

# DRAFT EIA / EMP REPORT

FOR

## PANAMOOPPANPATTI LIMESTONE MINE

### SITE DETAILS

Extent	3.07 Ha
Survey No.	132/1, 132/3(P)
Location	Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamilnadu
Land Type	Government Poromboke Land

### PROJECT DETAILS

Category	B1 - Sector 1(a)	
Type	Expansion	
Lease period	50 Years (02.02.1998-01.02.2048 as per MMDR Act, 2015)	
<u>PRODUCTION</u>	As per Existing EC	Proposed Expansion
Production	(1876T ROM) 563T of Limestone 1313T of Rejects	(74342.50T ROM) 52039.75 TPA of Limestone (Peak) 22302.75TPA of Rejects
Ultimate Depth	13m	34m
Mining Method	Opencast Mechanized	

### PROJECT PROPONENT

# B.THIRAVIAM

D.No.15/22A, Kavandanpatti Road, Usilampatti

### CONSULTANT

## CREATIVE ENGINEERS & CONSULTANTS

NABET ACCREDITED CONSULTANCY, NABL ACCREDITED TESTING LAB

9B/4, Bharathwajar Street, East Tambaram, Chennai-600059.

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**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**REVISIONS OF EIA/EMP REPORT**

Revision number	Report Status	Date of submission
00/APR/24	Draft EIA /EMP Report	08.04.2024

Environmental Impact Assessment & Environmental Management Plan Report for Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam is located in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu was prepared by Creative Engineers & Consultants and authorized for submission by Mr. P.Giri, CEO, of Creative Engineers & Consultants on 08.04.2024 after due review by the personnel and consultation with the proponent. Current Revision number of the EIA/EMP report is 00/APR/24, signifying as per the revision mentioned in the above table that this is a draft EIA/EMP report.

Signature: 

Date: 08.04.2024



## **PROJECT PROPONENT DECLARATION**

I, Tmt.B.Thiraviam received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their Letter SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024 for mining lease for Panamooppanpatti Limestone Mine at in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.

I have entrusted the EIA study to M/s. Creative Engineers & Consultants (CEC), Chennai who have been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India with their accreditation valid upto 11.06.2024.

The Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) have been prepared as per the generic structure proposed in the EIA notification 2006, ToR issued by SEIAA, Tamil Nadu. The prescribed ToR along with compliance is also incorporated in the EIA/EMP Report.

This report is prepared based on the information and data obtained from the Mining Plan and other records and the field study carried out by the consultant. The data given in the EIA/EMP report are factually correct to the best of my knowledge.

Signature:



**Tmt.B.Thiraviam**



# CREATIVE ENGINEERS & CONSULTANTS

(NABET ACCREDITED, NABL ACCREDITED TESTING LABORATORY,  
DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

## EIA Consultant Undertaking

[In compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

**Creative Engineers & Consultants** (CEC) is an NABL accredited testing Laboratory, and also NABET accredited Category–A environment consultancy organization for preparing EIA/EMP reports for the sectors Mining of minerals, Thermal power plants, Mineral Beneficiation & Cement plants.

CEC has been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India for empanelment of EIA Consultants with accreditation valid upto 11.06.2024.

Tmt.B.Thiraviam received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their Letter SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024 for mining lease for Panamooppanpatti Limestone Mine at in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.

The prescribed TOR is complied with and incorporated in the EIA Report and submitted. This report is based on the information and data obtained from Approved Mining Plan, other records and data from the field study by CEC. The data generated and given in the EIA/EMP Report are factually correct. The sample analyses are carried out through CEC's laboratory.

(P. Giri)

Chief Executive & EIA Coordinator

**Creative Engineers & Consultants**



Annexure – VII

**Declaration by Experts contributing to the EIA Report for**

**Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.**

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

EIA coordinator:



Name: **P.Giri**

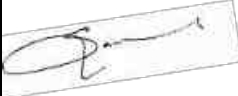
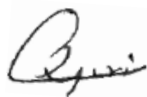



Signature and Date:





Period of involvement: **October 2023 onwards**



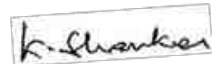
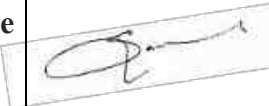
Contact information: **09444133619**

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP*	P.Giri	<ul style="list-style-type: none"> <li>• Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards.</li> <li>• Identification of sources of air pollution comprising dust, gaseous emission due to mining &amp; other activities</li> <li>• Identification of Impacts &amp; suggestion of mitigation measures</li> </ul> <b>Period: October 2023 onwards</b>	
		B.Swamynathan	<ul style="list-style-type: none"> <li>• Data interpretation of Micro meteorological data for wind rose.</li> <li>• Identification of polluting source and suggestion of suitable mitigation measures.</li> </ul> <b>Period: December 2023 onwards</b>	

2	WP*	G.Sandhya	<ul style="list-style-type: none"> <li>• Study of the monitored data with respect to the applicable standards.</li> <li>• Identification of Water requirement &amp; Source</li> <li>• Preparation of water balance diagram</li> <li>• Identification of Water polluting sources</li> <li>• Impact of the project on the water quality, both surface and groundwater</li> <li>• Suggestion of Mitigation measures to control water pollution</li> </ul> <p>Period: December 2023 onwards</p>	
3	SHW*	P.Giri	<ul style="list-style-type: none"> <li>• Quantification of mineral &amp; waste from mining operation</li> <li>• Waste disposal method evaluation</li> <li>• Providing dump management plan</li> <li>• Providing Surface Runoff Management Structure Requirements.</li> <li>• Identification of Hazardous waste and its details of disposal</li> </ul> <p>Period: October 2023 onwards</p>	
4	SE*	R.Baburaj	<ul style="list-style-type: none"> <li>• Identification of villages in the study area and finalization of demographic profile of the villages within the study area.</li> <li>• Preparation of sections relevant to SE functional area in the EIA/EMP report</li> </ul> <p>Period: December 2023 onwards</p>	
5	EB*	B.Swamynathan	<ul style="list-style-type: none"> <li>• Perusal of existing data relevant to this project.</li> <li>• Studying the details of flora and fauna, separately for core, buffer zone and forest area based on primary field survey.</li> <li>• Identification of species , Indicating the Schedule of the fauna present in the study area</li> <li>• Assessment of impact on Biological environment and suggestion of mitigative measures</li> <li>• Collecting &amp; providing details of existing and proposed Green belt development /plantation in the core zone</li> </ul> <p>Period: December 2023 onwards</p>	
6	HG*	K.Shankar	<ul style="list-style-type: none"> <li>• Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures</li> </ul>	

			<ul style="list-style-type: none"> <li>• Perusal of site specific ground water table details for the core zone and the study area.</li> <li>• Studied the hydrological aspects of surface and groundwater in study area</li> <li>• Study about impact on the hydrology due to mining operation</li> <li>• Suggesting mitigative measures like RWH for enhancement of ground water level</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
7	GEO*	K.Shankar	<ul style="list-style-type: none"> <li>• Study of geology of the ML area and the surrounding areas.</li> <li>• Provide details about Mineral composition</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
8	SC*	B.Swamynathan	<ul style="list-style-type: none"> <li>• Study of soil profile</li> <li>• Assessment of Impact on soil and suggesting plantation scheme.</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
9	AQ*	G.Sandhya	<ul style="list-style-type: none"> <li>• Quantification of emission particulars</li> <li>• Air quality modelling for post project impact on the air quality prediction of the study area.</li> </ul> <p>Analysis of the Isopleth generated</p> <ul style="list-style-type: none"> <li>• Arriving at the post project concentration at the AAQ monitoring locations</li> <li>• Preparation of meteorological data in suitable form for input into the model</li> <li>• Simulation of model for generation of Isopleth and data interpretation.</li> <li>• Studying the impact on AAQ monitoring locations due to the generated emissions.</li> <li>• Preparation of sections relevant to AQ functional area in the EIA/EMP report.</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
10	NV*	P.Giri	<ul style="list-style-type: none"> <li>• Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards.</li> <li>• Predict the noise level and vibration level due to proposed mining operation based on scientific evaluation.</li> <li>• Suggesting the Mitigation measures to control noise pollution, Suggesting the Mitigation measures to</li> </ul>	

			<p><b>control ground vibration</b>  <b>Period: October 2023 onwards</b></p>	
11	LU	<p><b>B.Swamynathan</b></p>	<ul style="list-style-type: none"> <li>• Collection of Remote sensing satellite data to study the land use pattern.</li> <li>• Primary field survey and limited field verification</li> <li>• Preparation of Land use map using Satellite data of the project area separately for the core zone and the buffer zone and providing the land use pattern.</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
		<p><b>G.Sandhya – Team Member</b></p>	<ul style="list-style-type: none"> <li>• Assisting the Expert in preparation of Land use map using Satellite data of the project area separately for the core zone and the buffer zone and providing the land use pattern.</li> </ul> <p><b>Period: February 2023 onwards</b></p>	
12	RH*	<p><b>K.Shankar</b></p>	<ul style="list-style-type: none"> <li>• Identified Major risks involved in the project Mitigation measures suggested to avoid risk.</li> <li>• Preparation of onsite and offsite emergency management plan</li> </ul> <p><b>Period: December 2023 onwards</b></p>	
		<p><b>G.Sandhya – Team Member</b></p>	<ul style="list-style-type: none"> <li>• Assisting the Expert in identification of major risks involved in the project and mitigation measures for the same.</li> </ul> <p><b>Period: February 2023 onwards</b></p>	


\*One TM against each FAE may be shown

\*\*Please attach additional sheet if required

**Declaration by the Head of the accredited consultant organization/ authorized person**

I, **P.Giri** hereby,confirm that the above mentioned experts prepared the EIA report for **Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.**

I also confirm that EIA Coordinator (EC) has gone through the report, and the consultant organization shall be fully accountable for any misleading information. It is certified that no unethical practices, plagiarism involved in carrying out the work and external data / text has not been used without proper acknowledgement while preparing this EIA report.

Signature: 

Name: **P.Giri**

Designation: **Chief Executive**

Name of the EIA consultant organization: **Creative Engineers & Consultants, Chennai – 59**

NABET Certificate No. & Issue Date: **No- NABET/EIA/2023/SA 0187 & date 30.01.2023**



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## National Accreditation Board for Education and Training



### Certificate of Accreditation

**Creative Engineers and Consultants,**  
9B/4, Bharathwajar street, East Tambaram, Chennai, Tamil Nadu

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

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	Thermal power plants	4	1 (d)	A
3	Mineral beneficiation	7	2 (b)	A
4	Cement Plants	9	3 (b)	A

**Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated Oct 4, 2022 posted on QCI-NABET website.**

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/23/2653 dated January 30, 2023. The accreditation needs to be renewed before the expiry date by Creative Engineers and Consultants, following due process of assessment.

Sr. Director, NABET  
Dated: January 30, 2023

Certificate No.  
NABET/EIA/2023/SA 0187

Valid up to  
December 23, 2023

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



## National Accreditation Board for Education and Training

# Certificate of Accreditation

### Creative Engineers and Consultants, Chennai

9B/4, Bharathwajar street, East Tambaram, Chennai, Tamil Nadu

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

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals- opencast mining only	1	1 (a) (i)	A
2.	Thermal power plants	4	1 (d)	A
3.	Mineral beneficiation	7	2 (b)	A
4.	Cement plants	9	3 (b)	A

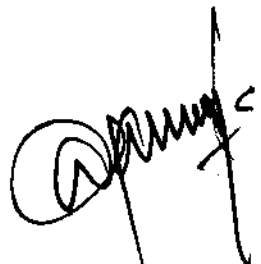
**Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated May 03, 2024, posted on QCI-NABET website.**

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3250 dated May 24, 2024. The accreditation needs to be renewed before the expiry date by Creative Engineers and Consultants, Chennai following due process of assessment.


Issue Date  
May 24, 2024

Valid up to  
December 23, 2026



  
Mr. Ajay Kumar Jha  
(Sr. Director, NABET)

Certificate No.  
NABET/EIA/23-26/RA 0331

  
Prof (Dr) Varinder S Kanwar  
(CEO-NABET)

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

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**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM –  
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(74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI  
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# **TERMS OF REFERENCE & ITS COMPLIANCE**



THIRU. RAHUL NADH, I.A.S.,  
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY-TAMILNADU  
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No.1, Jeenis Road, Saidapet,  
Chennai - 600 015.  
Phone No. 044-24359973  
Fax No. 044-24359975

**TERMS OF REFERENCE (ToR)**

**Lr.No.SEIAA-TN/E.No.10501/SEAC/I(a)ToR- 1663/2024 Dated: 08.02.2024.**

**To**

Tmt. B. Thiraviam,  
W/o Dr. K. Bose,  
No.9/1/22A, T.B.Road,  
Usilampatti Taluk,  
Madurai District.

**Sir / Madam,**

**Sub:** SEIAA, Tamil Nadu – Proposed Lime Stone quarry lease over an extent of 3.07.0 Ha at S.F.Nos. 132/1 & 132/3(P) of Panamooppampatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu by Tmt. B. Thiraviam- under project category – “B1” and Schedule S.No.1 (a) “Mining of Minerals Projects” – **ToR issued along with Public Hearing** - preparation of EIA report – Regarding.

**Ref:** 1. Online proposal No.SIA/TN/MIN/449390/2023, Dated: 19.10.2023.  
2. Your application submitted for Terms of Reference dated: 01.11.2023.  
3. Minutes of the 436<sup>th</sup> SEAC meeting held on 29.12.2023.  
4. Minutes of the 693<sup>rd</sup> SEIAA meeting held on 08.02.2024.

Kindly refer to your proposal submitted to the State Level Impact Assessment Authority for Terms of Reference.

The proponent, Tmt. B. Thiraviam has submitted an application for Terms of Reference (ToR) on 01.11.2023, for the Proposed Lime Stone quarry lease over an extent of 3.07.0 Ha at

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S.F.Nos. 132/1 & 132/3(P) of Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.

**Discussion by SEAC and the Remarks:-**

The proposal is placed for appraisal in the 436<sup>th</sup> SEAC meeting held on 29.12.2023. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).


**The SEAC noted the following:**

1. The project proponent, Tmt. B. Thiraviam has applied for Terms of Reference for the Proposed Lime Stone quarry lease over an extent of 3.07.0 Ha at S.F.Nos. 132/1 & 132/3(P) of Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.
2. The project/activity is covered under Schedule 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.

Now, the proposal was placed in the 436<sup>th</sup> SEAC meeting held on 29.12.2023. Based on the presentation and documents furnished by the proponent, committee noted the following

1. Earlier the Proponent had obtained Environmental Clearance vide Lr. No. SEIAA-TN/F.No.6355/1(a)/EC.No:5720/2018, dated: 09.05.2023 under 'B1' Category for Production for Five years, 563MT of production Limestone @30% and 1,313MT of rejects @70% with an ultimate depth of mining 13m BGL.
2. Now the proponent is proposing for an expansion in the production quantity with respect to the earlier issued Environmental clearance - 3,63,497.50 Tonnes of RoM, Production - 2,54,448.25 Tonnes @ 70% Recovery & 1,09,049.25 Tonnes of Mineral Reject. The annual peak production of RoM should not exceed 74,342.50 Tonnes. The ultimate depth of mining is 34m BGL.
3. MoEF&CC Office Memorandum Dated: 11.04.2022 regarding the Guidelines for granting Environmental Clearance (EC) under para 7(ii)(a) of EIA Notification, 2006 for expansion up to 50%, within the existing premises/ mine lease area, without additional land acquisition which inter alia states as follows
  - a) Under sub para (iv) of Para 4

*"The Proposed expansion shall not be more than 50% of production capacity as mentioned in prior EC, issued on the basis of public hearing held and the same shall be allowed in minimum three phases."*
  - b) Under para 5



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"Subject to the fulfilment of the conditions at Para 4 (i) to (viii) above, following procedure shall be adopted for processing the application for considering expansion of proposed project up to 50% of capacity as mentioned in the existing EC, in minimum three phases under Para 7(ii)(a) of EIA Notification, 2006.

c) Under para 8

"The projects that do not qualify with the above requirement shall continue to be considered on a case-to-case basis by the concerned EAC/ SEAC as per the provisions of para 7(ii)(a) who will decide whether Environmental Impact Assessment and public consultations need to be carried out."

Hence, based on the above facts and Office Memorandum issued by MoEF&CC issued from time to time, SEAC decided to recommend for grant of **Terms of Reference (TOR) with Public Hearing**, subject to the following TORs, as per the **Annexure I** of this minute, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report.

#### ANNEXURE I

1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:
  - (i) Original pit dimension
  - (ii) Quantity achieved Vs EC Approved Quantity
  - (iii) Balance Quantity as per Mineable Reserve calculated.
  - (iv) Mined out Depth as on date Vs EC Permitted depth
  - (v) Details of illegal/illicit mining
  - (vi) Violation in the quarry during the past working.
  - (vii) Quantity of material mined out outside the mine lease area
  - (viii) Condition of Safety zone/benches
  - (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.
2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.
3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it

  
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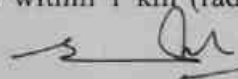
- belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
  5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
  6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
  7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.
  8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.
  9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
  10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
  11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.



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12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
  - Highest production achieved in any one year
  - Detail of approved depth of mining.
  - Actual depth of the mining achieved earlier.
  - Name of the person already mined in that leases area.
  - If EC and CTO already obtained, the copy of the same shall be submitted.
  - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
14. Quantity of minerals mined out.
  - Highest production achieved in any one year
  - Detail of approved depth of mining.
  - Actual depth of the mining achieved earlier.
  - Name of the person already mined in that leases area.
  - If EC and CTO already obtained, the copy of the same shall be submitted.
  - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,
17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along



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with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.

21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
28. Impact on local transport infrastructure due to the Project should be indicated.



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29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.



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38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.



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**Appendix - I**  
**List of Native Trees Suggested for Planting**

No	Scientific Name	Tamil Name	Tamil Name
1	<i>Aegle marmelos</i>	Vilvam	வில்வம்
2	<i>Adenaanthera pavonina</i>	Manjadi	மஞ்சாடி ஆனாக்கூண்டுமணி
3	<i>Albizia lebbek</i>	Vaagai	வாகை
4	<i>Albizia amara</i>	Usil	உசில்
5	<i>Bauhinia purpurea</i>	Mantharai	மந்தாரை
6	<i>Bauhinia racemosa</i>	Aathi	ஆத்தி
7	<i>Bauhinia tomentosa</i>	Iruvathi	இருவாத்தி
8	<i>Buchanania axillaris</i>	Kattuma	காட்டுமா
9	<i>Borassus flabellifer</i>	Parai	பனை
10	<i>Butea monosperma</i>	Murukkamaram	முருக்கமரம்
11	<i>Bobax ceiba</i>	Ilavu, Sevvilavu	இலவு
12	<i>Calophyllum inophyllum</i>	Punnai	புன்னை
13	<i>Cassia fistula</i>	Sarakondrai	சரக்கொன்றை
14	<i>Cassia roxburghii</i>	Sengondrai	செங்கொன்றை
15	<i>Chloroxylon stoeitema</i>	Purasamaram	பரசு மரம்
16	<i>Cochlospermum religiosum</i>	Kongu, Marjallavu	கோங்கு, மஞ்சள் இலவு
17	<i>Cordia dichotoma</i>	Naruvuli	நருவுளி
18	<i>Creteva adansonii</i>	Mavalingum	மாவிலங்கம்
19	<i>Dillenia indica</i>	Uva, Uzha	உசா
20	<i>Dillenia pentagyna</i>	SiruUva, Sitruzha	சீறு உசா
21	<i>Diospyro sebenuim</i>	Karungali	கருங்காலி
22	<i>Diospyro schloroxylon</i>	Vaganai	வாகனை
23	<i>Ficus amplissima</i>	Kalltchi	கல் இச்சி
24	<i>Hibiscus tilaceou</i>	Aatrupoovarasu	ஆற்றுப்புவரசு
25	<i>Hardwickia binata</i>	Aacha	ஆச்சா
26	<i>Holoptelia integrifolia</i>	Aayili	ஆயா மரம், ஆயிலி
27	<i>Lanea coromandelica</i>	Odhiam	ஒதியம்
28	<i>Lagerstroemia speciosa</i>	Poo Marudhu	பூ மருது
29	<i>Lepisanthus tetraphylla</i>	Neikottaimaram	நெய் கொட்டை மரம்
30	<i>Limonia acidissima</i>	Vila maram	வில்லா மரம்
31	<i>Litsea glutinos</i>	Pisinpattai	அரம்பா, பிசின்பட்டை
32	<i>Madhuca longifolia</i>	Illuppai	இலுப்பை
33	<i>Manilkara hexandra</i>	UlakkaiPaalai	உலக்கை பாலை
34	<i>Mimusops elengi</i>	Magizhamaram	மகிழ்மரம்
35	<i>Mitragyna parvifolia</i>	Kadambu	கடம்பு
36	<i>Morinda pubescens</i>	Nuna	நுணா
37	<i>Morinda citrifolia</i>	Vellai Nuna	வெள்ளை நுணா
38	<i>Phoenix sylvestre</i>	Eachai	ஈச்சமரம்
39	<i>Pongamia pinnat</i>	Pungam	புங்கம்

  
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40	<i>Premna mollissima</i>	Munnai	முள்ளை
41	<i>Premna serratifolia</i>	Narumunai	நறு முள்ளை
42	<i>Premna tomentosa</i>	Malaipoovarasu	மலை பூவரசு
43	<i>Prosopis cinerea</i>	Vanni maram	வணை மரம்
44	<i>Pterocarpus marsupium</i>	Vengai	வேங்கை
45	<i>Pterospermum canescens</i>	Vennangu, Tada	வெண்ணங்கு
46	<i>Pterospermum xylocarpum</i>	Polavu	புலவு
47	<i>Putranjiva roxburghii</i>	Karpala	கறிபாலா
48	<i>Salvadora persica</i>	Uga Maram	ஊகா மரம்
49	<i>Sapindus emarginatus</i>	Manipungai, Soapukai	மணிப்புங்கை சோப்புக்காய்
50	<i>Saraca asoca</i>	Asoca	அசோகா
51	<i>Streblus asper</i>	Piray maram	பிராய் மரம்
52	<i>Strychnos nuxvomica</i>	Yetti	எட்டி
53	<i>Strychnos potatorum</i>	Therthang Kottai	தேத்தான் கொட்டை
54	<i>Syzygium cumini</i>	Navai	நாவல்
55	<i>Terminalia bellieria</i>	Thandri	தாண்டி
56	<i>Terminalia arjuna</i>	Ven marudhu	வெண் மருது
57	<i>Toona ciliata</i>	Sandhana vembu	சந்தன வேம்பு
58	<i>Thespesia populnea</i>	Puvarasu	பூவரசு
59	<i>Walsuratrifoliata</i>	valsura	வால்கரா
60	<i>Wrightia tinctoria</i>	Veppalai	வெப்பாளை
61	<i>Pithecellobium dulce</i>	Kodukkapuli	கொடுக்காப்புளி

#### Discussion by SEIAA and the Remarks:-

The subject was placed in 693<sup>rd</sup> Authority meeting held on 08.02.2024. The authority noted that the subject was appraised in 436<sup>th</sup> SEAC meeting held on 29.12.2023.

The authority noted that the subject was appraised in 436<sup>th</sup> SEAC meeting held on 29.12.2023. Based on the presentation and documents furnished by the project proponent, SEAC after detailed deliberations, decided to **recommend the proposal for the grant of Terms of Reference (ToR)**. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the following conditions and the conditions mentioned in 'Annexure B' of this minute:

#### Annexure 'B'

##### Cluster Management Committee

1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.



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2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.
4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.
9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.

#### **Impact study of mining**

12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
  - a) Soil health & soil biological, physical land chemical features .
  - b) Climate change leading to Droughts, Floods etc.
  - c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
  - d) Possibilities of water contamination and impact on aquatic ecosystem health.
  - e) Agriculture, Forestry & Traditional practices.



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- f) Hydrothermal/Geothermal effect due to destruction in the Environment.
- g) Bio-geochemical processes and its foot prints including environmental stress.
- h) Sediment geochemistry in the surface streams.

#### **Agriculture & Agro-Biodiversity**

- 13. Impact on surrounding agricultural fields around the proposed mining Area.
- 14. Impact on soil flora & vegetation around the project site.
- 15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
- 16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
- 17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
- 18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

#### **Forests**

- 19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.
- 20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
- 21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
- 22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.

#### **Water Environment**

- 23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.



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24. Erosion Control measures.
25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.
28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.
29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.

#### **Energy**

31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.

#### **Climate Change**

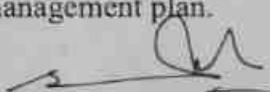
32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

#### **Mine Closure Plan**

34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

#### **EMP**

35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

  
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**Risk Assessment**

37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.

**Disaster Management Plan**

38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.

**Others**

39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.
40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.
41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

**A. STANDARD TERMS OF REFERENCE**

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/




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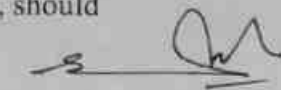
topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided,

  
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confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should



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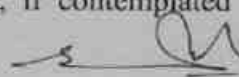
- also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.



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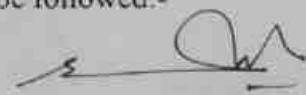
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including



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action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-



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- a) Executive Summary of the EIA/EMP Report
- b) All documents to be properly referenced with index and continuous page numbering.
- c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
- d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
- e) Where the documents provided are in a language other than English, an English translation should be provided.
- f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

**In addition to the above, the following shall be furnished:-**

**The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:**

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).



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2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.



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20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

**Besides the above, the below mentioned general points should also be followed:-**

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training



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SEIAA-TN**



(NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2<sup>nd</sup> December, 2009, 18<sup>th</sup> March 2010, 28<sup>th</sup> May 2010, 28<sup>th</sup> June 2010, 31<sup>st</sup> December 2010 & 30<sup>th</sup> September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.



**MEMBER SECRETARY**  
**SEIAA-TN**



**Copy to:**

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. Monitoring Cell, IA Division, Ministry of Environment, Forests &CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
5. The District Collector, Madurai District.
6. Stock File.

**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**TOR COMPLIANCE**

S.No	ToR Points	Reply	Pg. No
<b>A. ToR in Addition to Standard ToR</b>			
1	<p>In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</p> <p>a) Original pit dimension  b) Quantity achieved Vs EC Approved Quantity  c) Balance Quantity as per Mineable Reserve calculated.  d) Mined out Depth as on date Vs EC Permitted depth  e) Details of illegal/illicit mining  f) Violation in the quarry during the past working.  g) Quantity of material mined out outside the mine lease area  h) Condition of Safety zone/benches  i) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.</p>	<ul style="list-style-type: none"> <li>• Mining lease was initially executed in 1998. During this initial period, mining operations were carried out by the proponent in the lease area. Based on the letter obtained from Department of Geology &amp; Mining, Madurai vide. Roc.No.1123/2015-Mines dated 06.12.2017, it is seen that transport permit was issued on 08.06.2015 for 10T of Limestone. <b>(Annexure-5)</b></li> <li>• Further it states the following: “..the lessee has not applied for transport permit for transport limestone from 09.06.2015 to till date”.</li> <li>• Hence, it is observed that no mining operations were carried out subsequently.</li> <li>• Existing pit dimensions is provided in <b>Table 2.9, Chapter-II.</b></li> <li>• Environmental Clearance was obtained vide EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. <b>(Annexure-3)</b></li> <li>• The proponent has not commenced mining operations for this production quantity.</li> </ul>	<p><b>A-138</b></p> <p><b>2-21</b></p> <p><b>A-8</b></p>
2	<p>Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.</p>	<p>Letter has been obtained from VAO, Usilampatti regarding the details within 300m radius from the project and copy of the same is enclosed as <b>Annexure-14.</b></p>	<p><b>A-159</b></p>
3	<p>The proponent is requested to carry out</p>	<p>Details of the features produced within</p>	<p><b>2-15</b></p>



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	a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	500m radius are provided in <b>Figure 2.5, Chapter-II.</b>	
4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Hydrogeological Study is detailed under <b>Section 3.6, Chapter-III.</b>	3-43
5	The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	A detailed study of flora and fauna composition in the core and buffer zone of the project has been made through primary field surveys. The details are furnished in <b>Section 3.5, Chapter III.</b>	3-35
6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	Will be obtained	--
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and	Will be obtained	--



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	Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.		
8	However, in case of the fresh/virgin quarries, the proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.	Will be obtained	--
9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/ Class mines manager appointed by the proponent.	Enclosed as <b>Annexure-16</b>	<b>A-163</b>
10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	Controlled blasting will be adopted in this project and details of the same has been provided in <b>Section 4.4.2, Chapter-IV</b>	<b>4-19</b>
11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	Agreed	--
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	<ul style="list-style-type: none"> <li>• Mining lease was initially executed in 1998. During this initial period, mining operations were carried out by the proponent in the lease area. Based on the letter obtained from Department of Geology &amp; Mining, Madurai vide. Roc.No.1123/2015-Mines dated 06.12.2017, it is seen that transport</li> </ul>	<b>2-21</b>



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		<p>permit was issued on 08.06.2015 for 10T of Limestone.</p> <ul style="list-style-type: none"> <li>• Further it states the following: “..the lessee has not applied for transport permit for transport limestone from 09.06.2015 to till date”.</li> <li>• Hence, it is observed that no mining operations were carried out subsequently.</li> <li>• Existing pit dimensions is provided in <b>Table 2.9, Chapter-II.</b></li> <li>• Environmental Clearance was obtained vide EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. <b>(Annexure-3)</b></li> <li>• The proponent has not commenced mining operations for this production quantity.</li> </ul>	<b>A-8</b>
<b>13</b>	<b>What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?</b>	Replied above in point no.12	--
<b>14</b>	<p><b>Quantity of minerals mined out.</b></p> <ul style="list-style-type: none"> <li>•Highest production achieved in any one year</li> <li>•Detail of approved depth of mining.</li> <li>•Actual depth of the mining achieved earlier.</li> <li>•Name of the person already mined in that leases area.</li> <li>•If EC and CTO already obtained, the copy of the same shall be submitted.</li> <li>•Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.</li> </ul>	Replied above in point no.12	--
<b>15</b>	<b>All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet,</b>	<ul style="list-style-type: none"> <li>• Satellite imagery with corner coordinates of the project area is provided in <b>Figure</b></li> </ul>	<b>2-11</b>



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	topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	<p><b>2.5, Chapter-II.</b></p> <ul style="list-style-type: none"> <li>• Toposheet of the lease area and buffer zone is provided in <b>Figure 3.1, Chapter-III.</b></li> <li>• Geology, Geomorphology, Lithology map of the lease area and buffer zone is provided in <b>Figure 3.19, 3.20 and 3.21, Chapter-III.</b></li> </ul>	<p><b>3-2</b></p> <p><b>3-45</b></p>
16	The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,	Agreed	--
17	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Site photographs have been provided in Chapter-II.	2-12
18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	<ul style="list-style-type: none"> <li>• The details of geological and mineable reserves are provided in <b>Table 2.6, Chapter-II.</b></li> <li>• The production schedule during the plan period is provided in <b>Table 2.10, Chapter-II.</b></li> <li>• The working methodology is detailed under <b>Section 2.7, Chapter-II.</b></li> <li>• Anticipated impacts of mining operations on surrounding environment is provided under <b>Chapter-IV.</b></li> </ul>	<p><b>2-20</b></p> <p><b>2-22</b></p> <p><b>2-21</b></p> <p><b>4-1</b></p>
19	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The organization chart is provided as <b>Figure No.10.1, Chapter-X.</b>	10-1
20	The Project Proponent shall conduct the hydro-geological study considering the	Hydrogeological Study is detailed under	3-43



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	contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	Section 3.6, Chapter-III.	
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data on micro- meteorology, ambient air quality, Water quality, noise level, soil and flora & fauna are collected during Winter Season (December 2023 – February 2024) and detailed in <b>Section 3.3 to 3.5 of Chapter-III</b> . The details of Traffic Study is provided under <b>Section 4.9, Chapter-IV</b> .	3-11
22	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of air pollution, water pollution, & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	There are no other quarries within the 500m radius as per the letter obtained from Assistant Director, Geology & Mining vide Rc.No.1123/2015-Mines dated 25.04.2023. <b>(Annexure-15)</b>	A-161
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Water requirement for this project is 10 KLD. The required water will be procured initially from outside agencies. Later Rain water harvested in the mine sump can also be used.	2-31
24	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological	<ul style="list-style-type: none"> <li>The land use of the study area was studied to demarcate various LULC categories and its details are provided under <b>Section 3.4, Chapter-III</b>.</li> </ul>	3-30





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	features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	<ul style="list-style-type: none"> <li>The land use pattern at present and at the end of the quarrying period has been provided under <b>Section 4.5, Chapter-IV.</b></li> <li>The post mining land use has been provided in <b>Table No. 4.16, Chapter-IV.</b></li> </ul>	<b>4-21</b>
25	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	<ul style="list-style-type: none"> <li>A total waste of 41,000T and 1,09,049T of mineral reject will be generated during the plan period of 5 years. Mineral reject will be dumped in Waste Dump-1 and Overburden will be dumped in Waste Dump-2.</li> <li>During the conceptual period, the topsoil generated will be stored and used for plantation. The waste generated will be backfilled into the mined-out pit. The Mineral reject of 98,465m<sup>3</sup> will be dumped in Waste Dump-1 which will be stabilized by means of plantation ultimately.</li> </ul>	<b>2-30</b>
26	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not applicable	--
27	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	<ul style="list-style-type: none"> <li>The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc.</li> <li>Towards surface runoff management, a garland drain of length 890m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from</li> </ul>	<b>4-14</b>



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		<p>the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in <b>Figure No 4.4, Chapter-IV.</b></p> <ul style="list-style-type: none"> <li>• Details of rainwater harvesting are provided under <b>Section 4.3.4.2, Chapter-IV.</b></li> </ul>	
28	Impact on local transport infrastructure due to the Project should be indicated.	<ul style="list-style-type: none"> <li>• From this proposed quarry the entire output will be transported to the required customers.</li> <li>• About 1 trips per hour of transport is envisaged. The existing road can easily absorb this traffic due to this project. The details of various mitigative measures towards logistical system is elaborated under <b>Section 4.9, Chapter-IV.</b></li> </ul>	4-29
29	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	<ul style="list-style-type: none"> <li>• An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under <b>Section 3.5.1, Chapter-III.</b></li> </ul>	3-36
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Details of Mine Closure Plan is provided under <b>Section 7.5, Chapter-VII.</b>	7-9
31	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under <b>Section 3.5.1, Chapter-III.</b>	3-36
32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of	Agreed	--



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	native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.		
33	Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner	Agreed	--
34	A Disaster management Plan shall be prepared and included in the, EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The disaster management plan has been provided under <b>Section 7.3.1, Chapter-VII.</b>	7-1
35	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	Various risks likely to arise due to mining activities are detailed under <b>Section 7.3, Chapter-VII.</b>	7-2
36	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Details of occupational health and safety aspects are given under the subsections of <b>Section 4.8, Chapter-IV.</b>	4-27
37	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	<ul style="list-style-type: none"> <li>• Details of the socio-economic survey conducted in the buffer zone has been provided in <b>Section 3.2.4, Chapter-III.</b></li> <li>• Public health facilities will be further aimed to be developed through CER activities wherein periodic health checkups, medical camps for the locals</li> </ul>	3-9



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		will be conducted.	
38	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	<ul style="list-style-type: none"> <li>Nearby villages were visited for conducting study to know about socio-economic conditions, including aspirations and requirements of the people for a better living and collected relevant data. The details are provided under <b>Section 3.2.4, Chapter-III.</b></li> </ul>	3-9
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	There is no litigation pending against the project.	--
40	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	<ul style="list-style-type: none"> <li>The Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, health, infrastructural etc.</li> <li>Direct employment to about 22 people and indirect employment to scores of people.</li> <li>By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.5 Lakhs for various activities under CER for all the three projects together. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.</li> </ul>	8-1
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional office, Chennai (or) the concerned DEE/TNPCB.	<ul style="list-style-type: none"> <li>Environmental Clearance was obtained vide EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. <b>(Annexure-3)</b></li> <li>The proponent has not commenced mining operations for this production quantity.</li> </ul>	2-21



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42	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	Enclosed as <b>Annexure-16</b>	<b>A-163</b>
43	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Agreed	--
<b>Annexure-B</b>			
<b>Cluster Management Committee</b>			
1	<b>Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.</b>	<ul style="list-style-type: none"> <li>• There are no other quarries within the 500m radius as per the letter obtained from Assistant Director, Geology &amp; Mining vide Rc.No.1123/2015-Mines dated 25.04.2023. (<b>Annexure-15</b>)</li> <li>• Hence, cluster situation is not applicable.</li> </ul>	<b>A-161</b>
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, water sprinkling, tree plantation, blasting etc.,	Replied in point no.1	--
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Replied in point no.1	--
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	Replied in point no.1	--
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially	Replied in point no.1	--



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	during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.		
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	Replied in point no.1	--
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	Replied in point no.1	--
8	The committee shall furnish the Emergency Management plan within the cluster.	Replied in point no.1	--
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Replied in point no.1	--
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	Replied in point no.1	--
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	Replied in point no.1	--
<b>Impact Study of Mining</b>			
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the	<ul style="list-style-type: none"> <li>• As is it a mining project, no adverse generation of heat is envisaged.</li> <li>• Certified vehicles with low carbon emissions will only be used. These equipments will be properly and regularly maintained. Besides, regular vehicular emission tests will be done for</li> </ul>	<b>4-23</b>



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	<p>following:</p> <p>a) Soil health &amp; soil biological, physical land chemical features</p> <p>b) Climate change leading to Droughts, Floods etc.</p> <p>c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, &amp; Livelihood of the local people.</p> <p>d) Possibilities of water contamination and impact on aquatic ecosystem health</p> <p>e) Agriculture, Forestry &amp; Traditional practices.</p> <p>f) Hydrothermal/Geothermal effect due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress</p> <p>h) Sediment geochemistry in the surface streams</p>	<p>the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned.</p> <ul style="list-style-type: none"> <li>• Geologically the area in and around the lease area contains charnokite type rock formation containing mostly fallow land. As such there no major vegetation or agricultural activities are observed.</li> <li>• There are no Protected or Eco-Sensitive Zone or forest land nearby wherein it can have an impact.</li> <li>• It will be ensured that mining will be carried out adhering to all the statutory rules and regulations and maintaining the environmental quality within the prescribed standards by effective implementation of various mitigative measures.</li> <li>• These mitigative measures will be continued for the entire lease period ensuring no impact on the environment.</li> <li>• As such release of Greenhouse gases (GHG), rise in temperature, affecting livelihood of the local people, loss of Agriculture, Forestry and Traditional Practices is not envisaged. Such a limited scope will not induce any climatic change leading to droughts, floods etc.</li> </ul>	
<b>Agriculture &amp; Agro-Biodiversity</b>			
13	Impact on surrounding agricultural fields around the proposed mining Area.	Most of the study area remain uncultivated and only in patches of land away from the lease area, agricultural activities are carried during monsoon rainfall. Due to poor quality of the soil, inconsistent rainfall, water scarcity, high agricultural labor cost, manpower shortage and less yield are reason for very little agricultural activity in this region.	4-23
14	Impact on soil flora & vegetation around the project site.	The impact of mining on biological environment is provided under <b>Table 4.17, Chapter-IV.</b>	4-22
15	Details of type of vegetations including	The details of flora in the core zone is	3-40



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	no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	provided in <b>Table 3.24, Chapter-III</b> . There is no major clearance of vegetation or transplantation involved.	
16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under <b>Section 3.5.1, Chapter-III</b> .	3-40
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The post mining land use has been provided in <b>Table No. 4.16</b> . The post mining land use plan showing afforestation and water body is shown in <b>Figure No- 4.5, Chapter-IV</b> .	4-21
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	Most of the study area remain uncultivated and only in patches of land away from the lease area, agricultural activities are carried during monsoon rainfall. Due to poor quality of the soil, inconsistent rainfall, water scarcity, high agricultural labor cost, manpower shortage and less yield are reason for very little agricultural activity in this region.	4-23
<b>Forests</b>			
19	The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.	Vikkiramangalam R.F. is located at a distance of 320m in the south western side of the lease area. The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	4-22
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under <b>Section 3.5.1, Chapter-III</b> .	3-36
21	The Environmental Impact Assessment should study impact on standing trees	Replied in point 20. Above	--





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	and the existing trees should be numbered and action suggested for protection.		
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks. Corridors and Wildlife pathways. near project site.	There are no national parks or corridors in the 10k radius. There are no reserve forest in the proximity of the lease area	3-2
<b>Water Environment</b>			
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	Details of hydrogeological scenario of this project is provided under <b>Section 3.6, Chapter-III.</b>	3-45
24	<b>Erosion Control Measures</b>	<ul style="list-style-type: none"> <li>• Since the entire material from the quarry face will be directly dispatched to the consumers, there will not be any stockpiles. There are no waste dumps in this quarry. As such there will not be any wash out due to stock pile or waste dumps.</li> <li>• Towards surface runoff management, a garland drain of length 890m will be constructed around the quarry and will be connected to a settling pond with silt traps. Earthen bund provide of length 150m in southern side for safety barrier. The supernatant clear water from the settling pond will be flow to the downstream users.</li> </ul>	4-14
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby	There is no major waterbodies or drainage courses in and around the lease area. The nearest water body is Tirumangalam	4-14



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	Villages, Water-bodies/ Rivers, & any ecological fragile areas.	Canal which is beyond 3.88Km and Vaigai River which is at 3.4Km. No major impact is envisaged on the water bodies due to project operations	
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	There is no major perennial waterbody in close proximity of the lease area. The nearest water body is Tirumangalam Canal which is beyond 3.88Km and Vaigai River which is at 3.4Km.	3-3
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The post mining land use has been provided in <b>Table No. 4.16, Chapter-IV</b>	4-21
28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under <b>Section 3.5.1, Chapter-III</b> .	3-36
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	Soil samples were collected in 3 locations in the core and buffer zone to analyse the physiochemical characteristics of the soil in the area. The soil quality data is provided in <b>Table No.3.18, Chapter-III</b> .	3-28
30	The Environmental Impact Assessment should study on wetlands, water bodies, rivers steams, lakes and farmer sites.	<ul style="list-style-type: none"> <li>• The nearest major water bodies is provided in Table No.3.1, Chapter-III.</li> <li>• There is no major waterbodies or drainage courses in and around the lease area. The nearest water body is Tirumangalam Canal which is beyond 3.88Km and Vaigai River which is at 3.4Km. No major impact is envisaged on the water bodies due to project operations</li> <li>• From the previous hydrogeological study, it was seen that Perched local water table was inferred at 30-35m and the second fracture line is 50-60m in depth by electrical resistivity method. The yield from the top perched water is less and mainly post monsoon season</li> </ul>	3-2  4-15



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		only. From the pumping test, it is inferred that the transmissivity value is 0.6m <sup>2</sup> /day. Considering that the ultimate depth of mining is 34m, as such no groundwater intersection is envisaged.	
<b>Energy</b>			
31	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	The dust control measures are listed under <b>Table 4.1</b> , Water pollution control measures under <b>Section 4.3.2</b> , and noise pollution control measures under <b>Section 4.4.1.2, Chapter-IV</b> . Besides, energy consumption in this project will be optimum and as per requirement.	4-2
<b>Climate Change</b>			
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	Certified vehicles with low carbon emissions will only be used. These equipments will be properly and regularly maintained. Besides, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 1600 number of plants will be planted in and around the lease area.	4-23
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Replied in point no.32	--
<b>Mine Closure Plan</b>			
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Details of Mine Closure Plan is provided under <b>section 7.5, Chapter-VII</b> .	7-9
<b>EMP</b>			
35	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed environmental management plan is provided under <b>Chapter-X</b> .	10-1
36	The Environmental Impact Assessment should hold detailed study on EMP with	Detailed environmental management plan	10-1



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	budget for Green belt development and mine closure plan including disaster management plan.	is provided under <b>Chapter-X</b> .	
<b>Risk Assessment</b>			
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Various risks likely to arise due to mining activities are detailed under <b>Section 7.3, Chapter-VII</b> .	7-2
<b>Disaster Management Plan</b>			
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan has been provided under <b>Section 7.3.1, Chapter-VII</b> .	7-3
<b>Others</b>			
39	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites. Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel. river, lake pond, tank etc.	Letter has been obtained from VAO, Usilampatti regarding the details within 300m radius from the project and copy of the same is enclosed as <b>Annexure-14</b> .	A-159
40	As per the MoEF& cc office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management plan.	Agreed	--
41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and	Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be	4-30





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		Subsequently, application for renewal was submitted and the lease is deemed to be extended upto 01.02.2048 as per MMDR Act, 2015.	
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	The production capacity, quantity of waste, its management and mining technology in mine plan and EIA, etc., are compatible with one another.	--
4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	<ul style="list-style-type: none"> <li>• Satellite imagery with corner coordinates of the project area is provided in <b>Figure 2.5, Chapter-II.</b></li> <li>• Toposheet of the lease area and buffer zone is provided in <b>Figure 3.1, Chapter-III.</b></li> <li>• Geology, Geomorphology, Lithology map of the lease area and buffer zone is provided in <b>Figure 3.19, 3.20 and 3.21, Chapter-III.</b></li> </ul>	<p>2-11</p> <p>3-2</p> <p>3-45</p>
5	Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Replied in Standard ToR point no.4	--
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	Not Applicable	--
7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by	<ul style="list-style-type: none"> <li>• The proponent has framed a well-planned environmental policy. Its details are provided under <b>Section 10.2.1,</b></li> </ul>	10-1



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	its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	<p><b>Chapter-X.</b></p> <ul style="list-style-type: none"> <li>The Mines Manager will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided in <b>Figure No.10.1, Chapter-X.</b></li> </ul>	
8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Various risks likely to arise due to mining activities are detailed under section 7.4, Chapter-VII. This being an opencast mine, subsidence is not applicable. The impact due to ground vibrations due to blasting is given in <b>para 4.4.2, Chapter-IV.</b>	7-2  4-19
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The study area chosen for collecting existing environmental status covers 10 km radial distance from the project periphery ( <b>Figure No - 3.1, Chapter-III</b> ). Data given in the report is for the life of the mine.	3-2
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change	<ul style="list-style-type: none"> <li>The land use of the study area was studied to demarcate various LULC categories and its details are provided under <b>Section 3.4, Chapter-III.</b></li> <li>The land use pattern at present and at the end of the quarrying period has been provided under <b>Section 4.5.1, Chapter-IV.</b></li> <li>The post mining land use has been provided in <b>Table No. 4.17, Chapter-IV.</b></li> </ul>	3-30



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	of land use should be given.		
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	There are no OB dumps outside the lease area.	--
12	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not Applicable	--
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not Applicable	--
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable	--
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	There are no reserve forest in the proximity of the lease area	3-2





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16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	4-22
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	Replied in Standard ToR point No.16	--
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be	A detailed study of flora and fauna composition in the core and buffer zone of the project has been made through primary field surveys. The details are furnished in <b>Section 3.5, Chapter III.</b>	3-36



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	made as part of the project cost.		
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable	--
20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable	--
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shilling of village(s) including their R&R	The mining activities will be carried out within the mine lease areas only. Hence, the question of R& R does not arise.	7-9



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	and socio-economic aspects should be discussed in the Report.		
22	<p>One season (non-monsoon) (i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season) primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<ul style="list-style-type: none"> <li>The baseline data on micro-meteorology, ambient air quality, Water quality, noise level, soil and flora &amp; fauna are collected during Winter Season (December 2023 to February 2024) and detailed in para 3.3 to 3.5 of Chapter-III.</li> <li>Monitoring stations were selected taking into account, wind direction and location of sensitive receptors.</li> <li>Free silica composition in PM10 sample has been done and the values are found to be Below Detectable Limit (DL 0.05mg/m3) which is well within the prescribed limit of 5mg/m3.</li> </ul>	3-11
23	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p>	<ul style="list-style-type: none"> <li>Air quality modeling details are furnished in para 4.2.2 and its continuous sub paras in Chapter-IV of EIA report.</li> <li>The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion.</li> <li>The model simulations are done for the air pollutant arising from the mining operations, namely, PM10, PM2.5. Ground Level Concentration (GLC) have been computed using hourly meteorological data.</li> </ul>	4-2



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		<ul style="list-style-type: none"> <li>• The Isopleths of PM10, PM2.5 concentrations for with control measures scenario have also been drawn and these are given in Figure No.4.1 and 4.2.</li> <li>• It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM10 are within the statutory limits in each case.</li> </ul>	
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The water balance diagram for the same is shown in Figure No 4.3, Chapter-IV.	4-10
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable	--
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	<ul style="list-style-type: none"> <li>• The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc.</li> <li>• Towards surface runoff management, garland drain will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in Figure No 4.4, Chapter-IV.</li> <li>• The methods for reducing water</li> </ul>	4-14



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		consumption and rainwater harvesting is provided in section 4.3.4, Chapter-IV.	
27	Impact of the Project on the water quality, both surface and groundwater. should be assessed and necessary safeguard measures, if any required, should be provided.	<ul style="list-style-type: none"> <li>• There is no proposal to discharge any effluent into this water body.</li> <li>• The ultimate pit depth of mining is 34m. The ground water table in this area is below this level. Hence, ground water intersection in not envisaged and ground water will not be affected appreciably due to the quarrying operation.</li> </ul>	4-15
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	<ul style="list-style-type: none"> <li>• Hydrogeological study was conducted by Aadhi Bhoomi Mining &amp; Enviro Tech (P) Ltd., during the previous EIA/EMP Report. Perched local water table was inferred at 30-35m and the second fracture line is 50-60m in depth by electrical resistivity method. The yield from the top perched water is less and mainly post monsoon season only. From the pumping test, it is inferred that the transmissivity value is 0.6m<sup>2</sup>/day. From the hydrogeological study it is understood that the study area is composed of Limestone deposit, with little top soil capping and Kankar.</li> <li>• In the nearby region, the formations are compact with less intergranular porosity and fractures leading to less permeability and transmissivity values and as such the ground water level in this area is deep from surface. No major water seepage within the mine is expected from the periphery. The ultimate pit depth of mining is 34m. The ground water table in this area is below this level. Hence, ground water intersection in not envisaged and ground water will not be affected appreciably due to the quarrying operation.</li> <li>• Details of hydro geological study are given in Para 3.6, Chapter – III.</li> </ul>	4-15



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29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Replied above in Standard ToR point No.27.	--
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The ultimate pit depth of mining is 35m. The ground water table in this area is below this level.	4-15
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phasc-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	In the lease area, safety barrier 7.5m around the periphery is left. About 1600 trees will be planted in and around the lease area. The details of proposed plantation is provided under Table 4.18, Chapter-IV.	4-25
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies	From this proposed quarry the entire output will be transported to the nearby customers. Details of the traffic study is provided under section 4.9, Chapter-IV.	4-29



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	such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.		
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.	2-32
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	The post mining land use has been provided in Table No. 4.15. The post mining land use plan showing afforestation and water body is shown in Figure No- 2.16.	4-21
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed	Details of occupational health and safety aspects are given under the subsections of Para 4.8, Chapter-IV.	4-27
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations	<ul style="list-style-type: none"> <li>• Details of the socio economic survey conducted in the buffer zone has been provided in Para 3.2.4, Chapter-III.</li> <li>• Public health facilities will be further aimed to be developed through CER activities wherein periodic health checkups, medical camps for the locals will be conducted.</li> </ul>	3-9
37	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given	Nearby villages were visited for conducting study to know about socio-economic conditions, including aspirations and requirements of the people for a better living and collected relevant data. The details are provided under section	3-9



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	with time frames for implementation.	3.2.4, Chapter-III.	
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed environmental management plan is provided in Chapter-X.	10-1
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	<ul style="list-style-type: none"> <li>This draft EIA/EMP report will be submitted for public hearing as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures.</li> <li>The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.</li> </ul>	7-1
40	Details of litigation pending against the project, if any, with direction /order paced by any Court of Law against the Project should be given.	There is no litigation pending against the project.	--
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The cost of the project is Rs.160 Lakhs The capital and recurring cost of the project is provided under Table No.10.1, Chapter-X.	2-17
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	The disaster management plan has been provided under section 7.4.1, Chapter-VII.	7-14





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43	<p><b>Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.</b></p>	<p>The Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, health, infrastructural etc.</p> <p>Direct employment to 22 people and indirect employment to scores of people.</p> <p>By means of carrying out the socio economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs. 5 Lakhs for various activities under CER. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.</p>	8-1
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# **CHAPTER - I**



**INTRODUCTION**

**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**CHAPTER 1**

**INTRODUCTION**

**1.1 PURPOSE OF THE REPORT:**

**Tmt.B.Thiraviam’s Panamooppanpatti Limestone Mine** over an area of 3.07 Ha is located in Survey No. 132/1 and 132/3 (P) in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu. The lease was executed on 02.02.1998 and the lease is deemed to be extended upto 01.02.2048 as per MMDR Act, 2015. Only small scale mining operation is carried out by the lessee in this lease and no mining in this lease is carried out since 09.06.2015 for want of EC.

Environment Clearance for this project was obtained recently vide Lr.No.SEIAA-TN/F.No.6355/1(a)/ EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl after conducting public hearing for this capacity on 23.02.2021.

The proponent has not recommenced mining operations so far since the envisaged production capacity is very low and it will not be economical.

As such, now It is proposed to expand the production capacity from 563T of Limestone and 1313T of rejects (1,876T ROM) upto a depth of 13m to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.

As per MoEF&CC notification vide S.O.1533(E) dated 14.09.2006 and its subsequent amendments, non-coal mining projects are divided into the following categories as mentioned in Table No.1.1.

**Table 1.1: Screening of Schedule 1(a) Projects**

MoEF&CC Notification reference	Project or Activity		Category with threshold limit		Conditions if any
			A	B	
S.O. 1886(E) dated 20.04.2022	1 (a)	Mining of Minerals	> 250 Ha of mining lease area in respect of non-coal mine lease	All mining lease area in respect of minor minerals leases and ≤ 250 Ha mining lease area in respect of major mineral mining lease other than coal.	General condition shall apply

Source: MoEF&CC Notifications S.O.1533(E) dated 14.09.2006, S.O.3977(E) dated 14.08.2018, S.O.3194(E) dated 14.07.2022



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Considering that this is a limestone mining project which is a major mineral with a lease area of 3.07Ha, this project falls under Sector 1(a) i.e.; Mining of Minerals under Category B1 and as per MoEF & CC notification, this expansion proposal necessitates preparation of EIA/EMP report along with public hearing and the PP has initiated action towards the same.

This EIA/EMP report is prepared for this expansion proposal based on standard and additional Terms of Reference issued by SEIAA, Tamil Nadu vide letter no. SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024 and is in conformance of the generic structure prescribed by MOEF&CC in their notification of September 2006 and the approved mining plan.

**1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT:**

Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam is located in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu. The entire lease area of 3.07Ha is a non-forest Government poromboke land. Site vicinity map has been described in Figure 1.1. The mined out limestone will be transported to Kappaloor and Dindigul for the end users.

**Figure 1.1: Site Vicinity Map**



Source: Google Earth



**Creative Engineers & Consultants**

**CHAPTER-1 : INTRODUCTION**

**PRO CODE: CEC/EMP/MI-212**

**REV NO : 00/APR/24**

**1-2**

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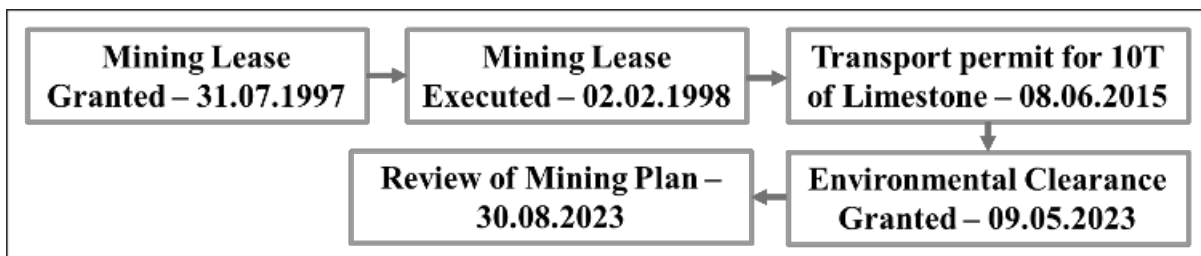
**Table 1.2 Identification of project**

1	<b>Project Name</b>	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
2	<b>Extent</b>	3.07 Ha
3	<b>Production</b>	Expansion in production capacity from 563T of Limestone and 1313T of rejects (1,876T ROM) upto a depth of 13m to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.
4	<b>Ultimate Depth</b>	34m
5	<b>Land Classification</b>	Government Poromboke Land
6	<b>Location</b>	<b>Survey Number:</b> 132/1, 132/3(P)
		<b>Village:</b> Panamooppanpatti
		<b>Taluk:</b> Usilampatti
		<b>District:</b> Madurai
		<b>State:</b> Tamil Nadu

Source: Review of Mining Plan

**History of the project:**

**Figure 1.2: Chronology of the project**



**Mining Lease:** Mining lease was granted for a period of 20 years under G.O.3(D) No.124/Industries (MMD2) Dept. dated 31.07.1997. **(Annexure-1)** The lease was executed on 02.02.1998 and was valid upto 01.02.2018. **(Annexure-2)** Subsequently, application for renewal was submitted and the lease is deemed to be extended upto 01.02.2048 as per MMDR Act, 2015.

**Production:** During this initial period, mining operations were carried out by the proponent in the lease area. Based on the letter obtained from Department of Geology & Mining, Madurai vide. Roc.No.1123/2015-Mines dated 06.12.2017, it is seen that transport permit was issued on 08.06.2015 for 10T of Limestone. Further it states the following: “..the lessee has not applied for



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transport permit for transport limestone from 09.06.2015 to till date”. Hence, it is observed that no mining operations were carried out subsequently.

**Environmental Clearance:** Environment Clearance for this project was obtained recently vide Lr.No.SEIAA-TN/F.No.6355/1(a)/ EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. **(Annexure-3)** The proponent has not commenced mining operations for this production quantity so far.

**Review of Mining Plan for expansion:** Subsequently, Review of Mining Plan for the period 2023-24 to 2027-28 was obtained from IBM vide Lr.No. TN/MDR/ROMP/LST-1712.MDS dated 30.08.2023. **(Annexure-4)** Further explorations carried out for the purpose of preparation of this mining plan shows the availability of 6,97,713T of Limestone as mineable reserves as against the previously approved quantity of 12,135T of Limestone of mineable reserves provided in the Review of Mining Plan for the period 2018-19 to 2022-23.

Due to the availability of good quantum of limestone reserves, and also owing to better cost-benefit of mining operations, it is proposed to expand the peak production capacity to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) and total five-year production of 254448.30T of Limestone and 109049.00T of Mineral Reject (363498.00T ROM) upto a depth of 16m during plan period and total ultimate depth of 34m.

**Table 1.3: Identification of Project Proponent**

1	<b>Proponent Name</b>	Tmt.B.Thiraviam
2	<b>Address</b>	No. 9/1/22A,T.B. Road, Usilampatti Taluk, Madurai District
3	<b>Contact Number</b>	9790447881
4	<b>Email-ID</b>	kb.kannan@gmail.com

The Proponent can meet the requirement the financial requirement of this project and will ensure that the mining activities are carried out as per statutory requirements.



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**1.3 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION & PROJECT IMPORTANCE**

**Table 1.4: Brief Description of Nature of project**

1.	<b>Sector</b>	1(a), Non-Coal Mining
2.	<b>Type</b>	Expansion Project
3.	<b>Category</b>	B1
4.	<b>Mineral Mined</b>	Limestone
5.	<b>Major/Minor Mineral</b>	Major
6.	<b>Mining method</b>	Opencast Semi mechanized Mining
7.	<b>End use</b>	The mined out limestone will be transported to Kappaloor and Dindigul for the end users.

**Table 1.5: Location of the project**

S.No	Particulars	Details
1.	<b>Location</b>	Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.
2.	<b>Corner Coordinates</b>	<b>Latitude</b> : 10°02'54.58" N to 10°03'2.38" N <b>Longitude</b> : 77°51'2.38" E to 77°51.10.35" E
3.	<b>Toposheet Number</b>	132/1, 132/3(P)

Location details are elaborated in Para 2.3, Chapter-II.

**1.3.1 IMPORTANCE TO THE COUNTRY AND REGION:**

The Limestone mined out from this quarry will meet the raw material requirement of the nearby cement plants. This project in the area will provide both direct and indirect employment opportunities through allied opportunities in logistics, trading, repairing works etc., improved per capita income for local people, improved social welfare facilities like infrastructural build-up, improvement in facilities due to the proposed CER activities of the proponent etc.

**1.4 SCOPE OF THE STUDY:**

Particulars	Details
<b>Proposal no</b>	SIA/TN/MIN/449390/2023 dated 19.10.2023
<b>File no</b>	F.No.10501
<b>SEAC meeting for issue of TOR</b>	436 <sup>th</sup> SEAC Meeting dated 29.12.2023
<b>SEIAA meeting for</b>	693 <sup>rd</sup> SEIAA Meeting dated 08.02.2024



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<b>issue of TOR</b>	
<b>Terms of Reference for expansion</b>	SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024
<b>Baseline Data Collection</b>	Carried out by Creative Engineers & Consultants , Chennai for Winter Season (Dec 2023 to Feb 2024)

Based on the terms of reference, data collection, the Environmental Impact Assessment was carried out for the project area (core zone and the buffer zone (10km radius from the core zone) and the following studies were covered:

- Collection of primary and secondary data relevant to the project.
- One-Season baseline monitoring for environmental parameters such as air, water, noise, soil, flora & fauna, etc. Analysis of parameters in in-house laboratory.
- Documentation of EIA/EMP report with inclusion of relevant studies conducted by other bodies into the EIA/EMP report.
- Identification of significant environmental parameters that are prone to get affected due to pollution. Namely, Air, Water, Noise, Soil, Biological and Land Environment.
- Evaluation and determination of suitable mitigation measures to reduce and control the said pollution.
- Prediction of post project concentration (baseline + incremental) with respect to air environment for core zone and buffer zone.
- Formulation of an Environmental Management plan including administrative aspects for proposed implementation of mitigative measures in time.

This draft EIA/EMP report will be submitted for public consultation, as per rules and procedures in this respect, as per the EIA notification 2006. The opinions, concerns and objections, if any, of the surrounding public and other stake holders connected, will be taken into consideration and compliance report thereon will be submitted to SEIAA, Tamil Nadu in the final EIA/EMP report.





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## **1.5 LEGAL AND REGULATORY FRAMEWORK:**

The Ministry of Environment, Forests & Climate Change, State and Central Pollution Control Board are the primary operational agencies/ regulation agencies in India with respect to Environment. The various environmental regulations and subsequent amendments which govern the project have been provided below:

- ❖ Environment Protection Act, 1986
- ❖ EIA Notification, 2006
- ❖ Air (Prevention and Control of Pollution) Act, 1981
- ❖ Water (Prevention and Control of Pollution) Act, 1974
- ❖ Noise Pollution (Prevention & Control) Rules, 2000
- ❖ Solid Waste Management Rules, 2016
- ❖ Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2016
- ❖ Mines-Act 1952
- ❖ Mines & Minerals (Regulation and Development) Act, 1957
- ❖ Metalliferous Mines Regulations (MMR), 1961
- ❖ Explosives Rules, 2018

## **1.6 STRUCTURE OF THE EIA/EMP REPORT:**

**Chapter-1: Introduction:** This chapter provides the background information of the project, brief description of nature, size and location of proposed project, environmental setting of project, importance of project and scope of the study.

**Chapter-2: Project Description:** This chapter deals with the need for the project, location, project implementation, details of mining activity, other technical and design details.

**Chapter-3: Description of the Environment:** This chapter presents the methodology and findings of one season field study undertaken to establish the environmental baseline conditions, which is also supplemented by secondary published literature.



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**Chapter-4: Anticipated Environmental Impact & Mitigation Measures:** This chapter cover detailed impact of the proposed project on different environmental components during operation phase of mining project. The chapter will also deal with the measures to be adopted to mitigate the adverse impact of the proposed mine development and underscores the areas of concern, which need mitigation measures.

**Chapter-5: Analysis of Alternatives (Technology & Site):** This chapter describes the analysis of various alternative sites and the technology considered for the mining activities.

**Chapter-6: Environmental Monitoring Program:** This chapter presents the environmental monitoring requirements for effective implementation of mitigatory measures during operational phase of the proposed project. The frequency and reporting of monitoring programme is also outlined in this chapter along with its cost.

**Chapter-7: Additional Studies:** This chapter describes various risks associated during operational stage of the project. A disaster management plan to minimise the risks or to combat the associated risks is also discussed. The public hearing details will be incorporated in this chapter in the final EIA/EMP after the successful completion of public hearing. The summary of additional studies and mine closure plan is also briefed here.

**Chapter-8: Project Benefits:** This chapter describes various benefits of the project to the community in the vicinity and as well as to the region on the whole.

**Chapter-9: Environmental Cost Benefit Analysis:** This chapter has to be carried out if specifically required as per scoping stage. As this is not specifically mentioned in scoping, accordingly detailed study in this regard is not carried out.

**Chapter-10: Environment Management Plan:** This chapter presents the details of institutional arrangements for environment protection and conservation and the capital and recurring cost of implementing the various mitigation measures stated in this EIA/EMP report.

**Chapter-11: Summary and Conclusions:** This chapter contains the summary and conclusion of the overall EIA studies.



**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**Chapter-12: Disclosure of Consultants Engaged:** This chapter contains the list of various experts engaged in preparing the EIA report along with brief description of the consultancy services.

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# **CHAPTER - II**

## **PROJECT DESCRIPTION**

## **CHAPTER 2**

### **PROJECT DESCRIPTION**

#### **2.1 TYPE OF PROJECT:**

This proposal involves expansion in production capacity from 563T of Limestone and 1313T of rejects (1,876T ROM) upto a depth of 13m to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.

#### **2.2 NEED & JUSTIFICATION FOR THE PROJECT:**

Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam is an existing mine for which environmental clearance was granted on 09.05.2023. However, the production for this approved quantity has not been carried so far. This proposed expansion is with respect to production and not the lease area. It will result in further growth with regards to employment and livelihood. Implementation of environmental control measures is envisaged to negate the negative environmental impacts to a suitable amount. This project is proposed to be carried out for the following reasons:

##### **A) Availability of good quality proved reserves:**

This review of mining plan shows the availability of 6,97,713T of Limestone as mineable reserves as against the previously approved quantity of 12,135T of Limestone of mineable reserves provided in the Review of Mining Plan for the period 2018-19 to 2022-23. Due to the availability of more quantum of limestone reserves as identified in the subsequent detailed exploration, and also owing to better cost-benefit of mining operations, it is proposed to expand the production capacity.

##### **B) Techno economic viability of the scheme:**

Mechanized opencast method of mining with conventional drilling and blasting is proposed in the mine, which is a proven technology in our country. With good market demand it is economically viable. Under the above circumstances it can be concluded that techno economically this scheme is feasible.



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**C) Economic and Socio Economic Benefits:**

Enhanced revenue to Government by way of Royalty, DMF, NMET etc., Socio economic benefit to the locals due to CSR/CER activities

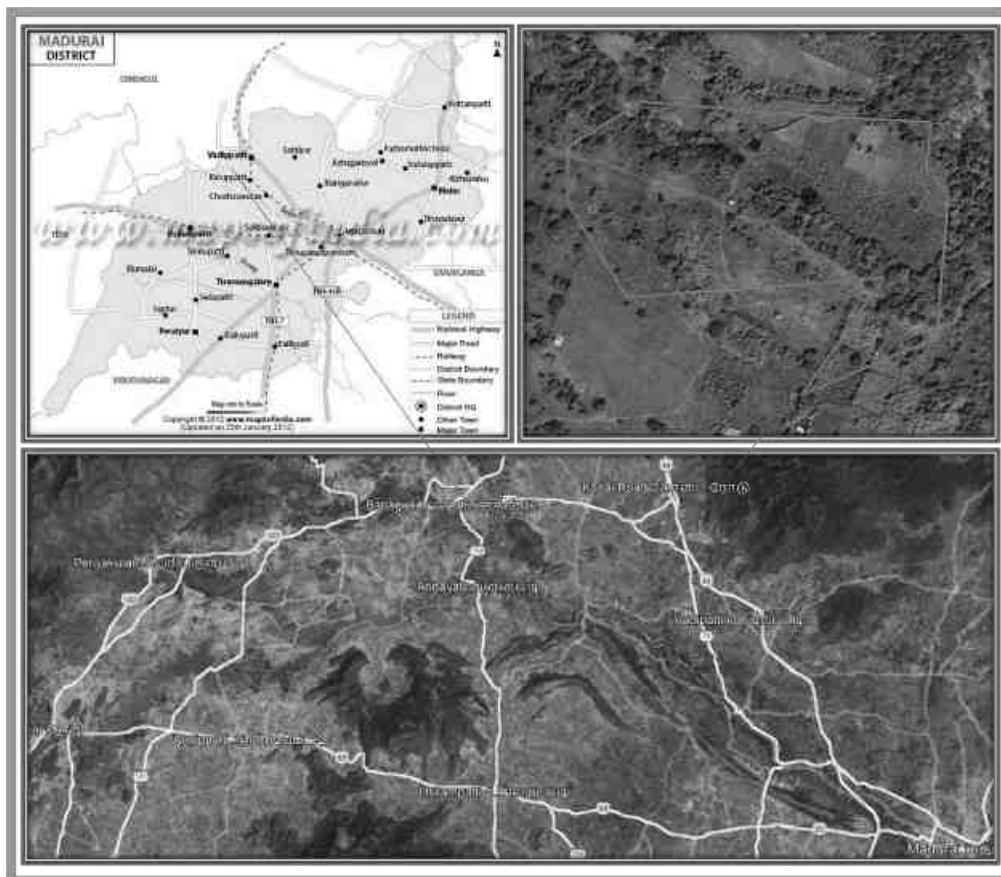
Considering all the above said favorable factors it is practically possible to achieve the proposal within the planned period and this proposal is fully justified.

**2.3 LOCATION:**

**A. Location of the project:**

The lease area is located in Panamoopanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu. The location map has been shown below in Figure 2.1.

**Figure 2.1: Location Map**



Source: Google Earth

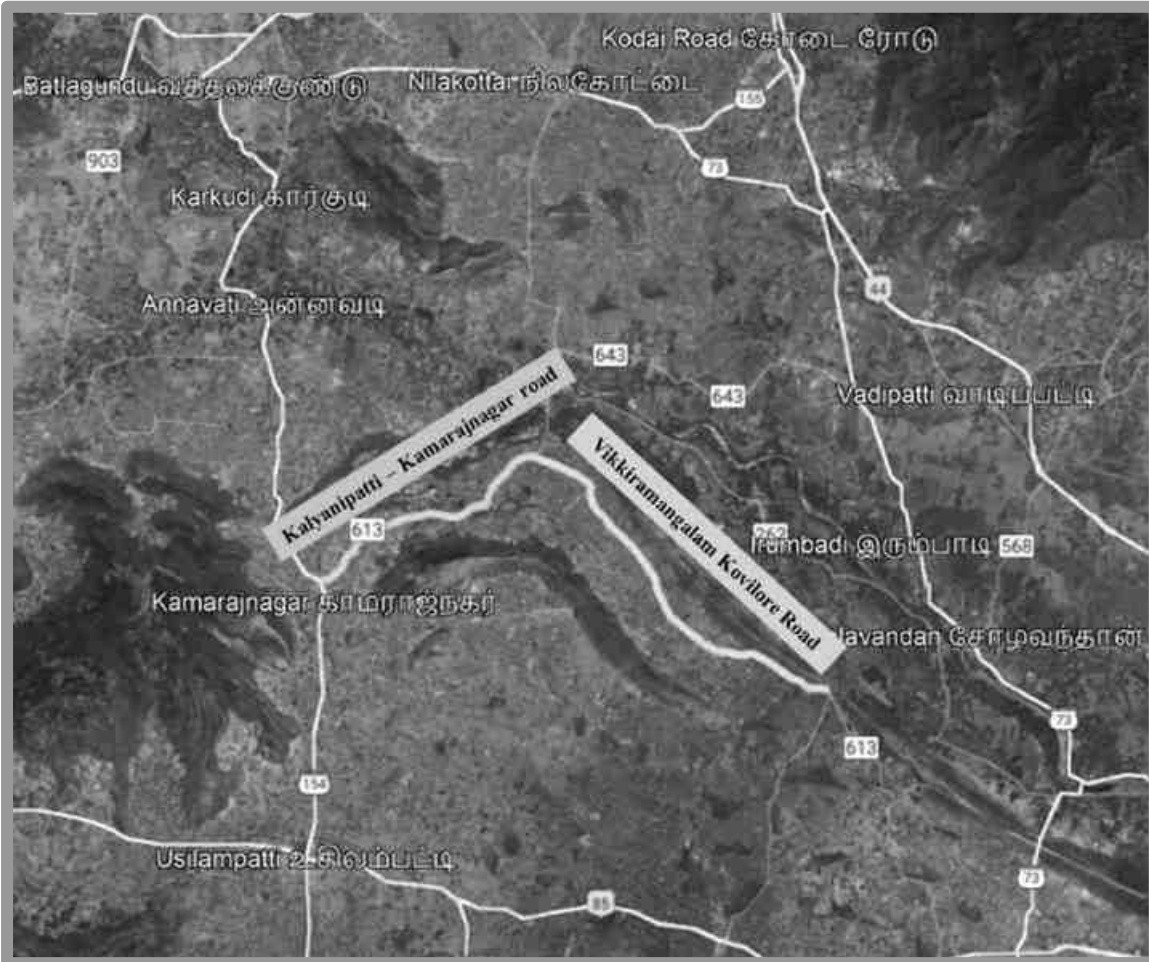


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**B. Approachability of the lease area:**

The lease area is accessible from Panamoopanpatti village from Vikkiramangalam Kovilore Road about 1.5Km on the eastern side of the lease area which joins Kalyanipatti – Kamarajnapur road on the northern side of the lease area.

**Figure 2.2: Approachability Map**



Source: Google Earth

**Table 2.1: Description of approach**

<b>Nearest Village</b>	Karattuppatti – 550m , NE
<b>Nearest Highway</b>	SH-154, Usilampatti – Vattalagundu – 6.5Km - W
<b>Nearest Railway Station</b>	Sholavandan R.S – 12.5 Km-E
<b>Nearest Airport</b>	Madurai – 33Km - SE



**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**C. Land Use Details:**

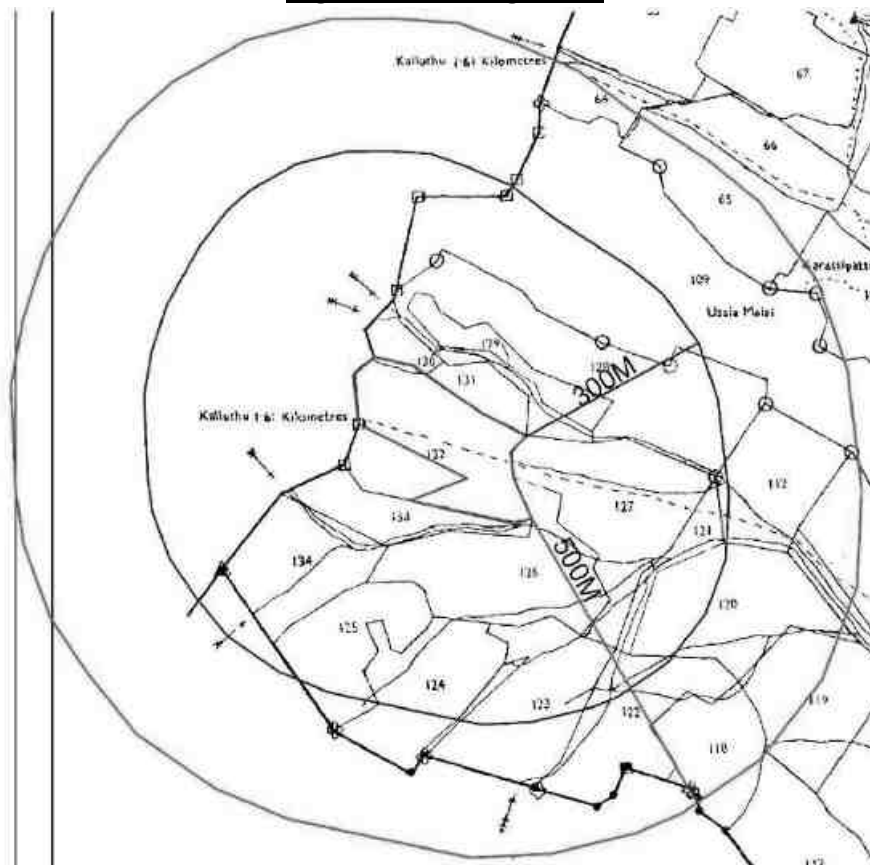
The lease area of 3.07Ha is a Government Poromboke Land located in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu over Survey Nos. 132/1 and 132/3 (P).

**Table 2.2: Survey No. wise breakup**

Survey Number	Area (Ha)
132/1	2.50.5
132/3 (P)	0.56.5
<b>Total</b>	<b>3.07.0</b>

Source: G.O.3(D) No.124 dated 31.07.1997

**Figure 2.3: Village Map**



The present land use of this project has been provided in the Table 2.2 below. A safety distance of 7.5m width has been left in the lease periphery. Lease plan has been shown below in Figure 2.2.





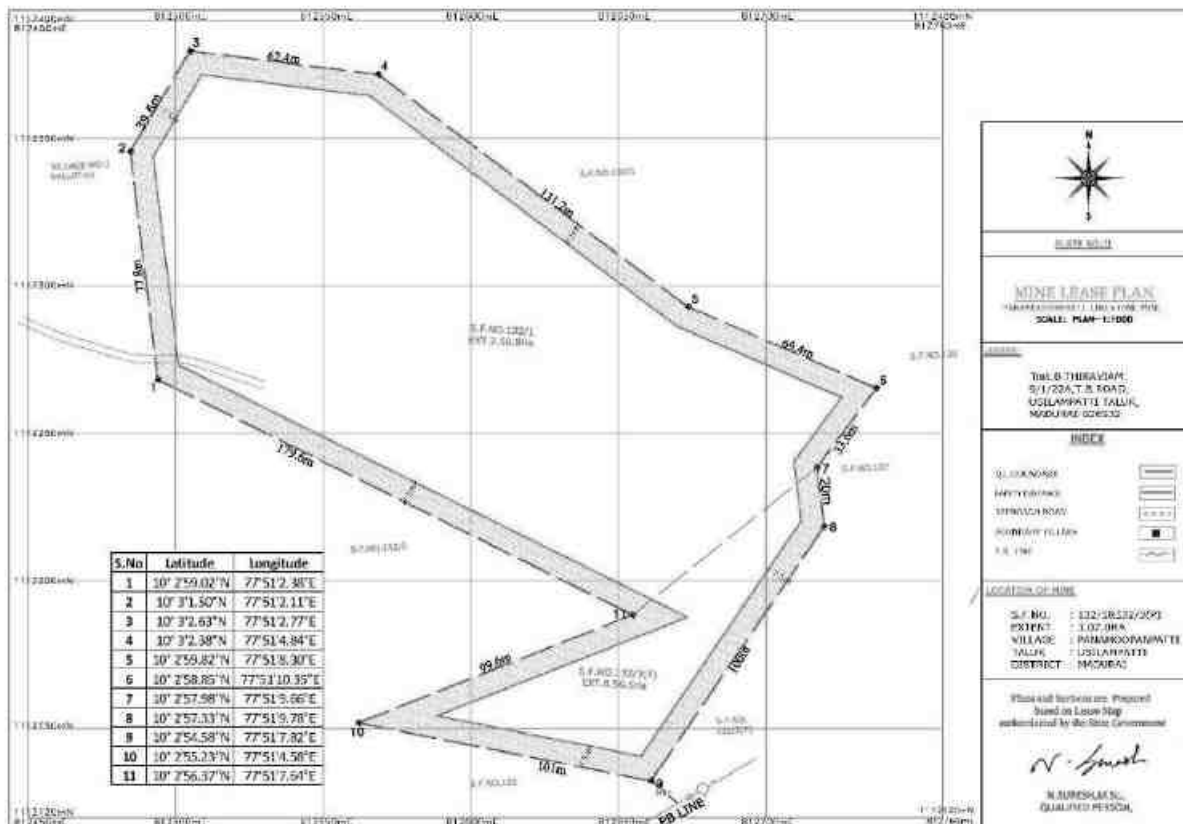
**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Table 2.3: Present Land Use**

S.No	Land Use	Present Land Use (Ha)
1	Quarrying Pit	0.05.20
2	External Dump	--
3	Infrastructure	0.01.00
4	Roads	0.02.00
5	Green Belt	0.58.60
6	Unused Land	2.40.20
	<b>Total</b>	<b>3.07.00</b>

Source: Approved Mining Plan

**Figure 2.4: Lease Plan**



Source: Approved Mining Plan

**D. Coordinates of the lease area:**

The lease area is bounded by latitudes 10°02'54.58" N to 10°03'2.63" N and longitudes 77°51'2.11" E to 77°51.10.35" E. The list of coordinates as per the approved mining plan has been provided below:



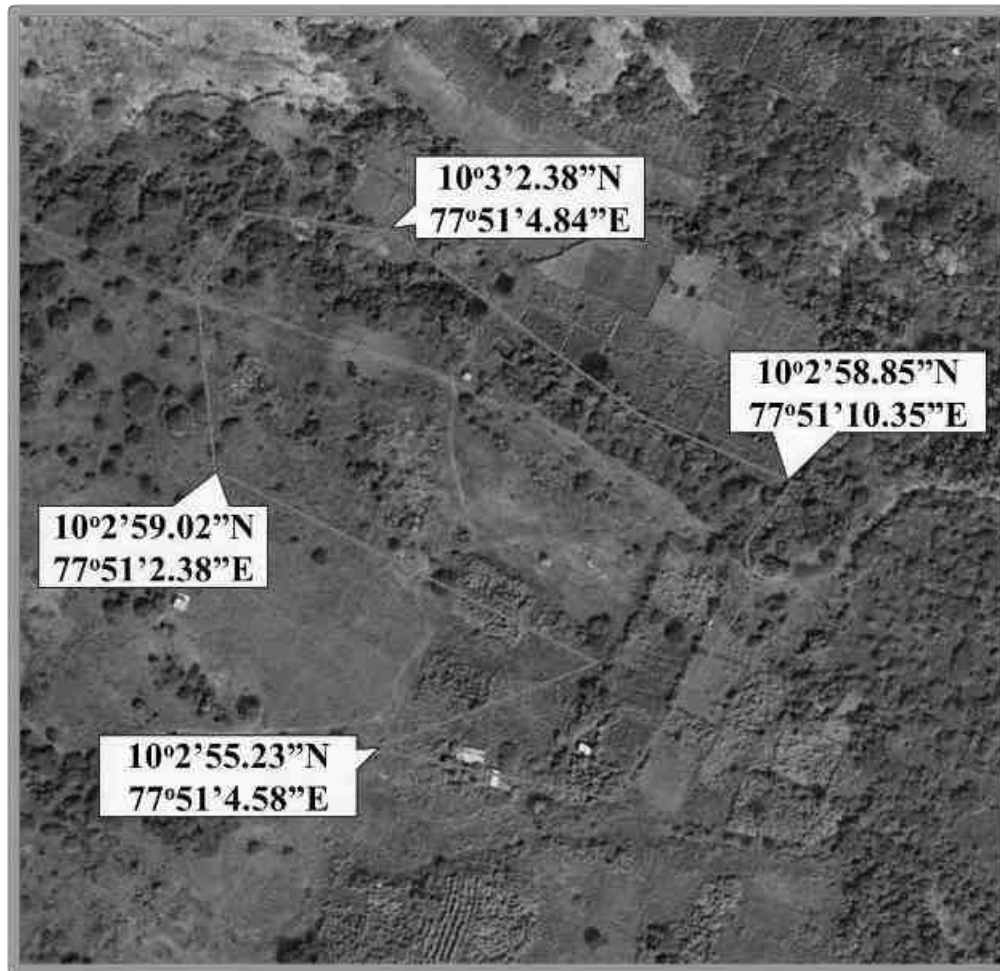
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**Table 2.4: Coordinates of the lease area**

S.No	Latitude	Longitude
1	10°02'59.02" N	77°51'2.38" E
2	10°03'1.50" N	77°51'2.11" E
3	10°03'2.63" N	77°51'2.77" E
4	10°03'2.38" N	77°51'4.84" E
5	10°02'59.82" N	77°51'8.30" E
6	10°02'58.85" N	77°51'10.35" E
7	10°02'57.98" N	77°51'9.66" E
8	10°02'57.33" N	77°51'9.78" E
9	10°02'54.58" N	77°51'7.82" E
10	10°02'55.23" N	77°51'4.58" E
11	10°02'56.37" N	77°51'7.64" E

Source: Approved Mining Plan

**Figure 2.5: Satellite Imagery Showing Corner Co-ordinates of the Project Area**



Source: Google Earth



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USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**SITE PHOTOGRAPHS**



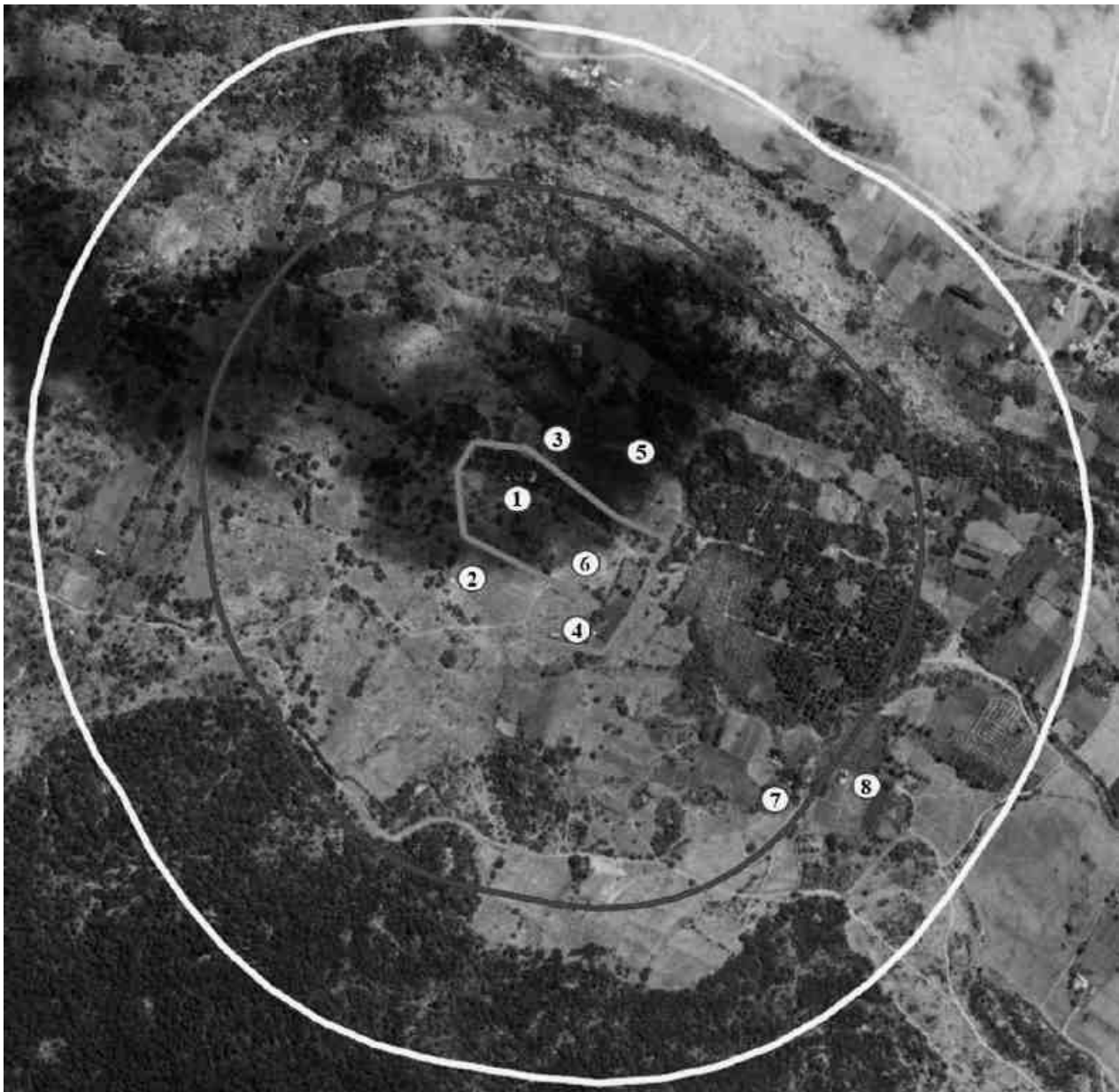
**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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**E. Features within 500m radius:**

Based on the Terms of Reference issued by SEIAA, the details of the structures within 500m radius of this project has been studied and provided in this section below.




**Figure 2.6: Details of features within 500m**



Source: Google Earth





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**Table 2.5: Details of Features within 500m radius**

S.No	Name	Distance	Photograph
1	Shed	Inside lease area	
2	Proponent's Store Room	50m (SW)	
3	Shed	<10m	




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4	Unapproved Structure	Within lease area	
5	odai	50m	
6	Cart Track	Inside lease area	
7	shed	250m-E	



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8	Farm House	310m-E	
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Besides, some habitations are also observed in the northern side of the lease area at a distance of 440m.

**2.4 GEOLOGY:**

The lease area exhibits moderately elevated area. Topsoil is covered with red soil upto a depth of 1m and partly capping the limestone outcrops. Intermittent outcrops of limestone are observed at surface continuously throughout the area for mapping. The width of limestone band is observed as 8-12.5m and running to a length of 200m along east-west direction and dip is 80° due to North. The limestone band is folded due to regional complex folding north of Usilampatti. The order of geological set-up has been identified for these deposits,

Age	Stage	Formation
Recent	--	Topsoil – Redsoil (1-2m)
Pre-Cambrian	--	Limestone and Calc Gneiss
Archean Age	--	Calcareous quartzite, granite gneiss, granites and quartz veins, Biotite Schist and Gneisses

The depth persistence of limestone is taken as 10m based on regional scale. The physical characters of limestone is grayish white, crypto crystalline massive with little black mineral (Biotite and Pyroxene) inclusions. The grade of limestone is reported to contain 60% CaCO<sub>3</sub> and MgO=5%.

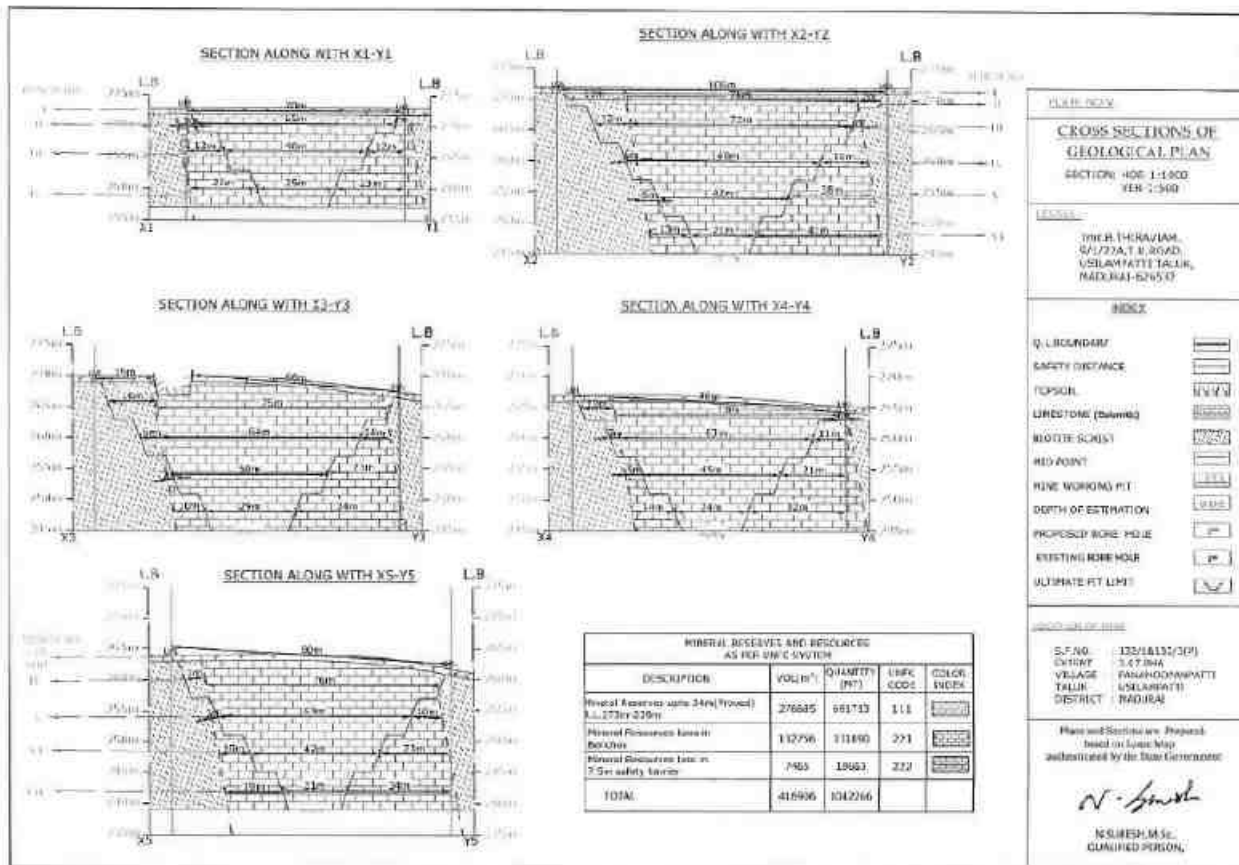






**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.8: Geological Cross Section**



Source: Approved Mining Plan

**2.5 SIZE AND MAGNITUDE OF THE OPERATION:**

- The mining will be done by open cast semi mechanized mining method.
- As per the approved review of mining plan, it is proposed to expand the production capacity from the EC approved quantity of 563T of Limestone and 1313T of rejects (1,876T ROM) to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.
- Life of mine will be 13.4 years based on the peak production rate. However, this may increase after further exploration works.



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- A total of 41,000T of waste will be generated during the plan period of 5 years. This will be entirely dumped in Waste Dump 2. In the post mining stage, this will be backfilled into the mined out pit during the conceptual period.
- A total of 1,09,049T of mineral reject generated during the plan period of 5 years will be dumped in Waste Dump-1. In the post mining stage this dump will be stabilized by means of plantation.

**2.6.1 RESERVES:**

**Table 2.6: Geological and Mineable Reserves**

S.No	Type of reserves	Limestone (T)
1	Geological Resources	10,42,266
2	Mineable Reserves	6,91,713

This review of mining plan shows the availability of 6,97,713T of Limestone as mineable reserves as against the previously approved quantity of 12,135T of Limestone of mineable reserves provided in the Review of Mining Plan for the period 2018-19 to 2022-23. Due to the availability of more quantum of limestone reserves as identified in the subsequent detailed exploration, and also owing to better cost-benefit of mining operations, it is proposed to expand the production capacity from the EC approved quantity of 563T of Limestone and 1313T of rejects (1,876T ROM) to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.

**2.6.2 MINING METHOD:**

Opencast semi mechanized mining using jackhammer drilling, blasting, excavation through excavator, manual sorting and mineral transport through tippers will be carried out. As the mineral occurs as outcrops and exposed mostly in small pits as well as surface and there is no separate development work involved expect side burden to win the material. The rejects and waste are removed manually by tipper.

**Table 2.7: Details of Equipments**

NAME OF THE EQUIPMENT	CAPACITY	REQUIREMENT
Hydraulic Excavator	1.20 M <sup>3</sup>	2
Dozer	50HP	1
Jack Hammer	140T	1
Tipper	25 tonnes	2



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Source: Approved Mining Plan

**2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION:**

The proponent propose to implement the production immediately after obtaining all the statutory approvals such as CTE, CTO, etc. The proponent will comply with the environmental clearance conditions during mining operations. The schedule of project implementation envisaged for this project is provided below. This is a tentative schedule subject to various factor, hence unforeseen variations may occur.

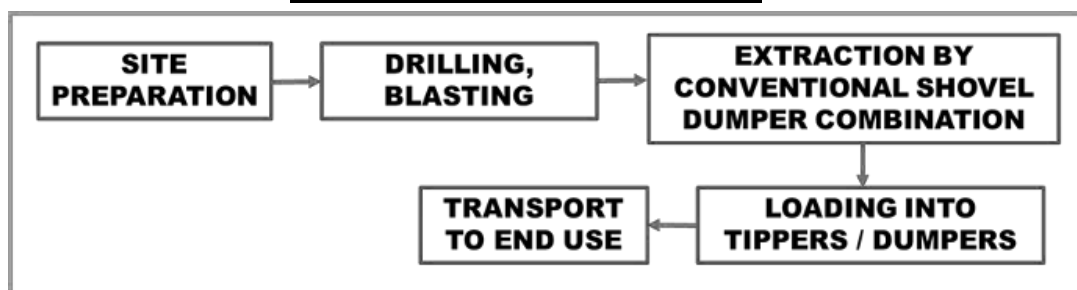
**Table 2.8: Proposed Schedule of Implementation**

Activities	Months					
	Zero Date	1	2	3	4	5
Obtaining Environmental Clearance						
Obtaining Consent from State Pollution Control Board						
Lease Execution						
Equipment mobilization and Commencement of Mining activity after following all the Statutory Requirements						

**2.7 TECHNOLOGY AND PROCESS DESCRIPTION:**

Opencast semi mechanized mining using jackhammer drilling, blasting, excavation through excavator, manual sorting and mineral transport through tippers will be carried out. It is a conventional opencast semi mechanized method of mining. The process flow diagram of this project is provided below.

**Figure 2.9: Process Flow Diagram**



**2.8 PROJECT DESCRIPTION:**

**2.9.1 PAST PRODUCTION:**

Mining lease was initially executed in 1998. During this initial period, mining operations were carried out by the proponent in the lease area. Based on the letter obtained from Department of



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Geology & Mining, Madurai vide. Roc.No.1123/2015-Mines dated 06.12.2017, it is seen that transport permit was issued on 08.06.2015 for 10T of Limestone. **(Annexure-5)** Further it states the following: “..the lessee has not applied for transport permit for transport limestone from 09.06.2015 to till date”. Hence, it is observed that no mining operations were carried out subsequently.

**Table 2.9: Existing Pit Dimensions**

Pit	Length (m)	Width (m)	Depth (m)
I	27	14	273 – 269m RL
II	15	10	270 – 267m RL

Environmental Clearance was obtained vide EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. **(Annexure-3)** The proponent has not commenced mining operations for this production quantity.

**2.9.2 PLAN PERIOD-PRODUCTION & WASTE DISPOSAL:**

As per the approved review of mining plan, it is proposed to expand the production capacity from the EC approved quantity of 563T of Limestone and 1313T of rejects (1,876T ROM) to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.

**Table 2.10: Yearwise Production**

Year	Topsoil (m3)	Waste Quantity (T)	ROM Quantity (T)	Total Handling (T)	Salable Mineral (T)	Mineral Reject (T)	OB Ratio to Ore	Grade Range (%)
2023-2024	8590.00	6500	74342.50	80843	52039.75	22302.75	0.09	40 – 52%
2024-2025	1850.00	21000	72750.00	93750	50925.00	21825.00	0.29	40 – 52%
2025-2026	6800.00	6000	72375.00	78375	50662.50	21712.50	0.08	40 – 52%
2026-2027	--	0	72000	72000	50400.00	21600.00	0.00	40 – 52%
2027-2028	--	7500	72030	79530	50421.00	21609.00	0.10	40 – 52%
<b>Total</b>	<b>17240.00</b>	<b>41000</b>	<b>363497.50</b>	<b>404498</b>	<b>254448.25</b>	<b>109049.25</b>		

Source: Approved Mining Plan



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Peak production quantity of 52039.75 TPA will be achieved during Year 1 (2023-24). A total waste of 41,000T and 1,09,049T of mineral reject will be generated during the plan period of 5 years. Mineral reject will be dumped in Waste Dump-1 and Overburden will be dumped in Waste Dump-2. Details of the same are provided below:

**Table 2.11: Dump Details**

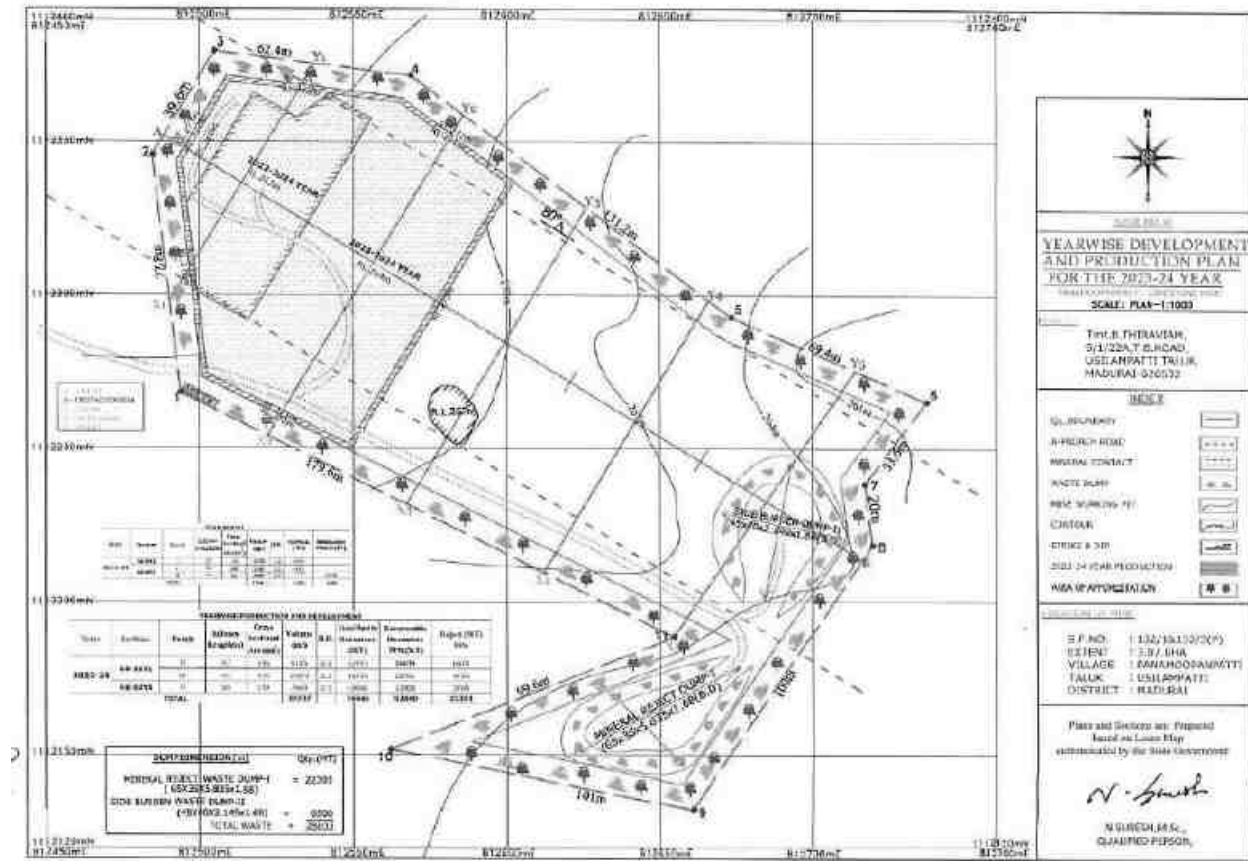
Year	Dump ID	Dump Type	Area (Ha)	Height (m)	Quantity (T)
2023-24	1	Mineral Reject	0.23	5.84	22302.75
2024-25				9.35	21825.00
2025-26				15.21	21712.50
2026-27				22.48	21600.00
2027-28				28.53	21609.00
<b>Total</b>					<b>109049.25</b>
2023-24	2	Waste	0.18	2.15	6500
2024-25				5.13	21000
2025-26				9.42	6000
2026-27				--	--
2027-28				13.55	7500
<b>Total</b>					<b>41000</b>

Source: Approved Mining Plan



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**Figure 2.10: Yearwise Plan (Year 1)**

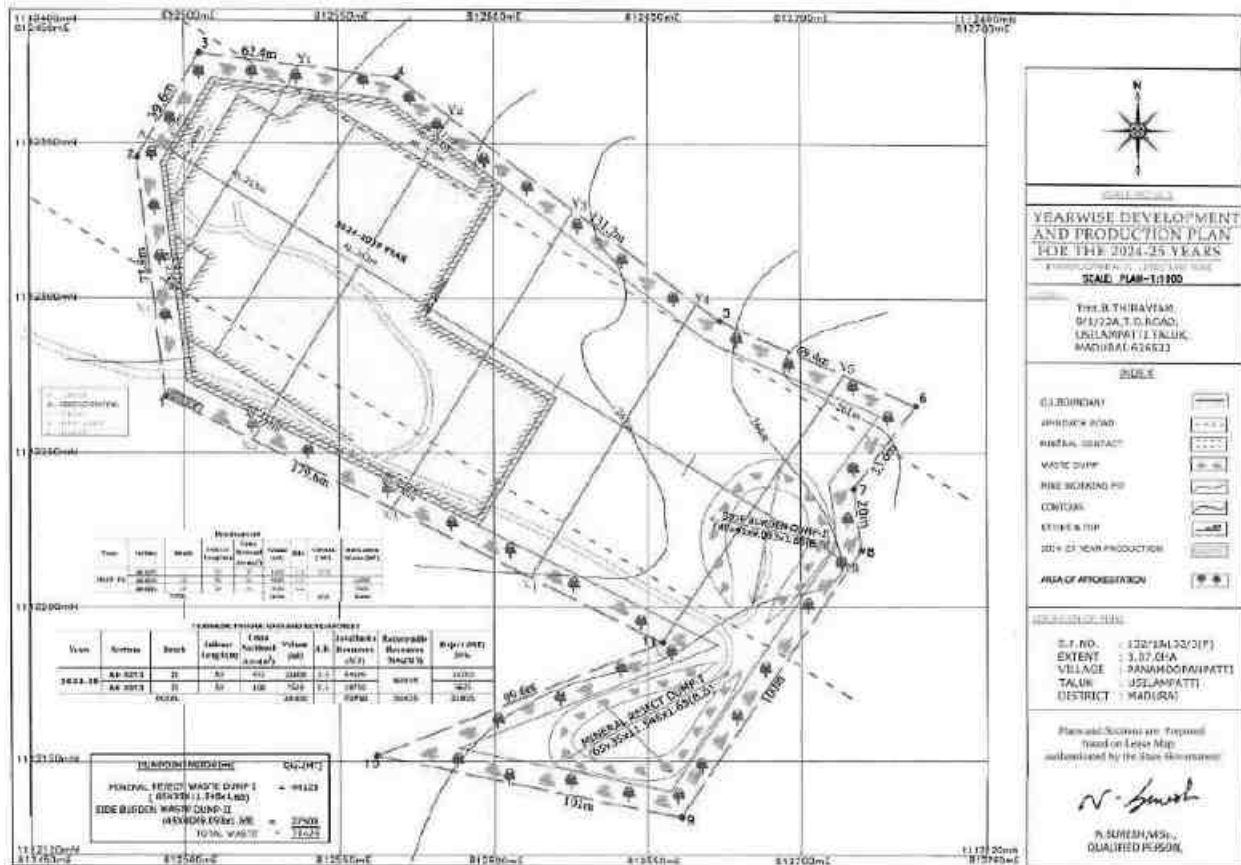


Source: Approved Mining Plan



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.11: Yearwise Plan (Year 2)**

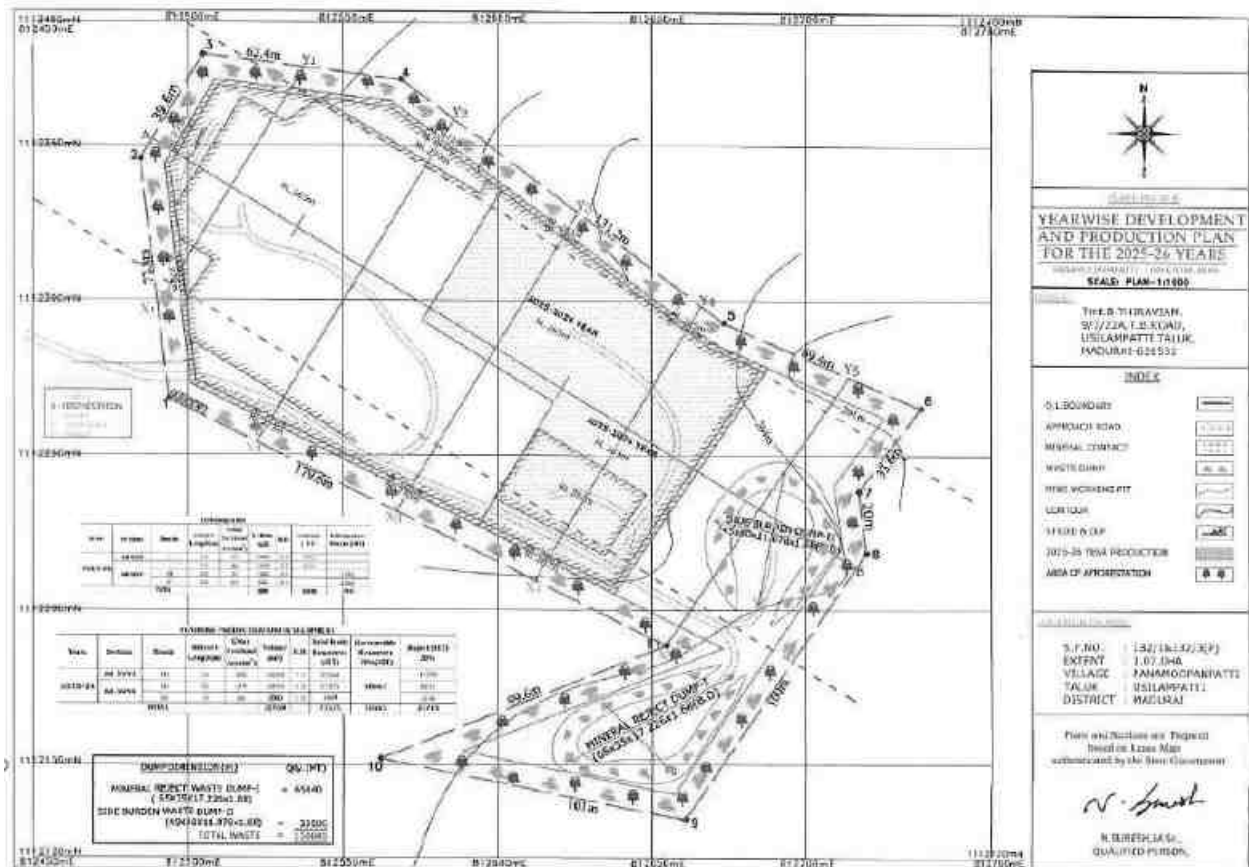


Source: Approved Mining Plan



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.12: Yearwise Plan (Year 3)**



Source: Approved Mining Plan

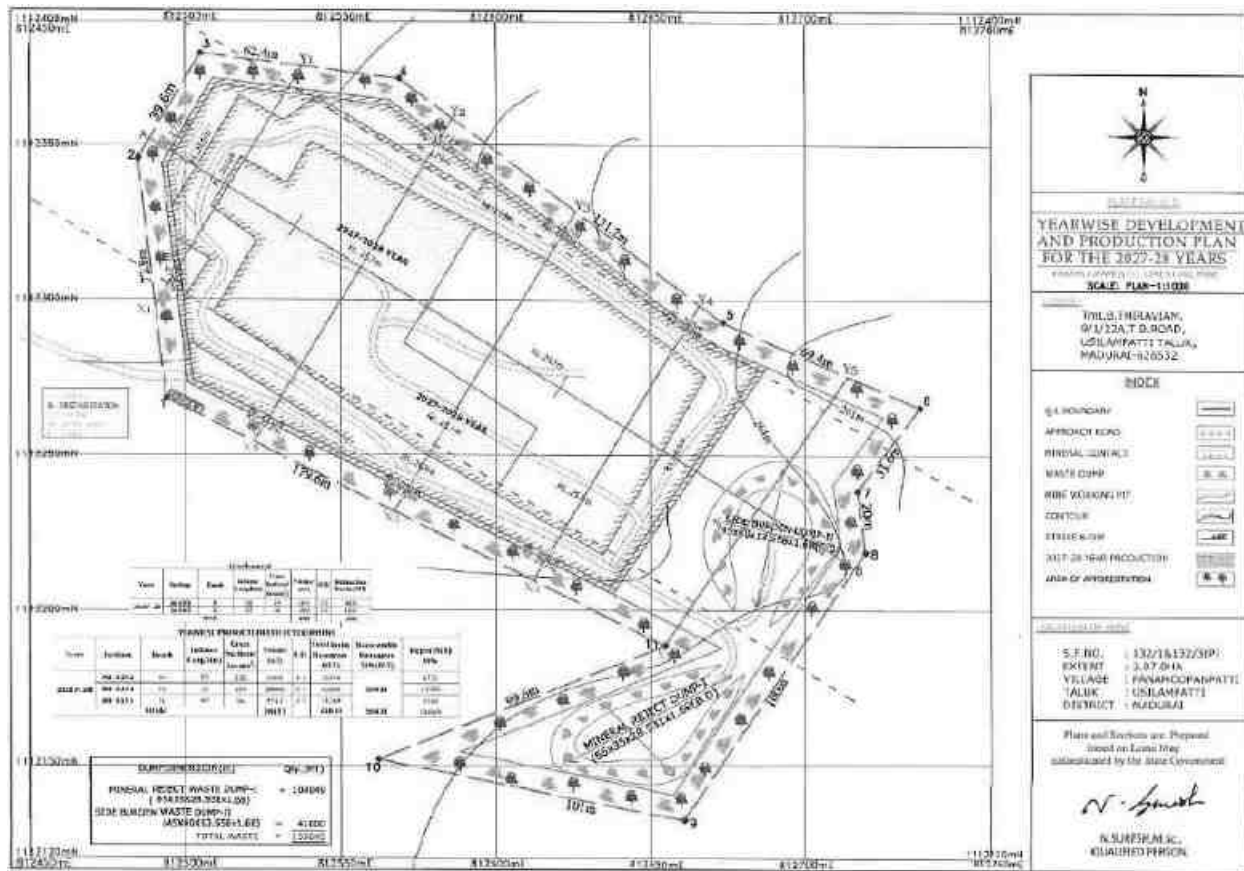






**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.14: Yearwise Plan (Year 5)**

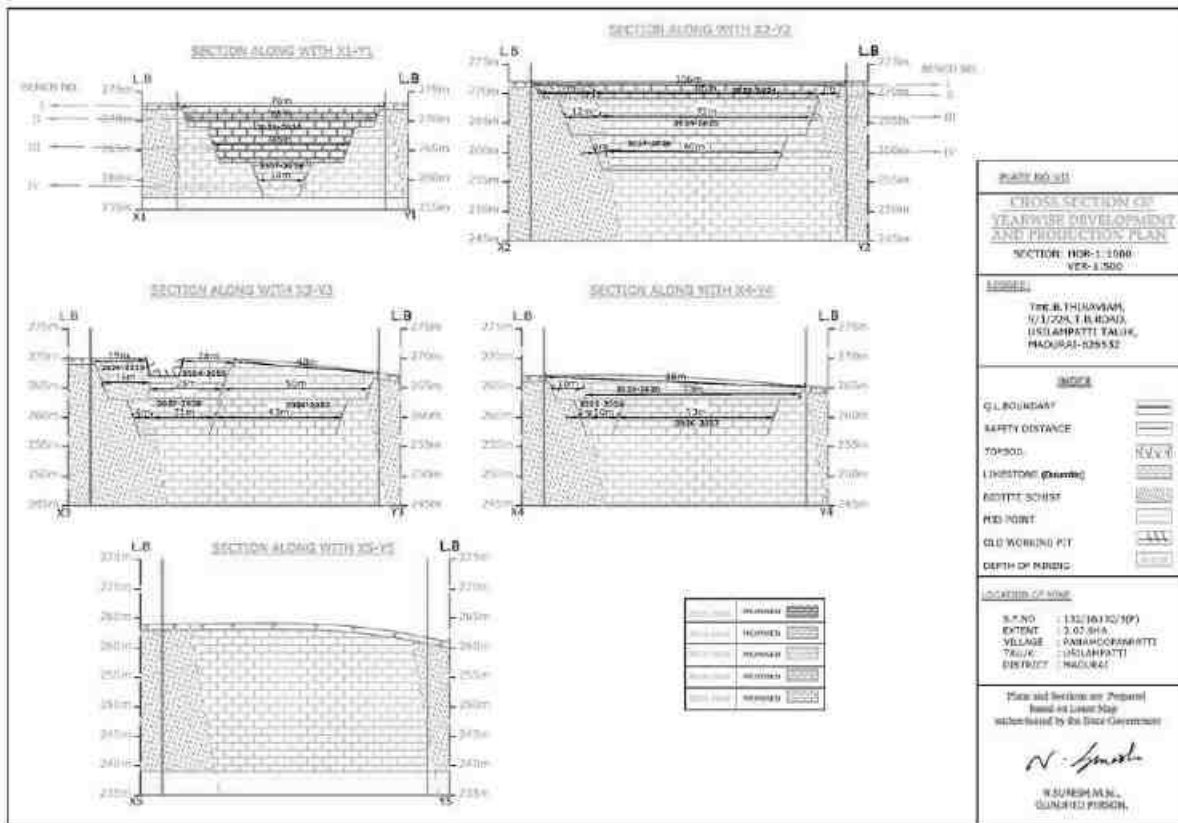


Source: Approved Mining Plan



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.15: Yearwise Cross Section**



Source: Approved Mining Plan

**2.9.3 CONCEPTUAL STAGE:**

The lease period has been deemed to be extended upto 01.02.2048 as per MMDR Act, 2015.

The life of the mine has been calculated as follows:

**Table 2.12: Life of the Mine**

S.No	Details	Quantity
A	Mineable Reserves	6,91,713T
B	Peak Production per annum	52039.75T
C	Total production during plan period	254448.30T
D	Balance production (A – C)	4,37,264.7T
E	Life of the Mine (D / B)	8.4 years

The life of the mine is expected to be 13.4 years including the plan period. However based on future exploration, the life of the mine is expected to increase.



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**Table 2.13: Production during conceptual period**

Details	Conceptual Period
ROM (T)	3,28,215.70
Limestone (T)	2,29,750.70
Mineral Reject (T)	98,465.00
Topsoil (T)	7,290.00
Side Burden (T)	5,670.00
Total Handling (T)	3,41,174.00

During the conceptual period, the topsoil generated will be stored and used for plantation. The waste generated will be backfilled into the mined-out pit. The Mineral reject of 98,465m<sup>3</sup> will be dumped in Waste Dump-1 which will be stabilized by means of plantation ultimately.

The ultimate pit dimension details has been provided below:

**Table 2.14:Ultimate Pit Dimension**

Bench	RL (m)	L (m)	W (m)	D(m)
I	273 – 372	251	106	1
II	272 – 269	249	102	3
III	269 – 263	239	98	6
IV	263 – 257	225	84	6
V	257 – 251	188	64	6
VI	251 – 245	167	42	6
VII	245 – 239	17	21	6

Source: Approved Mining Plan

The ultimate depth of mining in this project is 34m. The groundwater table is much below this depth. As such there is no groundwater intersection involved.

During the conceptual period, the mined-out area will be left as water body. The overburden dump will be backfilled into the mined-out pit and the mineral reject will be stabilized by means of plantation. An area of 2.22.60 Ha of mined out area will be backfilled. The top benches will be covered with plantation and the bottom most benches will be left as a water body. Dumps covering an area of 0.19.80 Ha will be stabilized with plantation. 0.01Ha of infrastructure will be dismantled and 0.58.60 Ha will be the greenbelt and safety zone area. Greenbelt / Plantation



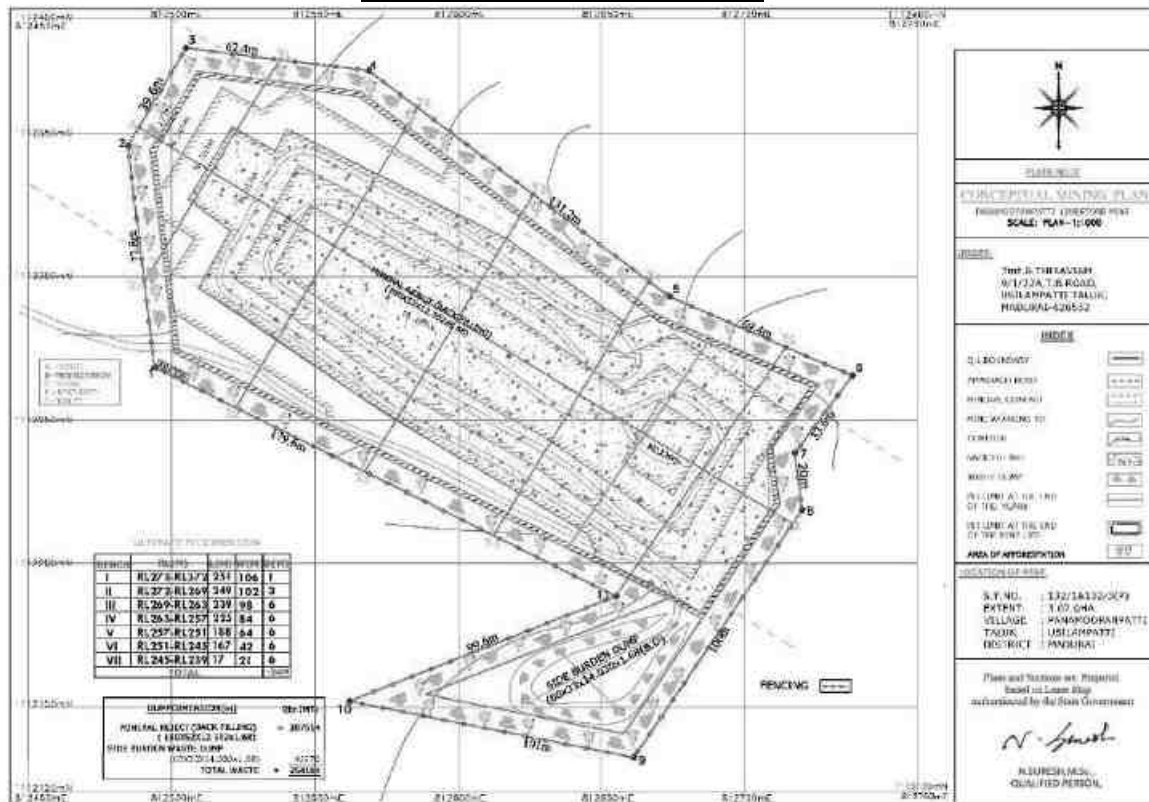
**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. 1550 numbers of trees will be planted in and around the lease area.

**Table 2.15: Land use breakup**

S.No	Land Use	Present Land Use (Ha)	During Plan Period (Ha)	Post Project (Ha)
1	Quarrying Pit	0.05.20	1.60.00	2.21.40
2	External Dump	--	0.41.00	0.23.00
2	Infrastructure	0.01.00	0.01.00	0.01.00
3	Roads	0.02.00	0.03.00	0.03.00
4	Green Belt	0.58.60	0.58.60	0.58.60
6	Unused Land	2.40.20	0.43.40	--
	<b>Total</b>	<b>3.07.00</b>	<b>3.07.00</b>	<b>3.07.00</b>

**Figure 2.16: Conceptual Plan**

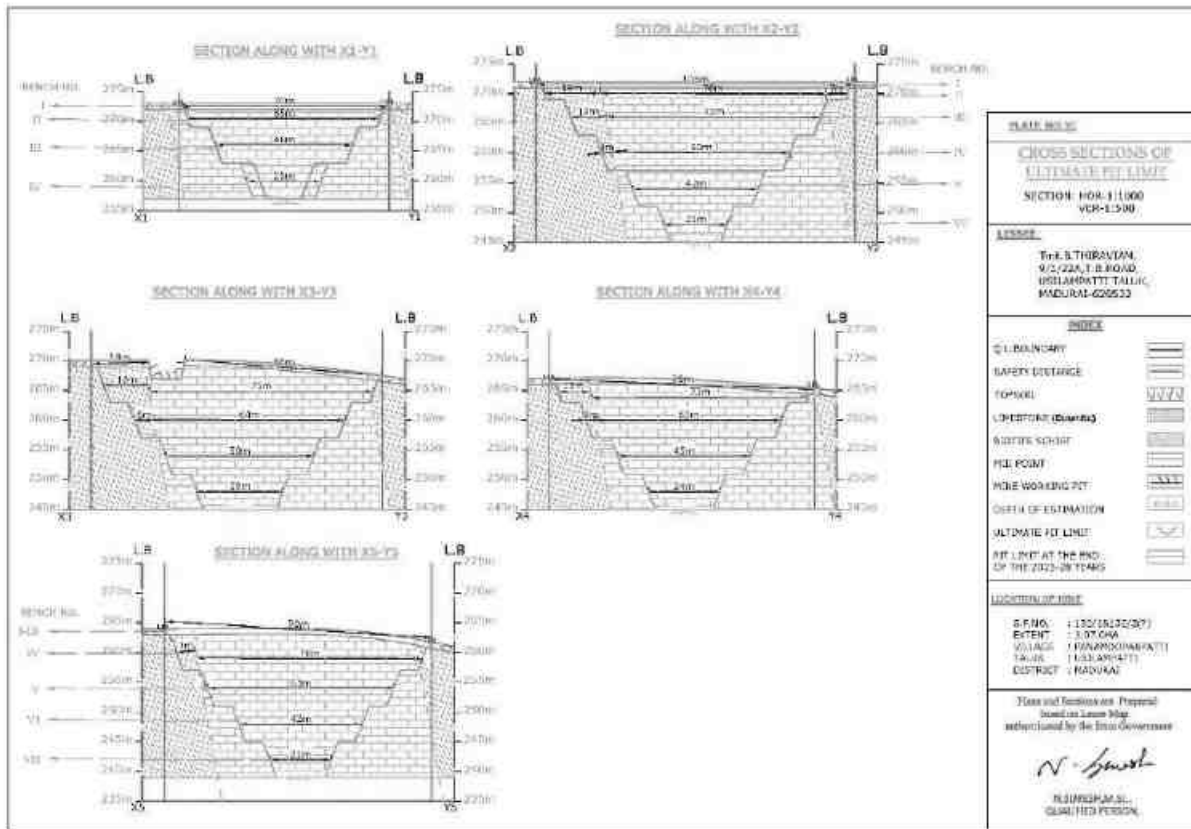


Source: Approved Mining Plan



**DRAFT EIA/EMP REPORT OF PANAMOOPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Figure 2.17: Conceptual Cross Section**



Source: Approved Mining Plan

**2.9.4 PROJECT REQUIREMENTS:**

**Table 2.16: Project Requirements**

<b>Manpower</b>	This project will continue to provide employment opportunities to about 22 persons directly and 50 people indirectly.										
<b>Water Requirement and Source</b>	<p><b>Water Requirement: 10 KLD</b></p> <table border="1"> <thead> <tr> <th>Details</th> <th>Quantity (KLD)</th> </tr> </thead> <tbody> <tr> <td>Drinking water and Domestic Use</td> <td>2.0</td> </tr> <tr> <td>Dust Suppression</td> <td>6.0</td> </tr> <tr> <td>Green belt</td> <td>2.0</td> </tr> <tr> <td><b>Total</b></td> <td><b>10.0</b></td> </tr> </tbody> </table> <p><b>Source:</b> The required water will be procured initially from outside agencies. Later Rain water harvested in the mine sump can also be used.</p>	Details	Quantity (KLD)	Drinking water and Domestic Use	2.0	Dust Suppression	6.0	Green belt	2.0	<b>Total</b>	<b>10.0</b>
Details	Quantity (KLD)										
Drinking water and Domestic Use	2.0										
Dust Suppression	6.0										
Green belt	2.0										
<b>Total</b>	<b>10.0</b>										
<b>Power Requirement</b>	No electricity needed for mining operation. The minimum power requirement for										



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	office, etc will be met from state grid.
<b>Site Services</b>	Site services like mine office, first aid room, rest shelters, toilets etc. are provided as semi-permanent structures.
<b>Project Cost</b>	Rs.160 Lakhs
<b>Funds allocated for socio-economic development</b>	Rs.5.0 Lakhs is allocated under CER budget.

**2.9 DESCRIPTION OF MITIGATION MEASURES:**

Scientific and systematic development of mines will be carried out by the project authorities for preserving as well as improving the environmental conditions in and around the mining lease area. Elaborate analysis on impacts and mitigation measures to be adopted on implementation of this project and the same has been dealt in Chapter- IV.

**2.10 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY:**

There is no new technology that is being implemented. Opencast method of mining which is the proposed method of mining is a proven technology which is technologically and economically viable. . No major technological failures are anticipated. A disaster management plan shall be put into place to take care of any unforeseen situation.

**2.11 CONCLUSION:**

As good environmental preservation is one of the prime motives of the project proponent. It is expected that the project activity will not have any major impact on environmental equilibrium in the study area.

\* \* \* \* \*



# **CHAPTER - III**

## **DESCRIPTION OF ENVIRONMENT**



## CHAPTER 3

### DESCRIPTION OF ENVIRONMENT

#### 3.1 GENERAL:

The existing environmental baseline data for the various environmental components were collected in the study area for the purpose of assessing the impact on present environment due to the project activities.

Monitoring was carried out systematically and meticulously as per relevant IS codes, CPCB, MoEF&CC guidelines during **Winter Season (December 2023 – February 2024)** the details of the study are given in this chapter.

For the purposes of this study, the area has been divided into two zones, namely, core and buffer zones. The entire lease area is considered to be the core zone while the buffer zone encompasses a 10 km radius from the periphery of the core zone. The details of villages falling in the study area and other features are given in Index Plan in Figure No - 3.1.

The primary data collection was done by means of field monitoring and the secondary data collection was obtained from published sources and government documents. The details of the baseline data collection which has been elaborated through the course of this chapter has been concised below:

**Table 3.1: Type of Baseline Data**

S.No	Studies	Parameters / Study	Location
1	Socio Economy	Demographic Data from Census 2011	Core and Buffer Zone
		Sample Survey	Buffer Zone
2	Micro Meteorology	Rainfall Data from IMD	Madurai District
		Temperature, Humidity, Wind Speed, Wind Direction	1 Representative Location
3	Ambient Air Quality	PM10, PM2.5, SO2, NOx, CO	1 Core Zone, 5 Buffer Zone
4	Water Quality	Physical and Chemical Parameters	1 Core Zone, 5 Buffer Zone
5	Noise Levels	Ambient Noise	1 Core Zone, 5 Buffer Zone
6	Soil Quality	Physical and Chemical Parameters	1 Core Zone, 2 Buffer Zone
7	Land Use and Land Cover	Land use pattern within 10km study area using RS Satellite	Buffer Zone
		Land use based on Census 2011	Core and Buffer Zone
8	Biological Environment	Flora and Fauna	Core Zone and Buffer Zone
9	Hydrology & Hydro Geology	Hydrogeological profile of the area	Core Zone and Buffer Zone



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**Figure 3.1: Study Area Map**



Source: Survey of India Toposheet No.58-F/16 and G13



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TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Table 3.2: Environmental Setting of the Study Area**

S.No	Particulars	Details	Distance	Direction
<b>I</b>	<b>Connectivity</b>			
1.	Highway	SH-154 (Usilampatti-Vattalagundu)	6.5Km	W
2.	Railway Station	Sholavandan R.S	12.5Km	E
3.	Airport	Madurai	33.0Km	SE
4.	Village	Karattuppatti	550m	NE
		Perumalpatti	650m	N
		Panamoopanpatti	1.1km	NE
5.	Town/City	Kamarajnaragar	6.5Km	W
<b>II</b>	<b>Environmental Features</b>			
6.	Water Bodies	Tirumangalam Main canal	3.9Km	NE
		Vaigai River	3.4Km	N
7.	Reserve Forests	Vikkiramangalam R.F	320m	SW
		Mettuppatti R.F	2.3km	N
		Mannadimangalam R F	2.6km	E
		Vettalaippatti R.F	3.2km	W
		Uttappanayakkanur R.F	6.4km	W
		Doddappanayakkanur North R.F	7.6km	W
		Kadavakurichi R.F	8.4Km	NW
		Valaiyapatti R.F	8.6Km	W
	Kodhamangalam R.F	9.6Km	SE	
<b>III</b>	<b>Sensitive Areas</b>			
8.	Notified Archaeologically important places, Monuments	Nil	--	--
9.	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972*	Nil	--	--
10.	Defense Installations	Nil	--	--

\*Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves



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**3.2 SOCIO-ECONOMIC CONFIGURATIONS OF THE AREA:**

**3.2.1 GENERAL:**

The Socio-Economic details of the study area are collected through:

- Identification of villages falling from the study area map with combined Taluk map.
- Collection of primary data through sample survey, village meetings and discussion.
- Collection of the demographic pattern of villages falling in the area through NIC 2011 census data.
- Occupational structure of villages falling in the study area through NIC 2011 census data.
- Details of the amenities available in villages falling in the study area through NIC 2011 census data. The findings of the study are illustrated below:

**3.2.2 SECONDARY DATA DESCRIPTION:**

The quarry is located in Panamooppanpatti Village, Usilampatti Taluk, Madurai District. Based on 2011 census data, in the 10km radius there are 49 Rural villages from three Taluks namely Usilampatti ,Vadipatti, Nilakkottai. The demographic profile of the study area is given below:

**Table 3.3: Study area details**

Distance	No. of Villages	Taluk	District
0-2Km	3	Usilampatti	Madurai
2-5Km	3	Usilampatti	Madurai
	1	Vadipatti	Madurai
	2	Nilakottai	Dindigul
5-10Km	6	Vadipatti	Madurai
	17	Usilampatti	Madurai
	17	Nilakottai	Dindigul
<b>Total</b>	<b>49</b>	<b>3 Taluks</b>	<b>2 Districts</b>

Source: Census of India, 2011

**Table 3.4: Social, Economic and Demographic Profile of the Study Area**

Details	Population	Percentage
<b>A. Gender-wise distribution</b>		
Male Population	93803	50.84
Female Population	90719	49.16
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>B. Caste-wise population distribution</b>		
Scheduled Caste	41568	22.53



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Details	Population	Percentage
Scheduled Tribes	906	0.49
Other	142048	76.98
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>C. Literacy Levels</b>		
Total Literate Population	118629	64.29
Others	65893	35.71
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>D. Occupational structure</b>		
Main workers	81120	44.00
Marginal workers	22453	12.20
<b>Total Workers</b>	<b>103573</b>	<b>56.20</b>
<b>Total Non-workers</b>	<b>80949</b>	<b>43.90</b>
<b>Total</b>	<b>184522</b>	<b>100</b>

*Source: Census of India, 2011*

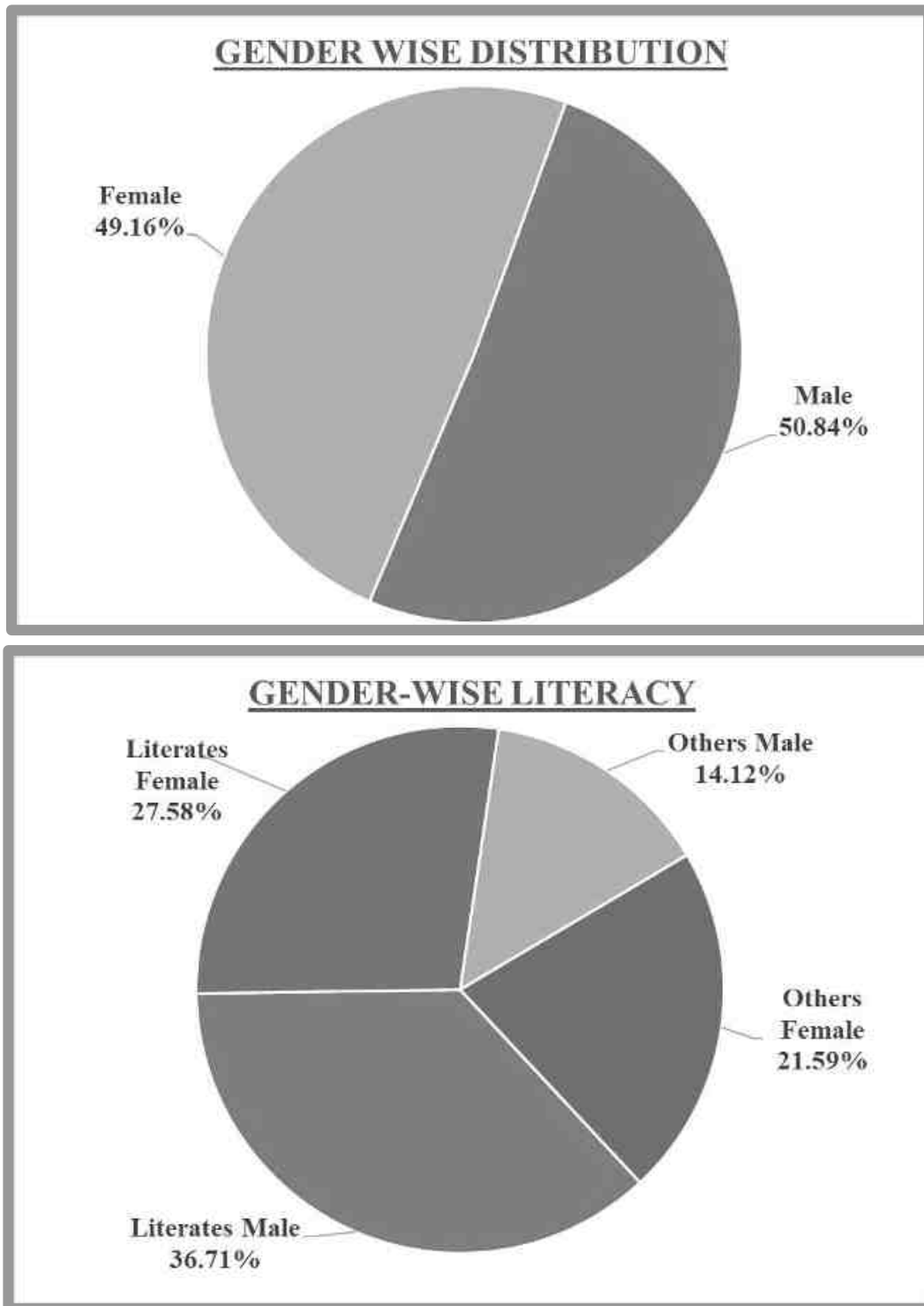
The total population of these 49 rural villages is 184522 in which the male population is 93803 (50.84%) and the female population is 90719 (49.16%). This shows that the male and female population ratio is almost equal. Among the total population 0.49% belong to Scheduled Tribes, 22.53% are Scheduled Caste and the balance 76.98% people belong to other castes. Among the total population, 69.29% of the people are literate.

Among the total population, 36.71% are literate males and 27.58% are literate females. This shows that the male literates are more than the female literates.

The village wise population, literacy levels and occupational structure details area given in **Annexures 4 and 5**. The demographic structure within the buffer zone is shown diagrammatically in **Figure No – 3.2**.

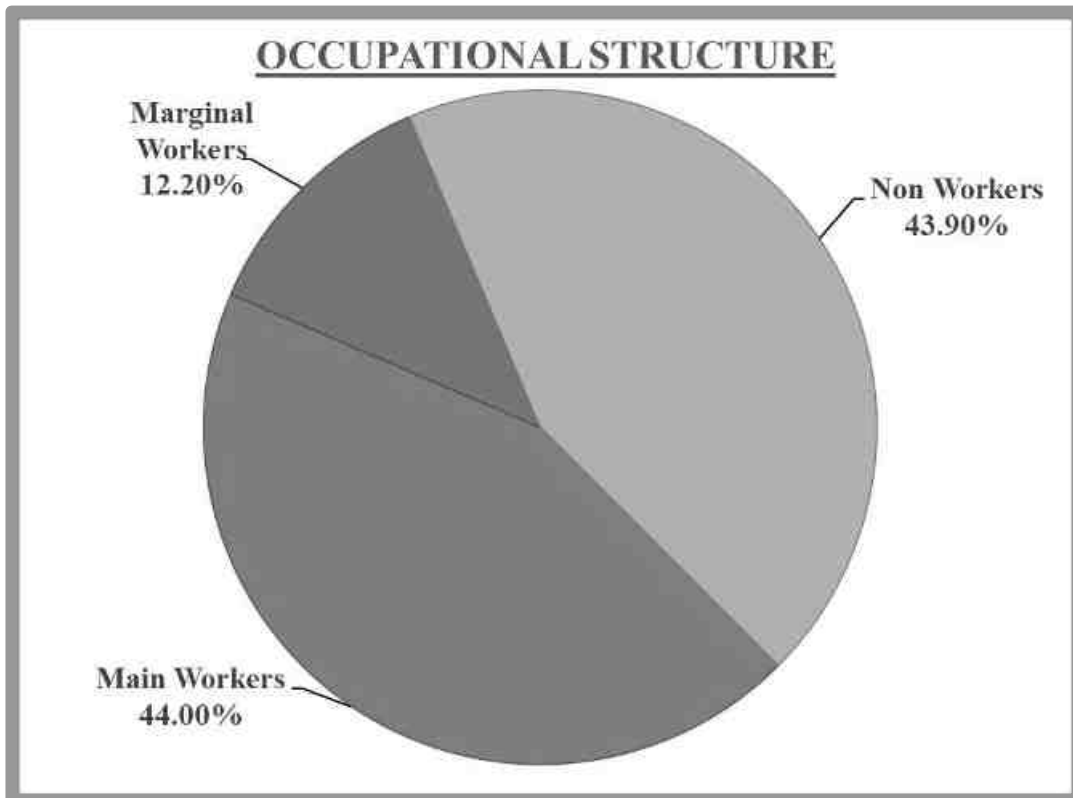
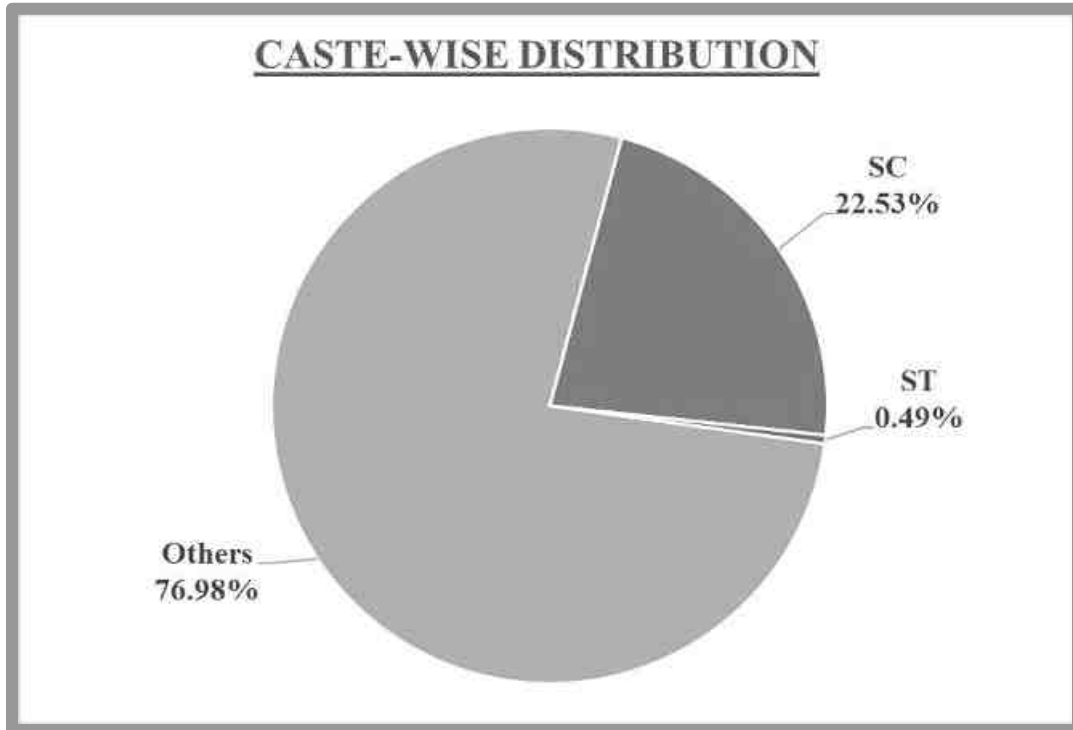


**Figure 3.2: Demographic Structure in Buffer Zone**



Source: Census of India, 2011

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Source: Census of India, 2011



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**3.2.3 DETAILS OF AMENITIES:**

Based on 2011 census data, regarding the educational facilities, there are totally 166 Primary Schools functioning in these 49 rural villages. Among them 1 villages have no primary school, 8 villages have 1 primary schools, 14 villages have 2 primary schools, 5 villages have 3 primary schools, 11 villages has 4 primary schools, 2 villages have 5 primary schools, 4 villages have 6 primary schools, 0 villages have 7 primary schools, 1 villages have 8 primary schools, 1 villages have 9 primary schools, 2 villages have 10 primary schools.

**Table 3.5: Primary Schools in the Buffer Zone Rural Villages**

S.No	No of Rural Villages	Number of primary schools	Totals
1	1	0	0
2	8	1	8
3	14	2	28
4	5	3	15
5	11	4	44
6	2	5	10
7	4	6	24
8	0	7	0
9	1	8	8
10	1	9	9
11	2	10	20
<b>Total</b>	<b>49</b>		<b>166</b>

**Table 3.6: Education Facility Availability**

PARTICULARS	Available in village
Govt Primary School	48
Govt Middle School	33
Govt Secondary School	18
Govt Senior Secondary School	9
Govt Arts and Science Degree College	0
Govt Engineering College	0
Govt Medicine College	0
Govt Management Institute	0
Govt Polytechnic	0
Govt Vocational Training School/ITI	0

Better and higher education facilities are available in nearby Madurai and Dindigul city corporation.





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**Table 3.7: Healthcare Amenities Availability**

<b>PARTICULARS</b>	<b>Available in village</b>
Community Health Centre	2
Primary Health Centre	7
Primary Health Sub Centre	25
Maternity And Child Welfare Centre	9
TB Clinic	8
Hospital Allopathic	0
Hospital Alternative Medicine	0
Dispensary	7
Veterinary Hospital	14
Mobile Health Clinic	0
Family Welfare Centre	7

Better Healthcare facilities are available in nearby town like Madurai and Dindigul.

**Table 3.8: Infrastructure Facilities**

<b>Particulars</b>	<b>Available in village</b>
Tap Water-Treated	46
Covered Well	24
Hand Pump	29
Tube Wells/Borehole	40
Post office	10
bus services	44
Commercial Bank	4
Cooperative bank	16

The details of the educational, medical and infrastructural facilities available in the buffer zone is provided in **Annexures- 6-8**.

**3.2.4 SAMPLE SURVEY:**

Study of the nearby villages to know about socio-economic conditions, including aspirations and requirements of the people show the following:

- Predominantly the study area is seasonal dry, barren land with rural atmosphere.
- The lease is between the 2 rocky hills. Hence the intervening area primarily shows rocky characteristics only.
- Due to poor soil condition and less water availability patches of plantation ( coconut) and agriculture ( cholam, vegetables etc) are only observed.



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- Majority of the people are small farmers.
- Since agriculture is predominantly rainfed and only limited water is available other occupations include construction workers, vendors, etc.
- Other allied activities livestock rearing and poultry farming are also found.
- Reasonably better amenities like approach road bus facility, electricity, mobile phone connectivity, Public Distribution System , banks etc are available.
- Bore well is the main source for drinking water. There are OHT's, Ground level tanks, public taps are available .



### **3.3 EXISTING ENVIRONMENTAL QUALITY**

#### **3.3.1 MICRO-METEOROLOGY**

##### **3.3.1.1 General:**

The meteorological conditions in an area regulate the dispersion of air pollutants being released into the atmosphere. The principal variables are horizontal convective transport i.e. wind speed and direction and vertical convective transport, i.e. mixing height, stability class and topography of the area.

##### **3.3.1.2 Historical Meteorological Data:**

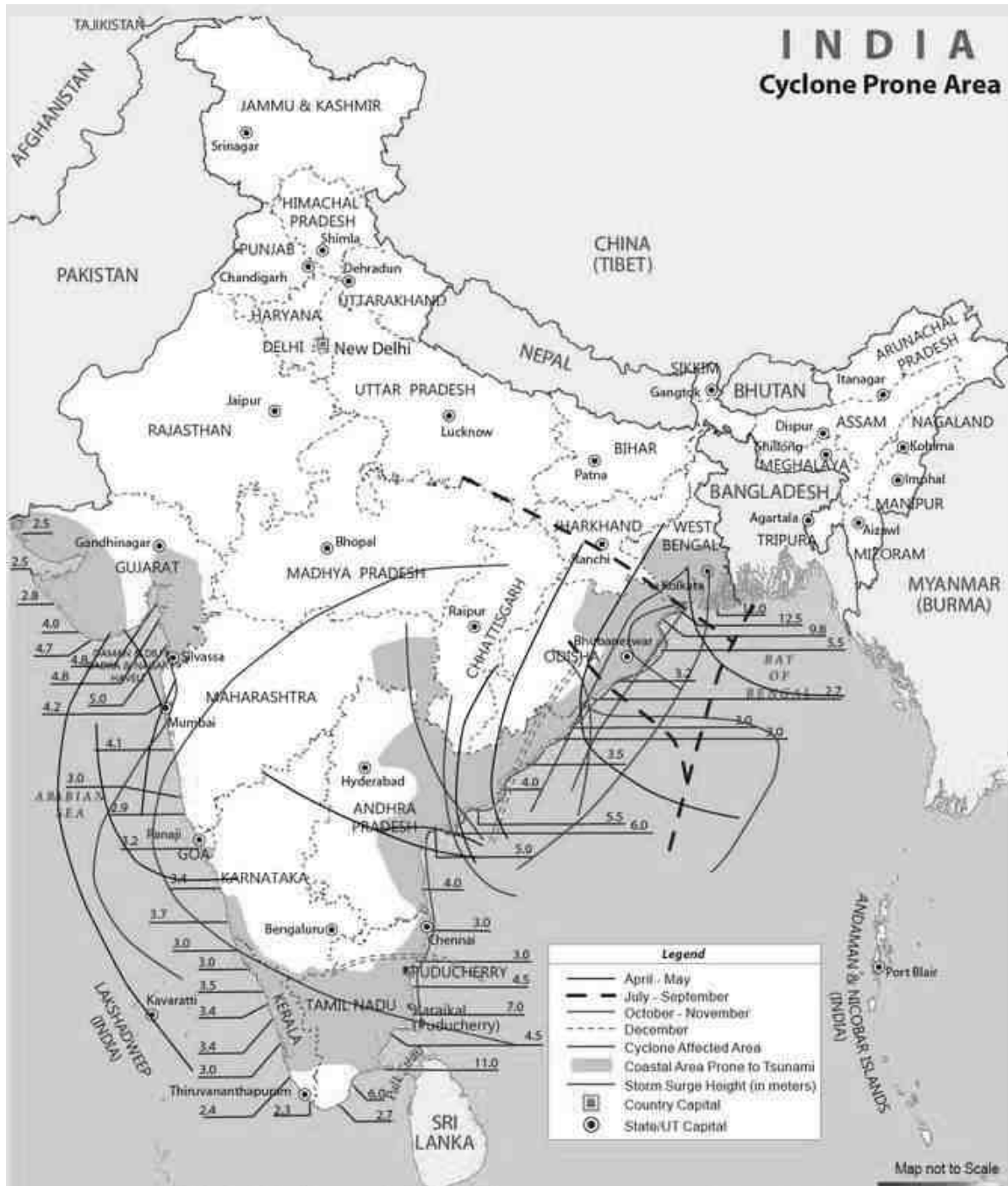
###### **A. Cyclones And Depressions**

Cyclonic storms and depressions in Bay of Bengal affect the East Coast of India. Isolated ones, forming in January to March in the South Bay of Bengal move West-North-westwards and hit Tamil Nadu coast. In April and May, cyclonic storms and depressions form in the South and adjoining Central Bay and move initially to the Northwest, then North and then recurve to the Northeast striking the Arakan coasts in April and Andhra Pradesh (AP)-Orissa-West Bengal (WB) – Bangladesh coasts in May. Most of the monsoon (June – September) storms develop in the central and in the north bay and move west – north - westwards affecting AP – Orissa – WB coasts. Post monsoon (October – December) storms form mostly in the south and central Bay, recurve between 15° and 18° N affecting Tamil Nadu – AP – Orissa – WB – Bangladesh coasts. **Figure No - 3.3** depicts the history of cyclonic storms, which have struck the Indian coast during the months of October, November and December during the last 75 years. . East coast is prone to cyclonic storms round the year but mostly these occur prior to SW i.e., in May and after SW monsoon i.e., in October and November.



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**Figure 3.3: History of Cyclonic Storms**



Source: Vulnerability Atlas of India series, above figure accessed from [www.maps of india.com](http://www.maps of india.com)

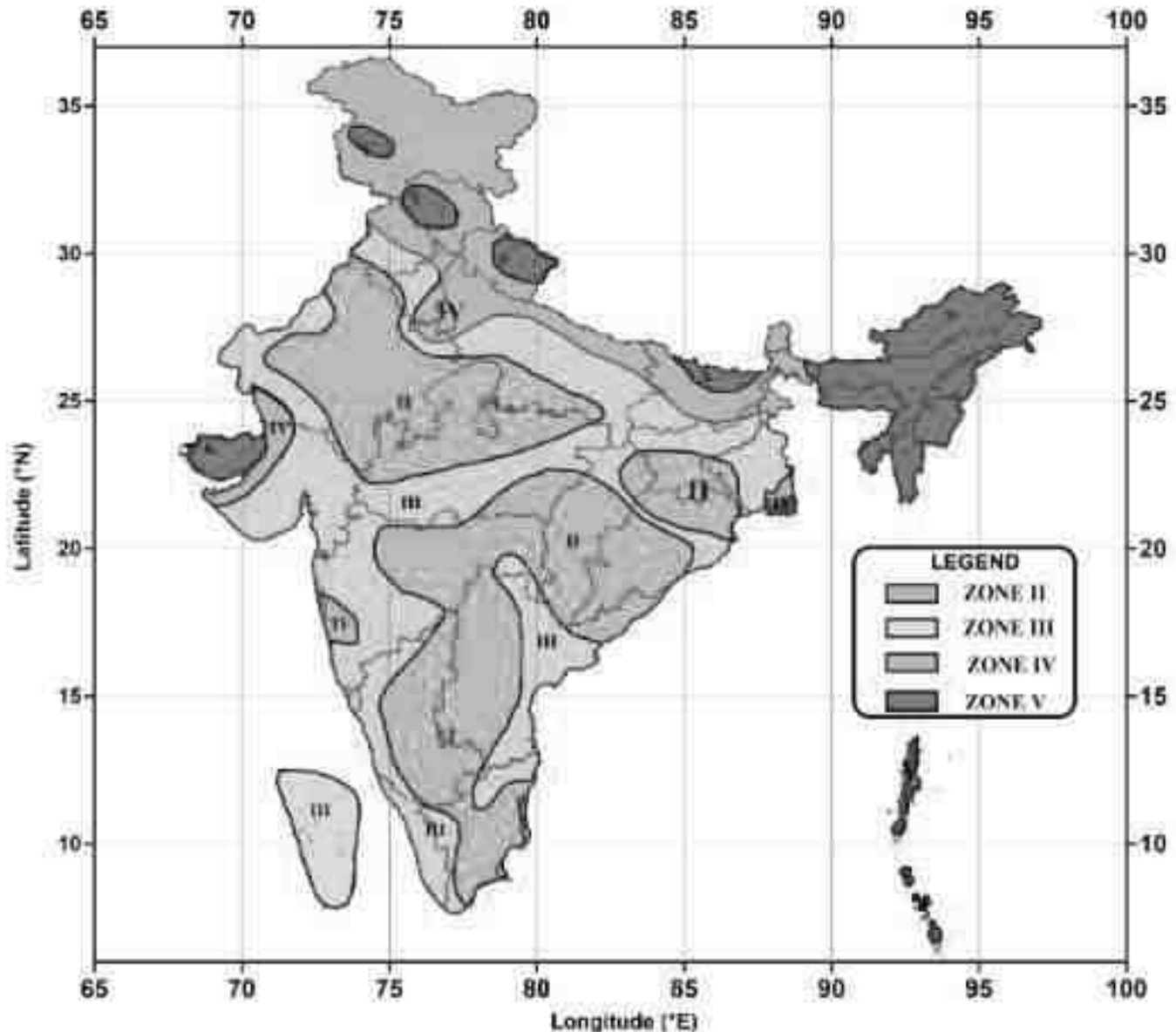


**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**B. SEISMIC DATA**

From the seismic zone map of India as depicted in the **Figure No - 3.4**, it can be seen that the project site and study area falls in the Zone – III and is described as least active zone.

**Figure 3.4: Seismic Zone Map of India**



Source: <https://pib.gov.in/PressReleasePage.aspx?PRID=1740656>



**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**C. Climate and Rainfall Data:**

Analysis of long term rainfall data (1901-2004) shows that the district receives rainfall during NE monsoon (47%) , SW monsoon (32%), summer (17%) and winter (4%). The normal annual rainfall varies from 806 mm (Sholavandan Rain Gauge Station) in the northern part to 964.1 mm (Melur Ranguage Station) in the eastern part of the district. The entire district experiences a declining trend in annual rainfall except at Melur, where a rising trend is noticed.

The climate is subtropical and the temperature varies from 15 to 41°C in the district. The relative humidity varies from 45 to 85% and is high during NE monsoon.

Rainfall data collected by Madurai, IMD station for the period of 2014 to 2023 is given in **Table No.3.8** Rainfall histograms are presented in **Figure No - 3.5 and 3.6.**

**Table 3.9: Average Annual Rainfall Data (2014-2023)**

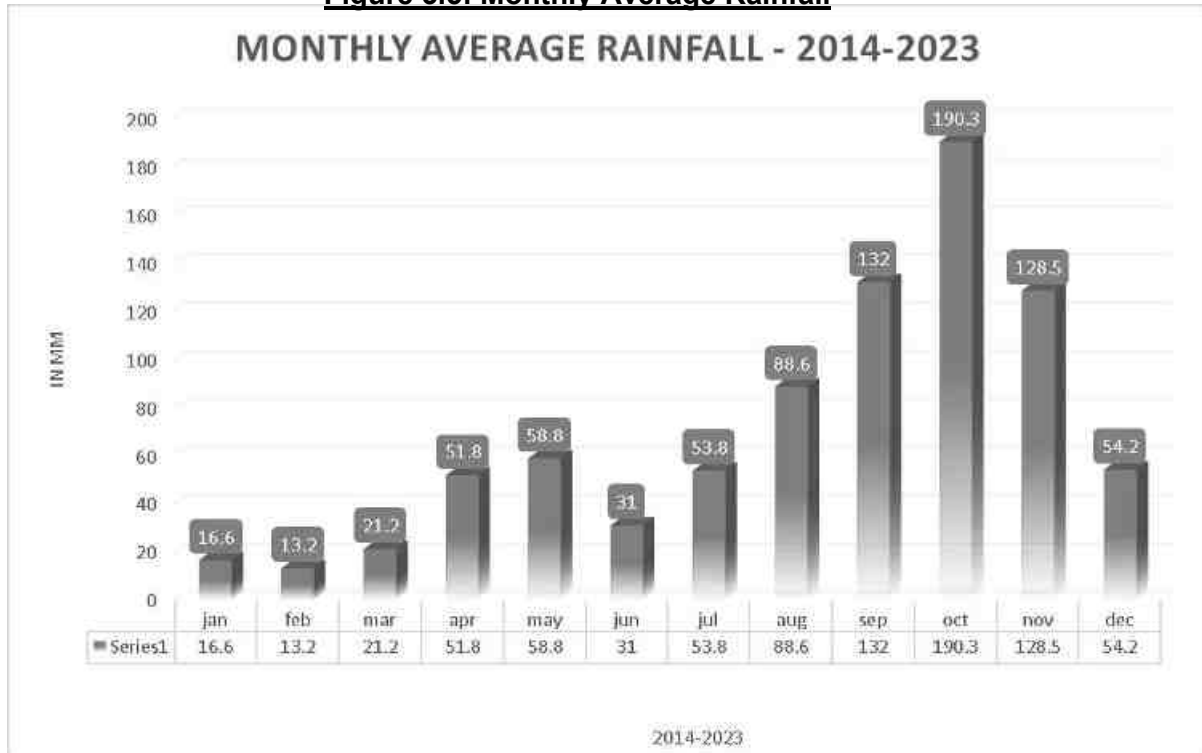
YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Rainfall
2014	8.01	0.96	0.96	4.88	173.66	25.29	29.07	110.53	87.88	227.63	90.76	44.93	<b>804.56</b>
2015	15.04	0.79	30.09	148.7	126.27	45.77	49.11	96.78	125.81	83.45	314.31	74.12	<b>1110.24</b>
2016	0.08	0	0.62	16.75	79.3	17.94	98.41	73.97	73.59	127.69	11.16	59.54	<b>559.05</b>
2017	34.28	1.22	46.39	6.97	47.37	40.37	24.84	91.27	109.23	98.58	40.2	7.67	<b>548.39</b>
2018	1.21	1.45	12.52	19.74	119.84	22.38	67.75	62.36	121.87	148.61	100.84	8.11	<b>686.68</b>
2019	4.68	1.24	0.6	12.81	25.41	24.52	41.49	83.77	195.48	189.36	102.41	62.01	<b>743.78</b>
2020	3.87	0.02	0.69	19.03	52.21	67.62	63.38	78.75	158.79	170.62	221.12	97.15	<b>933.25</b>
2021	143.27	2.1	3.16	36.04	63.03	53.95	100.69	65.92	131.97	215.75	294.71	45.43	<b>1156.02</b>
2022	25.61	0.28	0.73	81.99	76.56	79.01	185.3	184.03	73.78	212.66	130.98	59.21	<b>1110.14</b>
2023	1.4	16.41	30.03	52.4	97.33	31.05	59.27	147.98	81.4	129.29	245.67	65.63	<b>957.86</b>
<b>normal</b>	16.6	13.2	21.2	51.8	58.8	31	53.8	88.6	132	190.3	128.5	54.2	<b>736.9</b>

Source – IMD GRID – Madurai District report

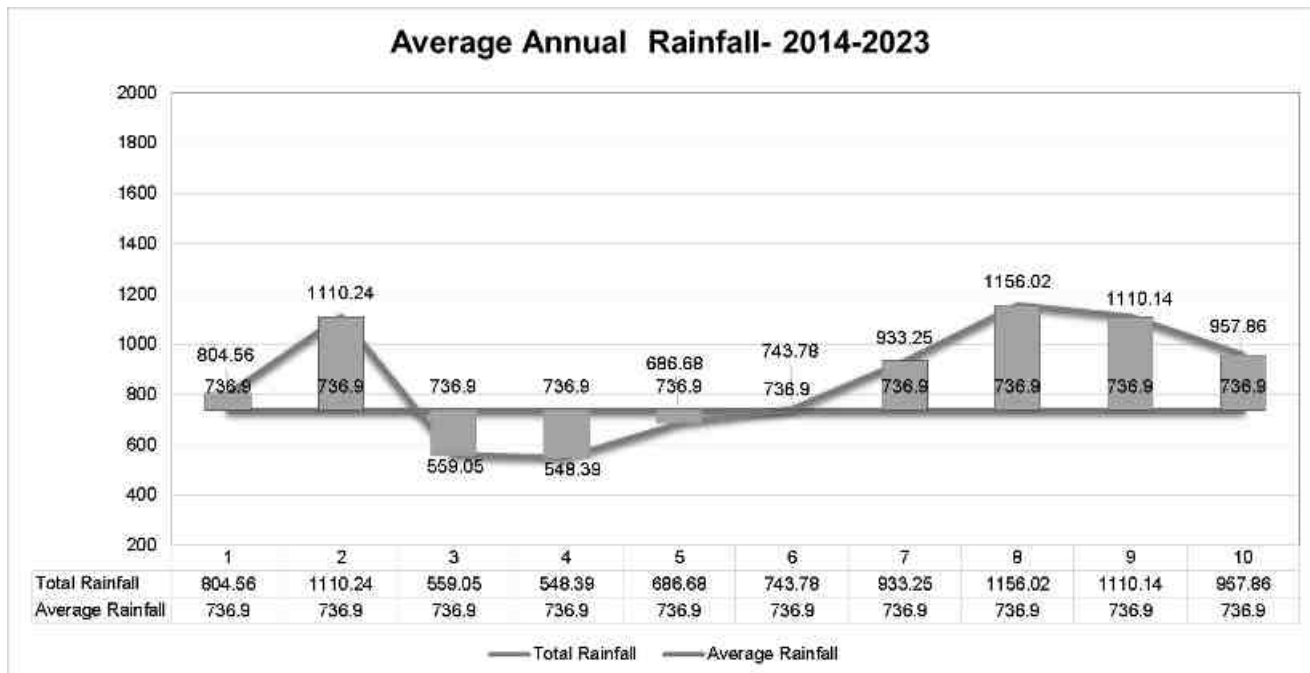


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**Figure 3.5: Monthly Average Rainfall**



**Figure 3.6: Average Annual Rainfall**



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**3.3.1.3 SITE SPECIFIC METEOROLOGICAL DATA:**

Micrometeorology and microclimatic parameters of wind velocity, wind direction, ambient temperature, relative humidity, were collected throughout the monitoring period.

**DATA ANALYSIS:**

The temperature in the area during the study period ranged from 13.7°C to 37.0°C while the relative humidity varied between 29.5 – 94.6%. The wind speed during the study period ranged from <1.8 to 29.5 km/h. The predominant wind direction is from ENE. The meteorological data are presented in **Table no – 3.9**. The average wind rose is depicted in **Figure No - 3.7**.

**Table 3.10: Meteorological Data**

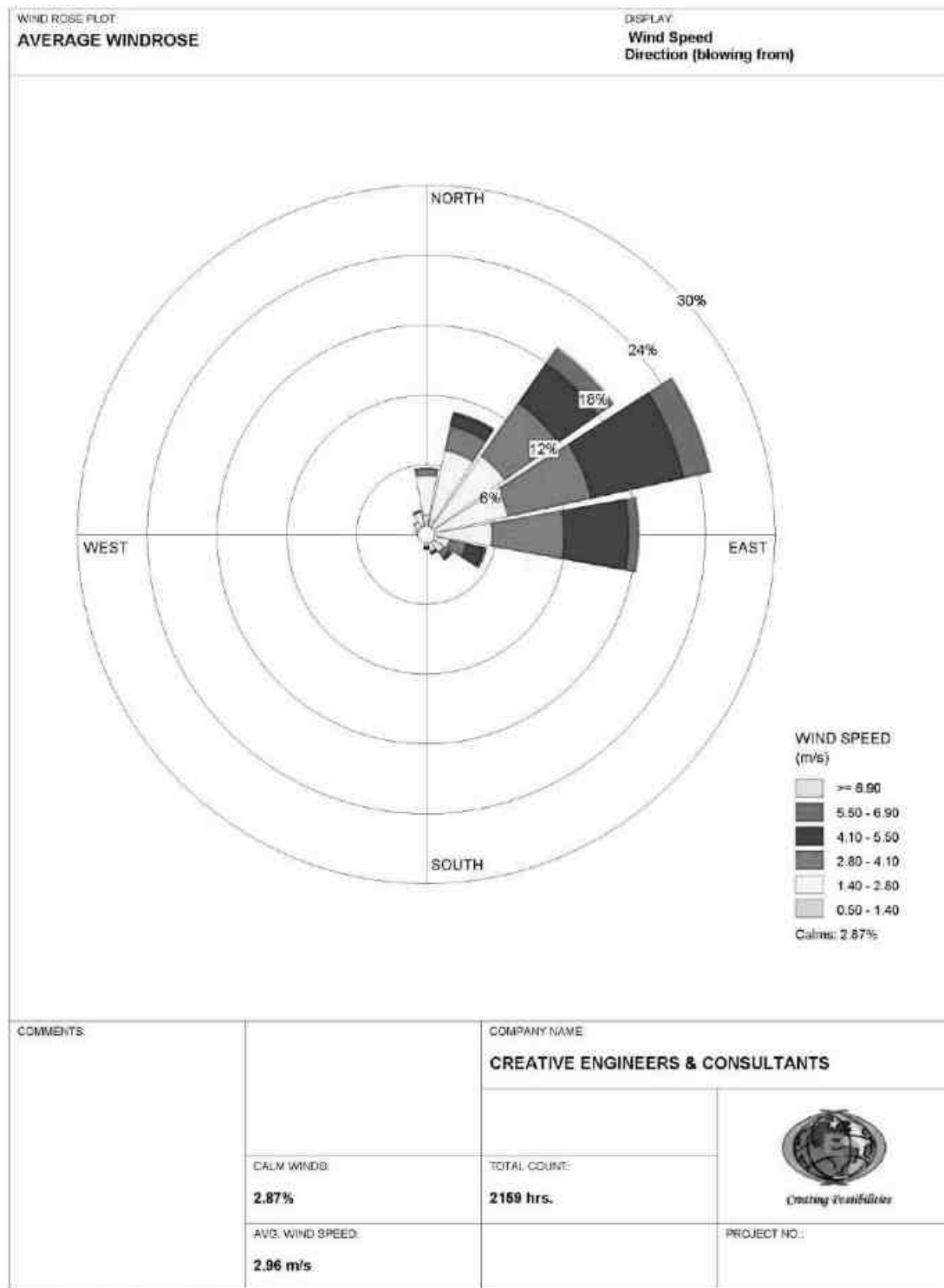
<b>Season: Winter Season ( Dec 2023 – Feb 2024)</b>			
<b>S.NO</b>	<b>PARAMETERS</b>	<b>MIN</b>	<b>MAX</b>
1	Temperature In °c	13.7	37.0
2	Humidity in %	29.5	94.6
3	Wind speed in km/hr	<1.8	29.5
4	Predominant wind direction from	ENE	





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**Figure 3.7: Average Wind Rose**



WRPLOT View - Lises Environmental Software



**DRAFT EIA/EMP REPORT OF PANAMOOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**3.3.2 AMBIENT AIR QUALITY (AAQ):**

Ambient Air quality has been assessed through a network of 6 ambient air quality stations. The following methodology has been considered for design of ambient air quality monitoring network in the area. Based on these criteria, 6 numbers of air sampling stations were selected in the area as shown below in Table No.3.10.

- ❖ Topography / terrain of study area.
- ❖ Populated areas within study area.
- ❖ Residential /sensitive areas within study area.
- ❖ Magnitude of surrounding industries.
- ❖ Representation of regional background levels.
- ❖ Representation of cross sectional distribution in down wind direction.
- ❖ Predominant wind direction and wind pattern.

**Table 3.11: Air Quality Monitoring**

1.	<b>Monitoring Period</b>	<b>Winter Season ( Dec 2023 – Feb 2024)</b>
2.	<b>Monitoring Location</b>	The location map showing Ambient Air Quality study stations are shown in <b>Figure No- 3.9.</b>
3.	<b>Methodology</b>	
	<b>Parameter</b>	<b>Protocol</b>
	a. Particulate Matter (PM10)	Gravimetric (IS 5182: Part 23:2017)
	b. Particulate Matter PM2.5	Gravimetric ( IS 5182: Part 24:2019)
	c. Sulphur Dioxide	Colorimetric (West & Gaeke Method) (IS 5182: Part 02: 2017)
	d. Nitrogen Dioxide	Colorimetric(Modified Jacob & Hocheiser Method) (IS 5182: Part 06:2017)
	e. Carbon Monoxide	CO Monitor
	f. Silica	Colorimetric (Molybdate Method) NIOSH 7601 -2003
4.	<b>Monitoring Frequency</b>	2 days in a week, 4 weeks in a month for 3 months in a season.

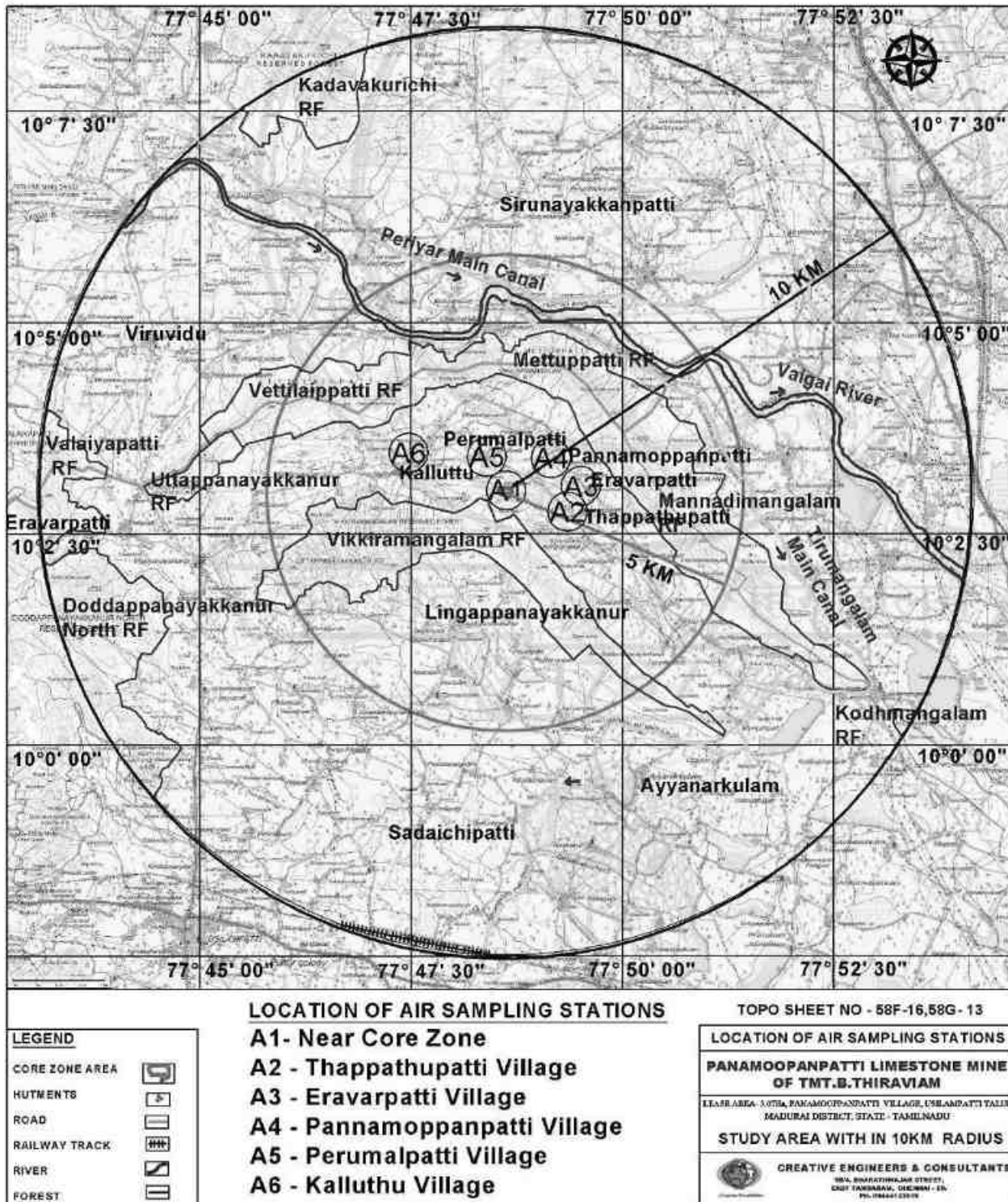
**Table 3.12: Air Quality Monitoring Locations**

S.NO	LOCATION CODE	LOCATION	DISTANCE FROM CORE ZONE (KM)	DIRECTION
1	A1	Near Core Zone	-	-
2	A2	Thappathupatti Village	1.4km	SE
3	A3	Eravarpatti Village	1.7km	E
4	A4	Pannamoppanpatti Village	1.2km	NE
5	A5	Perumalpatti Village	710m	NW
6	A6	Kalluthu Village	1.7km	NW



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**Figure 3.8: Ambient Air Quality Study Stations**



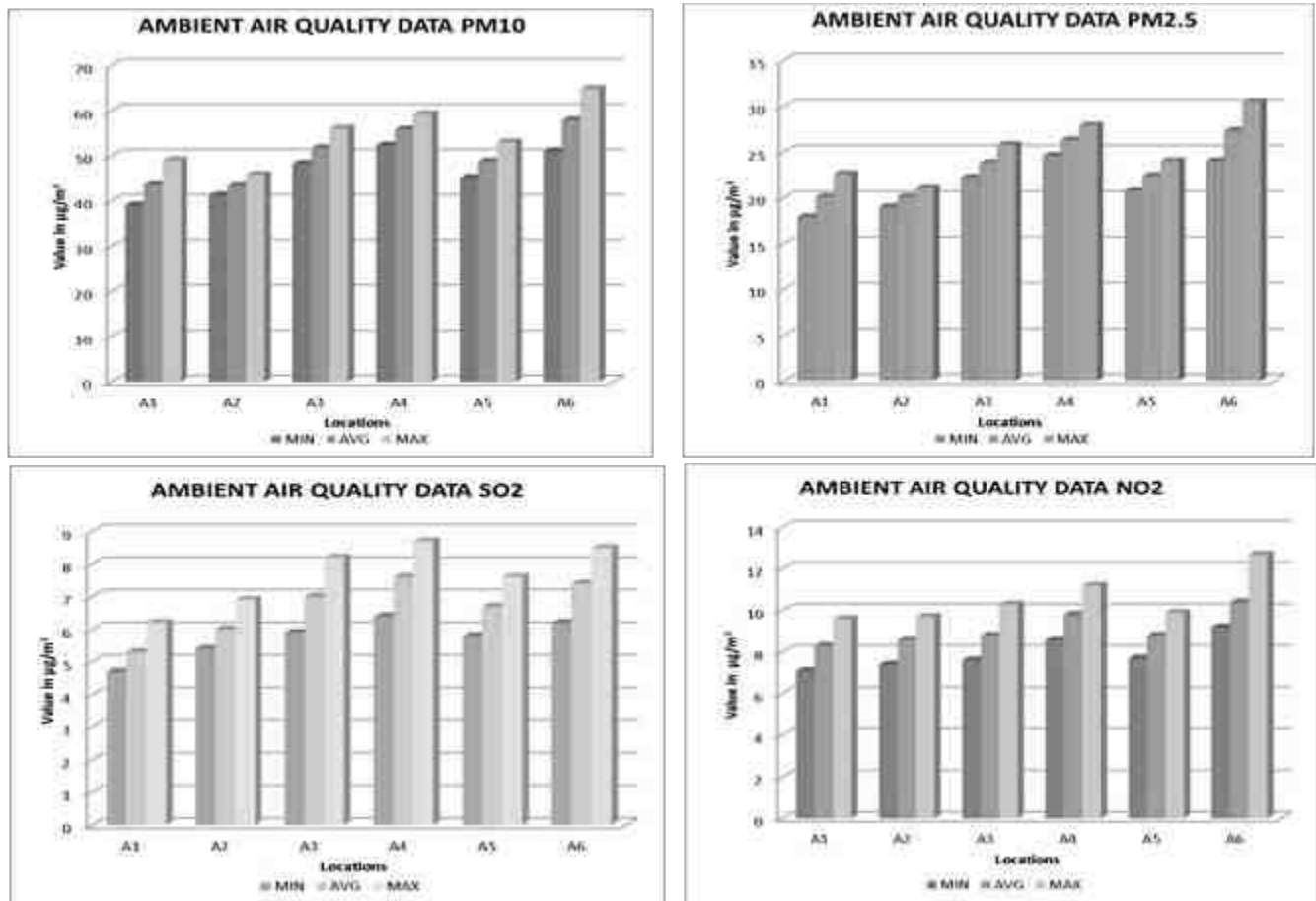
**DRAFT EIA/EMP REPORT OF PANAMOPPANPATTI LIMESTONE MINE OF TMT.B.THIRAVIAM – EXPANSION OF PRODUCTION TO 52039.75TPA OF LIMESTONE AND 22302.75TPA OF REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOPPANPATTI VILLAGE, USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Table 3.13: Ambient Air Quality Data**

PARAMETERS LOCATIONS	Cat.*	All Value in $\mu\text{g}/\text{m}^3$											
		PM <sub>10</sub>			PM <sub>2.5</sub>			SO <sub>2</sub>			NO <sub>2</sub>		
		MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX
A1-Near Core Zone	I	39.1	43.8	49.1	17.9	20.1	22.6	4.7	5.3	6.2	7.1	8.3	9.6
A2-Thappathupatti Village	R	41.3	43.6	45.9	19	20.1	21.1	5.4	6	6.9	7.4	8.6	9.7
A3-Eravarpatti Village	R	48.3	51.8	56.1	22.2	23.8	25.8	5.9	7	8.2	7.6	8.8	10.3
A4-Pannamoppanpatti Village	R	52.4	55.9	59.3	24.6	26.3	27.9	6.4	7.6	8.7	8.6	9.8	11.2
A5-Perumalpatti Village	R	45.2	48.8	53.1	20.8	22.4	24	5.8	6.7	7.6	7.7	8.8	9.9
A6-Kalluthu Village	R	51.1	58	64.9	24	27.3	30.5	6.2	7.4	8.5	9.2	10.4	12.7
<b>NAAQ Limits</b>		<b>PM<sub>10</sub></b>			<b>PM<sub>2.5</sub></b>			<b>SO<sub>2</sub></b>			<b>NO<sub>2</sub></b>		
	*	<b>100</b>			<b>60</b>			<b>80</b>			<b>80</b>		
	**	<b>100</b>			<b>60</b>			<b>80</b>			<b>80</b>		

**\*Note: Category: \* - Industrial, Residential, Rural and other area, \*\* – Ecologically Sensitive Area (notified by Central Government)**

**Figure 3.9: Ambient Air Quality Data**



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**3.3.2.1 Results and Discussion:**

The AAQ monitored data for all locations for above parameters are shown in **Table No - 3.12** and in **Figure No - 3.10**. Ambient Air Quality data during the study period is given in **Annexure-9**. From the table it is seen that, in the ambient air, the PM<sub>10</sub> values were in the range of 39.1-64.9 µg/m<sup>3</sup>. PM<sub>2.5</sub> values were in the range of 17.9 – 30.5 µg/m<sup>3</sup>. SO<sub>2</sub> levels were ranging from 4.7– 8.7 µg/m<sup>3</sup>. NO<sub>2</sub> levels were ranging from 7.1-12.7 µg/m<sup>3</sup>.

The existing Ambient Air Quality levels for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>2</sub>, are within the NAAQ standards prescribed CPCB limits of 100 µg/m<sup>3</sup>, 60 µg/m<sup>3</sup>, 80 µg/m<sup>3</sup> & 80 µg/m<sup>3</sup>. The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m<sup>3</sup>)

**3.3.3 WATER ENVIRONMENT:**

Assessment of baseline data on water environment includes Identification of water resources, Collection of water samples and Analyzing water samples collected for physico-chemical parameters as per standards. The water sampling was carried out for 6 locations. Details of the same has been provided below:

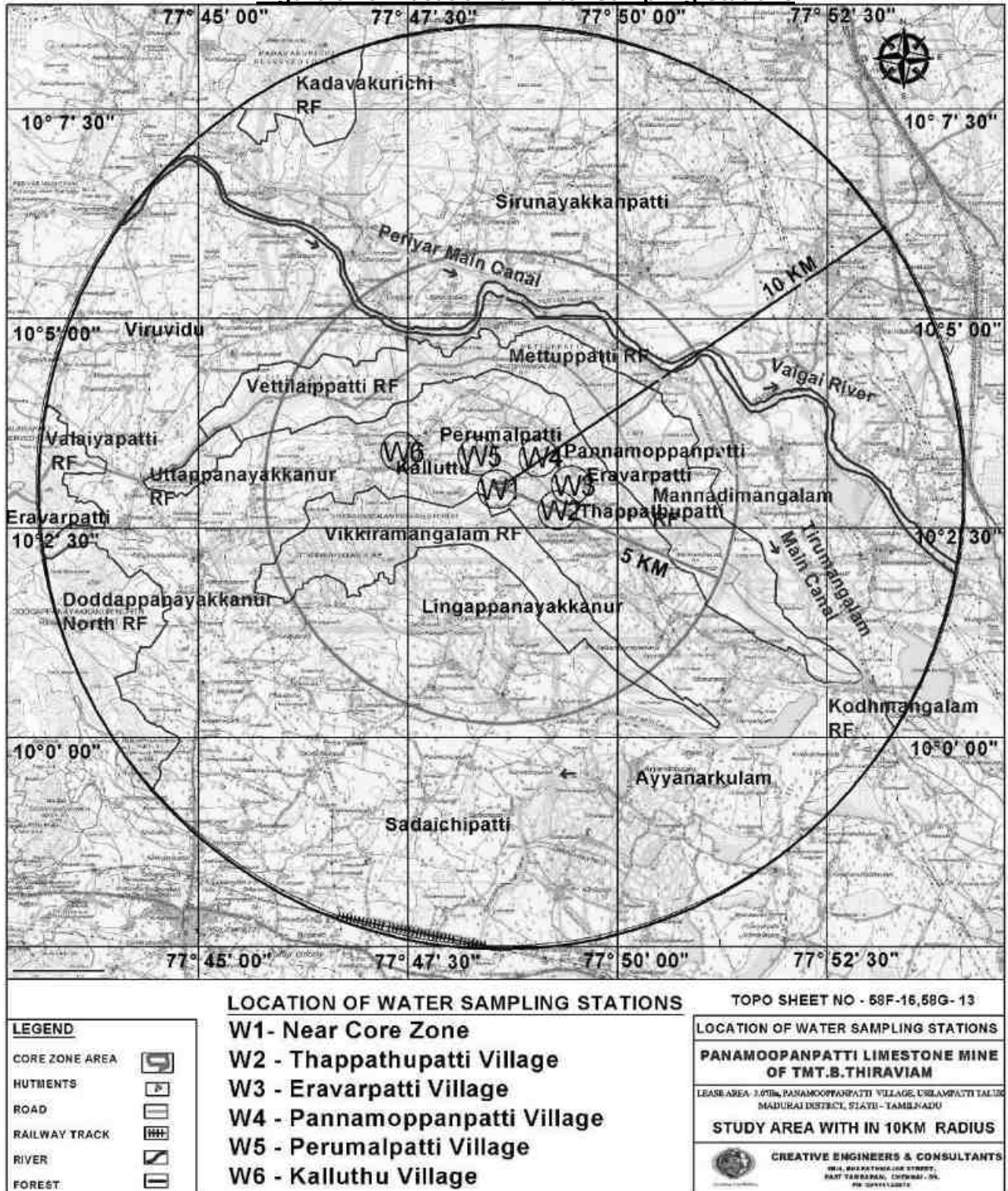
**Table 3.14: Water Quality Monitoring**

1.	<b>Monitoring Period</b>		<b>Winter Season ( Dec 2023 – Feb 2024)</b>		
2.	<b>Monitoring Location</b>		<b>The location map showing water sampling locations are given in Figure No.3.11.</b>		
	<b>Code</b>	<b>Location</b>	<b>Sample Type</b>	<b>Distance</b>	<b>Direction</b>
	W1	Near Core Zone	Bore Well	-	-
	W2	Thappathupatti Village	Borewell	1.4km	SE
	W3	Eravarpatti Village	Borewell	1.7km	E
	W4	Pannamoppanpatti Village	Borewell	1.2km	NE
	W5	Perumalpatti Village	Borewell	710m	NW
	W6	Kalluthu Village	Borewell	1.7km	NW
3.	Methodology		Sampling - IS 3025 Part - I		
			Analysis – IS 3025 relevant parts / APHA 23rd Edition		



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**Figure 3.10: Location of Water Sampling Stations**



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**Table 3.15: Summary of Water Quality Data**

Season	December 2023 to February 2024	
Monitoring Locations	6 locations	
Parameters	Range of values	Limits*
pH at 25 °C	7.06 – 7.55	<b>6.5-8.5</b>
Total Dissolved Solids, mg/L	342 – 856	<b>2000</b>
Chloride as Cl-, mg/L	98.6 – 216	<b>1000</b>
Total Hardness (as CaCO <sub>3</sub> ), mg/L	184 – 478	<b>600</b>
Total Alkalinity (as CaCO <sub>3</sub> ), mg/L	187– 438	<b>600</b>
Sulphates as SO <sub>4</sub> <sup>2-</sup> , mg/L	32.5 – 152	<b>400</b>
Iron as Fe, mg/L	0.02 – 0.05	<b>0.3</b>
Nitrate as NO <sub>3</sub> , mg/L	1.45 – 4.65	<b>45</b>
Fluoride as F, mg/L	0.16 – 0.54	<b>1.5</b>

**3.3.3.1 Results and Discussion:**

The results of the water sample analysis are shown in **Table No - 3.14**. The pH values were ranging in between 7.06 – 7.55 TDS values were in the range of 342 – 856mg/L. Chloride values were ranging from 98.6 – 216mg/L. Iron content was found to be in the range 0.02– 0.05mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications. The water quality data is provided in **Annexure-10**.

**3.3.4 NOISE ENVIRONMENT:**

Opearional phase of this project may lead to increase noise levels from the existing levels at least in and around the project area. As noise level beyond permissible limits will cause adverse impacts on the environment, it has become imperative to assess the noise levels in and around the mine area. Noise level measurements were taken at the 5 locations during the monitoring period. Details of the same are provided below:



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TALUK, MADURAI DISTRICT, TAMIL NADU.**

**Table 3.16: Noise Level Monitoring**

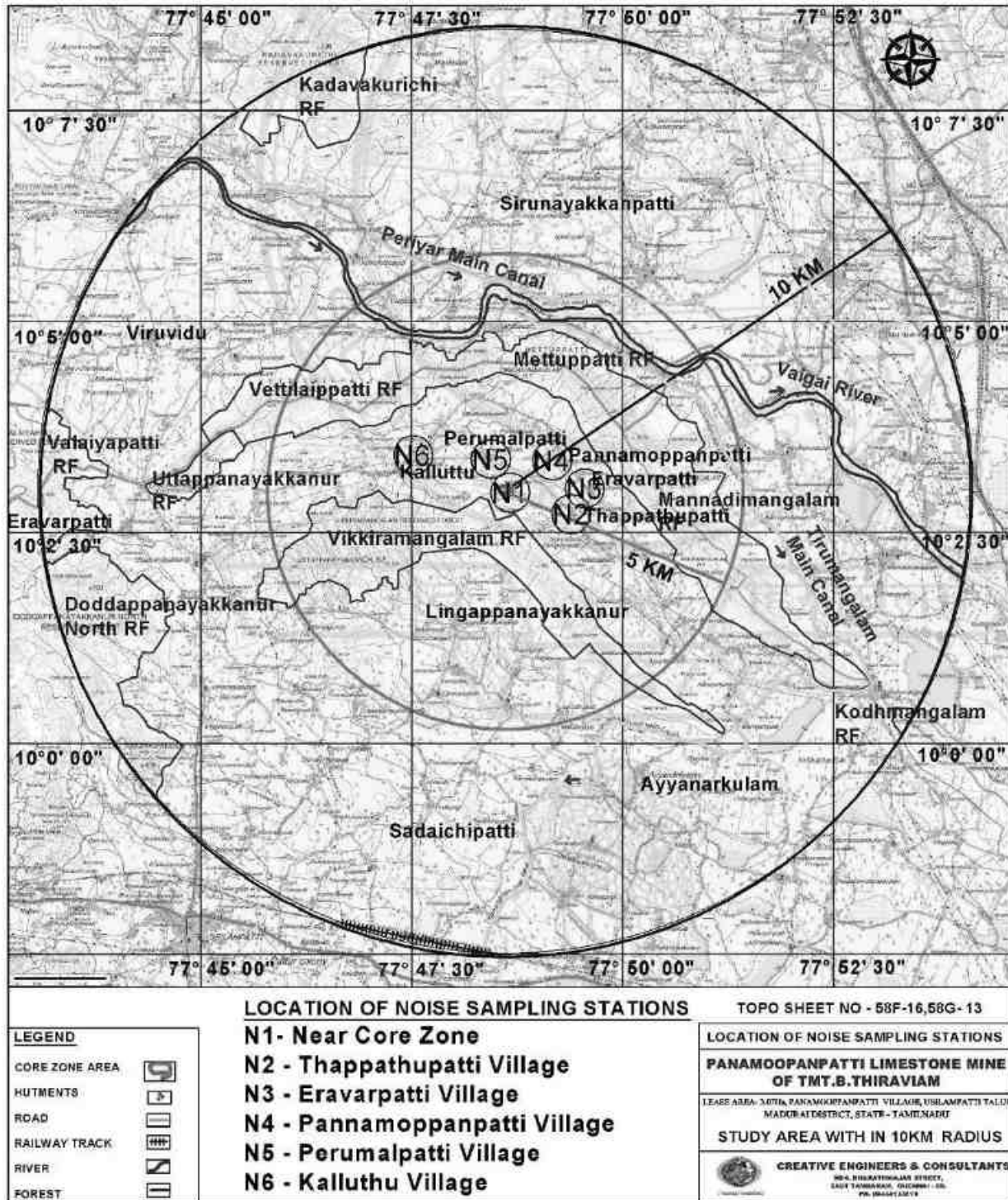
1.	<b>Monitoring Period</b>	<b>Winter Season ( Dec 2023 – Feb 2024)</b>		
2.	<b>Monitoring Location</b>	The location map showing noise monitoring locations are given in <b>Figure No.3.12.</b>		
	<b>Code</b>	<b>Location</b>	<b>Distance</b>	<b>Direction</b>
	N1	Near Core Zone	-	-
	N2	Thappathupatti Village	1.4km	SE
	N3	Eravarpatti Village	1.7km	E
	N4	Pannamoppanpatti Village	1.2km	NE
	N5	Perumalpatti Village	710m	NW
	N6	Kalluthu Village	1.7km	NW
3.	<b>Methodology</b>	Noise levels were measured using sound level meter manufactured by (Model No - SL- 4001, Make - Lutron). Sound Pressure Level (SPL) measurements were measured at all locations where ambient air quality monitored; one reading for every hour was taken for 24 hours.		
4.	<b>Monitoring Frequency</b>	Once during monitoring period		





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**Figure 3.11: Location of Noise Sampling Stations**

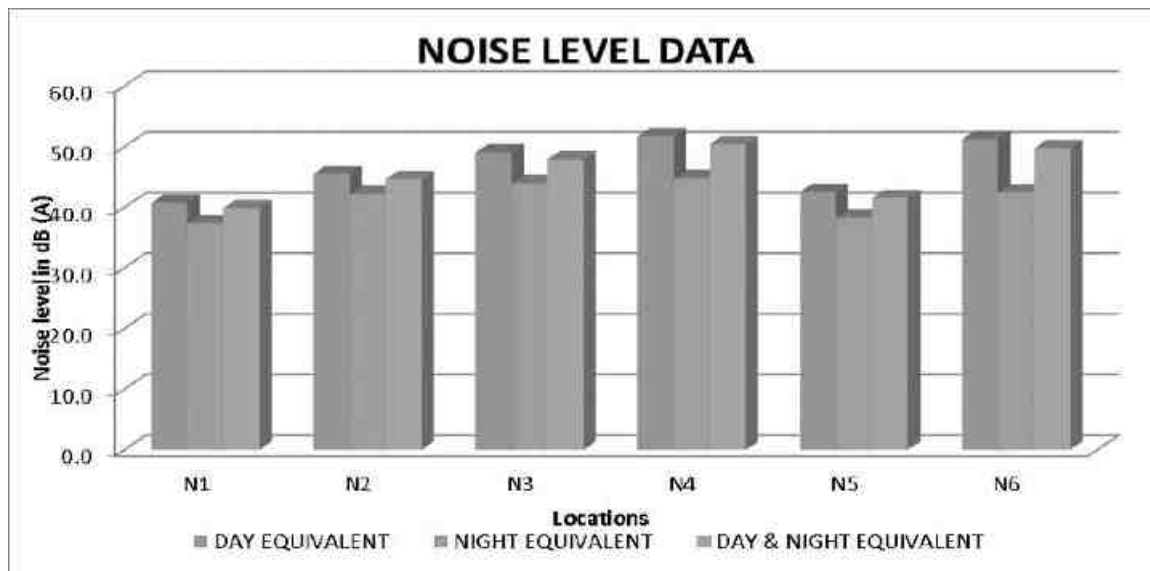


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**Table 3.17: Ambient Noise Level in dB (A)**

Date and time of monitoring	N1	N2	N3	N4	N5	N6
Day Equivalent	40.7	45.5	49.1	51.8	42.6	51.2
Night Equivalent	37.4	42.2	44.0	44.9	38.3	42.5
Day & Night Equivalent	39.9	44.7	47.9	50.4	41.5	49.8

**Figure 3.12: Noise Level Data**



**3.3.4.1 Results and Discussion:**

The results of noise levels for all locations are given in **Table No-3.15**. The noise values for all above locations are shown in a comparative chart given in **Figure No - 3.13**. In the buffer zone, day Equivalent Noise (Leq-d) noise levels were ranging from 40.7 dB(A) to 51.8 dB(A) and night Equivalent Noise (Leq-d) levels ranged between 37.4 dB(A) to 44.9dB(A). While comparing with the MOEF&CC Norm of 55 dB(A) for day time and 45 dB(A) for night time, the monitored ambient noise levels were within the limit values for Residential areas.

**3.3.5 SOIL CHARACTERISTICS:**

Soil samples were collected in 3 locations in the core and buffer zone to analyse the physiochemical characteristics of the soil in the area. Elaborate details of the same has been provided below.



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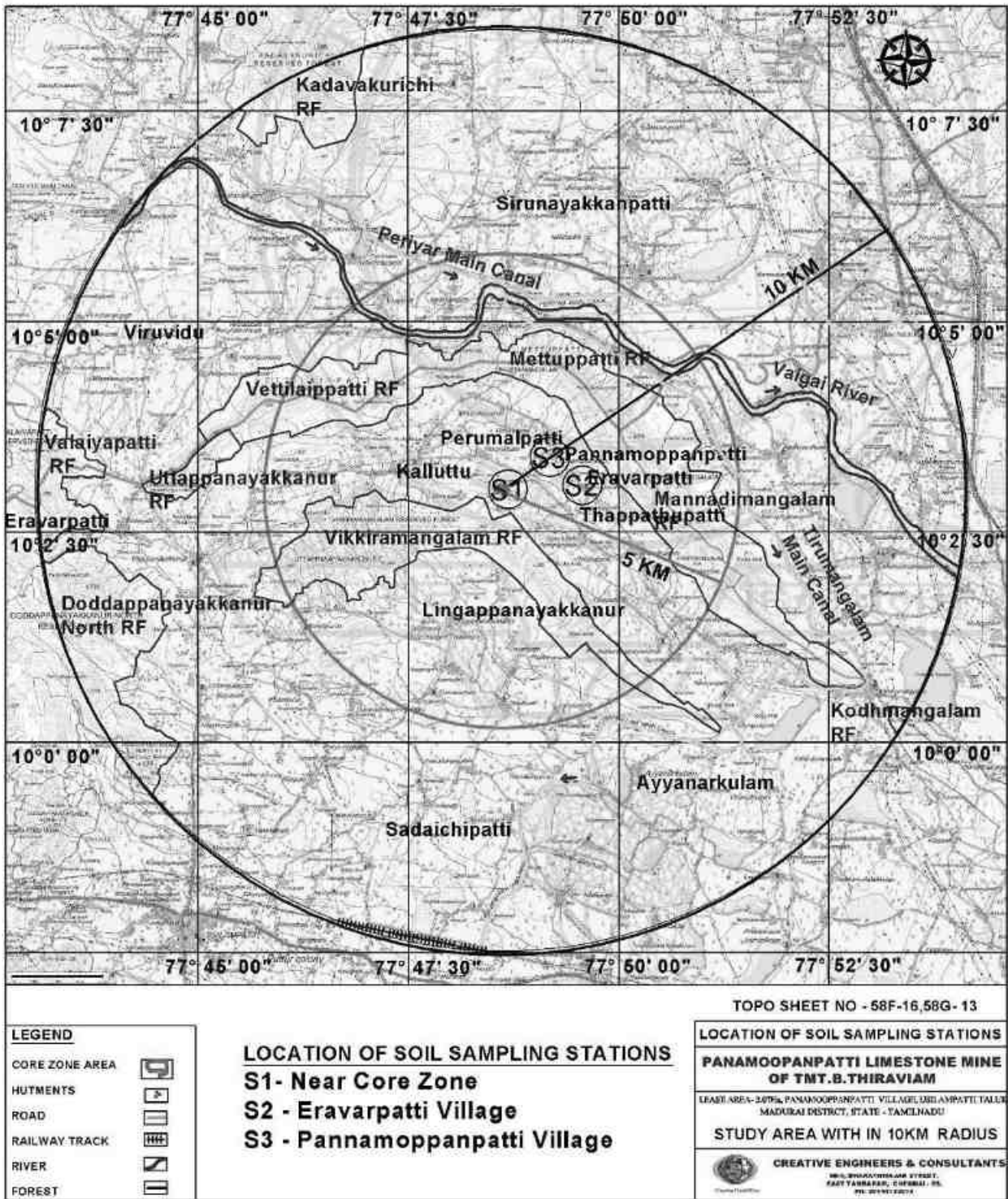
**Table 3.18: Soil Quality Monitoring**

1.	<b>Monitoring Period</b>	<b>Winter Season ( Dec 2023 – Feb 2024)</b>		
2.	<b>Monitoring Location</b>	The location map showing soil sampling locations are given in <b>Figure No.3.14.</b>		
	<b>Code</b>	<b>Location</b>	<b>Distance</b>	<b>Direction</b>
	S1	Near Core Zone	-	-
	S2	Eravarpatti Village	1.7km	E
	S3	Pannamoppanpatti Village	1.2km	NE
3.	<b>Methodology</b>	Composite soil samples using sampling augers and field capacity apparatus.		
4.	<b>Monitoring Frequency</b>	Once during monitoring period		



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**Figure 3.13: Location of Soil Sampling Stations**



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**Table 3.19: Soil Quality Data**

S.No	Parameters	Unit	S1	S2	S3
1	pH at 25°C	-	6.97	7.32	7.65
2	Electrical Conductivity	(µmhos/cm)	40.35	79.47	97.44
3	Dry matter content	%	96.65	97.23	94.87
4	Water Content	%	3.35	2.77	5.13
5	Organic Matter	%	0.72	0.94	0.76
6	Soil texture	-	Sandy Clay Loam	Loam	Loam
7	Grain Size Distribution i. Sand	%	54.87	48.97	38.95
8	ii. Silt	%	23.98	32.64	45.74
9	iii. Clay	%	21.15	18.39	15.31
10	Phosphorous	µg/g	1.54	1.72	2.31
11	Sodium	mg/kg	510	432	490
12	Potassium	mg/kg	360	310	335
13	Total Nitrogen	mg/kg	59.7	140	172
14	Total Sulphur	%	BDL(D.L - 0.02)	BDL(D.L - 0.02)	BDL(D.L - 0.02)
15	Water Holding Capacity	-			
16	Porosity	-			

**3.3.5.1 Results and Discussion:**

Results of the soil samples show that the pH values were ranging between 6.97 to 7.65 and Electrical Conductivity values were ranging between 40.35 – 97.44 µmhos/cm. Soils are generally Silty loam type. Organic matter values were ranging between 0.72 – 0.94%. Total Nitrogen values were ranging between 59.7 - 172mg/kg. Phosphorus values were ranging between 1.54 – 2.31µg/g. Potassium values were ranging between 310 - 360 mg/kg. Sodium values were ranging between 432- 510 mg/kg. Total Sulphur values were observed to be BDL. The soil quality data for the 3 samples collected and analyzed are provided in **Table No – 3.18.**



### **3.4 LAND ENVIRONMENT - LANDUSE & LAND COVER**

For preparing an impact statement, aspects of the land conditions are covered under land use. An industrial project / mine can cause changes in land use, soil process in different intensities depending upon the size of the project and distance involved between the industries and the area. Here, land use status for a radius of 10 km has been studied.

#### **3.4.1 DATA USED AND METHODOLOGY**

For the present study on land use pattern of buffer area around the quarry, an archived historical data of Landsat-8 data shas been used as base data acquired on Feb 2024 (Figure No.3.14) has been used to generate the require landuse map showing their spatial pattern within the buffer area. The table showing data used for generation of information on landuse and subsequent GIS analysis is given below

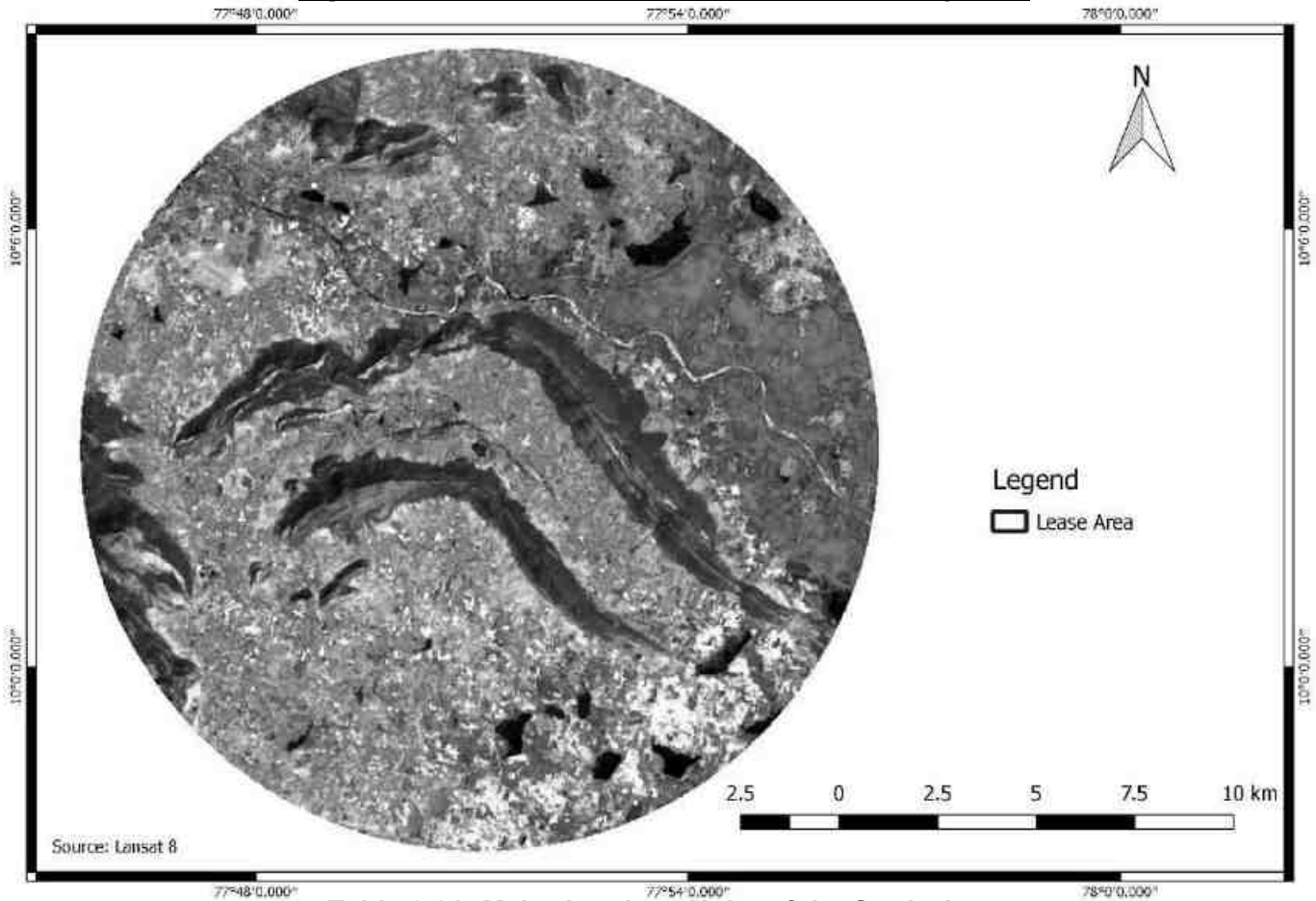
**Table 3.20: RS satellite image used for the present study**

<b>S.No</b>	<b>Type of Data</b>	<b>Date</b>	<b>Generated Map</b>
1.	Landsat-8	Feb 2024	Landuse (LU) Map showing 10 Km around the ML area

Interpretation of satellite image requires understanding of relationship between image elements and their respective terrain elements. Since, in the present study, the landuse information is obtained using visual interpretation, an interpretation key is generated. The image elements such as color, tone, texture, size, shape and associated elements have been used to delineate various landuse categories. The landuse categorization and nomenclature used in the present study is based on the national level landuse classification system, which is adopted for the entire country as recommended by National Remote Sensing Centre (NRSC), Department of Space, Government of India.

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**Figure 3.14 : Landsat 8 Satellite Data of the Study Area**



**Table 3.21: Major Landuse Units of the Study Area**

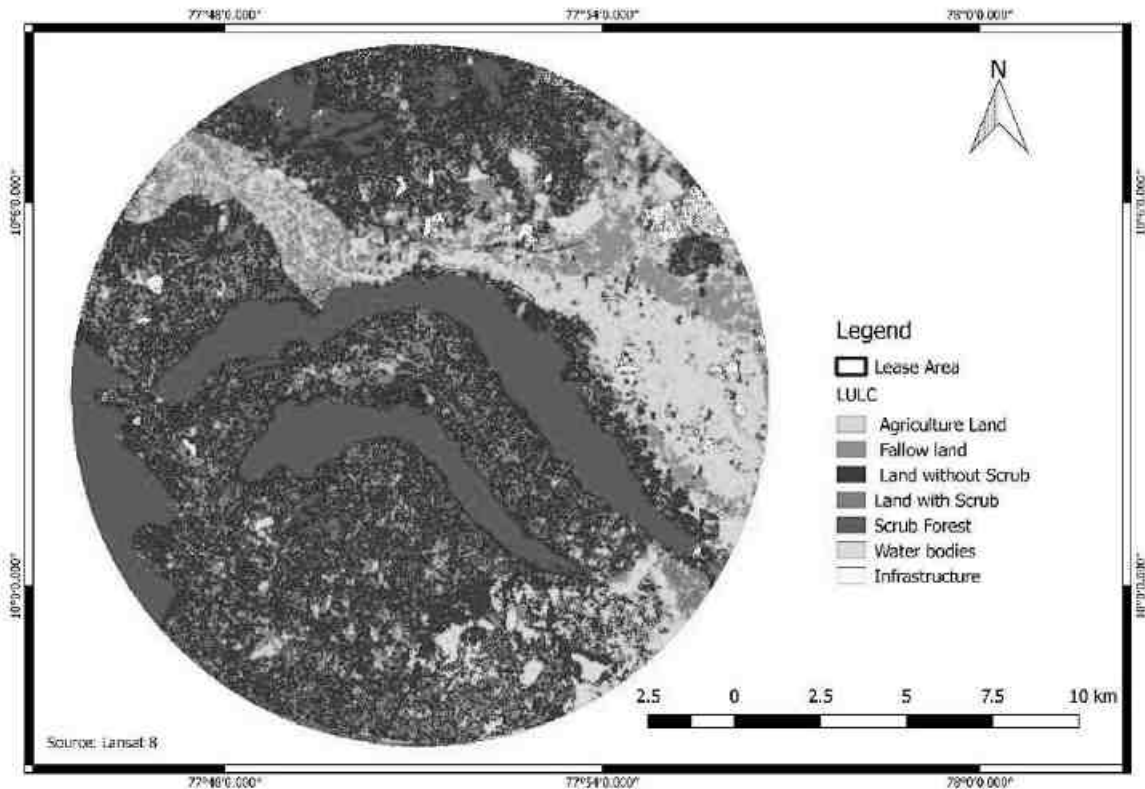
S.No	Major Category	Landuse unit
1	Built-Up Land	Village, Town, Industrial / Vacant Area
2	Agricultural Land	Crop Land Fallow Land Plantation Farm Land
3	Forest Land	Open Scrub Forest
4	Waste Land Mining Area	Land With Scrub/ Land Without Scrub Barren Rocky/ Stony Waste Quarries / Abandoned Quarries
5	Waterbodies	Tanks/ Rivers / Streams

Such LandUse and Land cover (LULC) categories have been verified using field check and identified sample sites within the buffer area, verified on field and transferred into gis geo-coordinates using observation coordinates received from hand held GPS (global positioning system) instrument. Thus, an interpreted final landuse map has been generated (Figure No. 3.15) using above such elaborate procedure and transformed into GIS environment for its spatial

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distribution and area estimation. Spatial nature and extent of various landuse categories within the buffer area is discussed is given below:

**Figure 3.15: Map Showing Land Use Categories around 10km Buffer**



**Table 3.22: Area Estimation of Landuse Categories in Buffer Zone**

S.No	Landuse Feature	Area (Sq.Km)	Percentage
1	Agriculture/ Plantation	49.17	15.24
2	Fallow Land	28.49	8.86
3	Land With Scrub	102.33	31.72
4	Land Without Scrub	58.76	18.21
5	Scrub Forest	65.01	20.15
6	Water bodies	15.30	4.74
7	Settlement	34.93	1.08
	<b>Total</b>	<b>353.99</b>	<b>100</b>

From the above table it is seen that 15.24 % of the study area is agriculture land and 8.86 % are fallow land. Land with scrub constitutes 31.72 %, lands without scrub constitute 18.21 % , Scrub Forest constitute 20.15 % and waterbodies & others constitute 5.82 %.





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**3.4.2 LAND USED BASED ON REVENUE RECORDS:**

The lease area falls in panamooppanpatti village, usilampatti taluk, Madurai district, Tamilnadu state and the study area for the land use pattern (10 km radius) has been divided into four zones viz. Zone-I (0-2 km), Zone-II (2-5 km), Zone-III (5-10 km) and Zone-IV (0-10 km) respectively. The land use pattern of the study area falling within 10 km radius around the proposed project area is presented in Table no - 3.19. Village wise land use pattern is provided in **Annexure-11**.

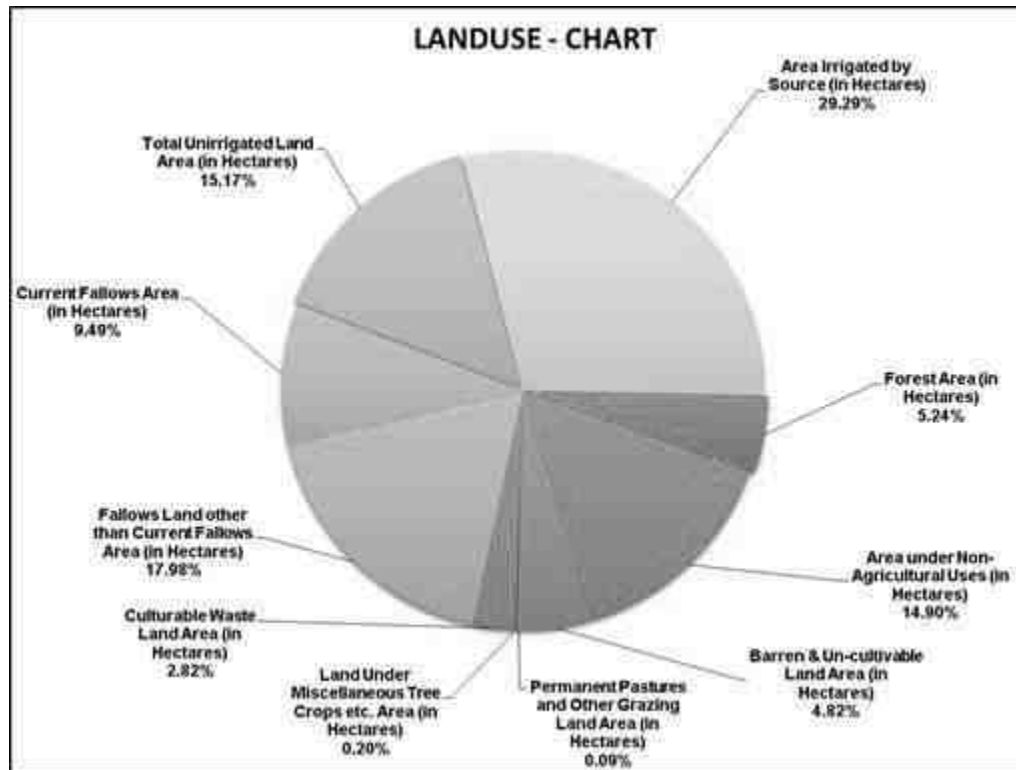


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**Table 3.23: Land Use Pattern of the Study Area Falling Within 10 Km Area in (Ha)**

Study Area	Total Geographical Area	Forest Area	Area under Non-Agricultural Uses	Barren & Un-cultivable Land Area	Permanent Pastures and Other Grazing Land Area	Land Under Miscellaneous Tree Crops etc. Area	Culturable Waste Land Area	Fallows Land other than Current Fallows Area	Current Fallows Area	Total Un irrigated Land Area	Area Irrigated by Source
0- 2 KM	2118.19	140.41	193.29	246.27	0	30.53	40.09	705.2	122.23	267.01	373.16
2 - 5 KM	5180.5	308.23	1037.52	382.73	0	22.95	82.97	820.54	571.28	1050.1	904.18
5-10 KM	30184.17	1514.96	4352.6	1179.04	35.11	19.92	935.51	5213.91	2864.83	4367.22	9701.07
0-10 KM	37482.86	1963.6	5583.41	1808.04	35.11	73.4	1058.57	6739.65	3558.34	5684.33	10978.41

**Figure 3.16: Landuse within the Buffer Zone Area**



### **3.5 BIOLOGICAL ENVIRONMENT:**

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

#### **3.5.1 FLORA:**

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

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

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

##### **3.5.1.1 Sampling Methodology:**

In order to provide representative ecological status for the study area, the 10-km radius buffer area has been divided into four quartiles for biodiversity sampling, i.e., NE (Q-1), NW (Q-2) SW (Q-3) and SE (Q-4). Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (10x10 m), shrubs (5x5 m) and herbs (1x1 m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

**Phyto-sociological Survey:** Phyto-sociological parameters, viz., Abundance (i.e., density), average and minimum stems were measured to determine the distribution and ecological aspects of the species. Abundance is a measure of the density of distribution of an individual species within a given area. It is calculated by summed individuals of a species. Average species number



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is calculated for all quadrates; similarly, minimum number of individuals represented is recorded at quadrats level. A total of 10 quadrats were laid down in core area and a total of 20 quadrats were laid out in four quartiles (5 each) of buffer area.

**Quadrats method for flora :** Quadrats of 10 × 10m were laid down randomly within core and 10kms buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and 5 × 5 m sub-quadrat nested within the quadrat for shrubs and two plot 1 × 1 m for herbs . The quadrats were laid at a minimum distance of a kilometer apart to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, natural forest area, avenue plantations, house backyards, etc. In each sample quadrat, individuals belonging to tree, shrub and herb species were recorded separately, and have been identified on the field. The prevailing land use and habitat quality has been noted down for each location on the field.

**Vegetation Analysis using index:** Species diversity will be calculated by using Shannon and Wiener (1963) formula as follows:

$$H' = - \sum_{i=1}^R p_i \ln p_i$$

Whereas,

H' is Shannon index of general diversity,

$P_i$  is often the proportion of individuals belonging to the ith species in the dataset of interest.

Evenness index was calculated as:  $E = H'/H_{max}$ ,

Whereas  $H_{max} = \log_2$  (number of species in the plot)

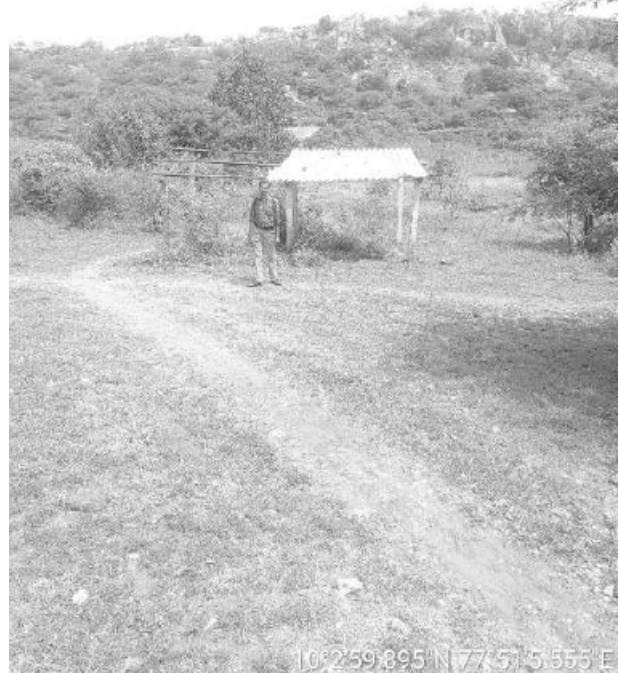
**A.CORE ZONE:**

The lease area is a non-forest, private land. Major part of lease area is rocky barren fallow land with bushes ( Prosopis juliflora) and grasses. The detailed list of plants found in the core zone are given in Table no – 3.20.



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**Photos Showing the Core Zone**



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**Table 3.24: List of Floristic Species in the Core Zone**

SI.No	Species Name	Common Name	Family
<b>Trees</b>			
1	<i>Acacia leucophloea</i>	Fabaceae	Valvelam
	<i>Pongamia pinnata</i>	Fabaceae	Pungai
2	<i>Azadirachta indica</i>	Meliaceae	Vembu
3	<i>Prosopis juliflora</i>	Fabaceae	Cimaikkaruvel
4	<i>Acacia nilotica</i>	Fabaceae	Karuvelan
5	<i>Albizia lebbek</i>	Fabaceae	Vagai
6	<i>Morinda tinctoria</i>	Rubiaceae	Nuna
<b>Shrubs</b>			
1	<i>Calotropis gigantea</i>	Apocynaceae	Earukku
2	<i>Cassia auriculata</i>	Fabaceae	Aavarampoo
3	<i>Ziziphus jujuba</i>	Rhamnaceae	Elanthai
4	<i>Lantana camara</i>	Verbenaceae	Uni
<b>Herbs</b>			
1	<i>Tridax procumbens</i>	Asteraceae	Vettukai poondu
2	<i>Sida acuta</i>	Malvaceae	Palambasi
3	<i>Leucas aspera</i>	Lamiaceae	Thumbai
4	<i>Solanum nigrum</i>	Solanaceae	Manathakkali
5	<i>Anisomeles indica</i>	Lamiaceae	marutti
6	<i>Acalypha indica</i>	Amaranthaceae	Kupaimeni keeri
<b>Climbers</b>			
1	<i>Cissus quadrangularis</i>	Vitaceae	Pirandai
2	<i>Abrus precatorius</i>	Fabaceae	Kundumani
<b>Grasses</b>			
1	<i>Cynodon dactylon</i>	Poaceae	Arugampillu

**PROJECT IMPACT ZONE (PIZ-300m BUFFER FROM CORE ZONE):**

Part of the PIZ is a dry barren fallow land with thorny bushes of *Prosopis juliflora*. This portion is intervening the 2 rocky hills on the north and south side of the lease area. Some patches of coconut groves are observed in the NE side of the lease area. A total of 11 tree species from 5 families were recorded in the PIZ. The diversity indexes was less due to dry area. From the above result it is clearly shows the PIZ is disturbed and has less diversity. Hence it is important to improve the plantation of the study area. The list of plants found in the PIZ are given in Table no – 3.23. The detailed list of plants found in the PIZ is given below.



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**Table 3.25: Phyto-Sociological Survey Of Trees In PIZ**

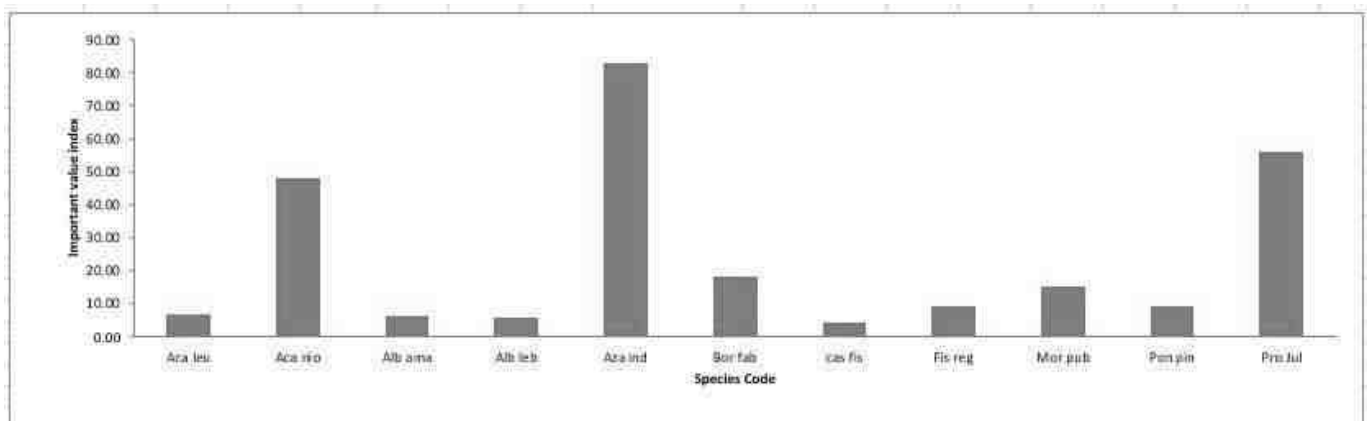
Species	Family	Density	Frequency	BA	Rd	Rdo	Rf	IVI
Acacia leucophloea	Fabaceae	8	5	0.782245223	6.11	7.5825	7.575757576	21.27
Acacia nilotica	Fabaceae	14	8	1.015127389	10.69	9.8398	12.12121212	32.65
Albizia amara	Fabaceae	5	5	0.421974522	3.82	4.0903	7.575757576	15.48
Albizia lebbeck	Fabaceae	2	2	0.169187898	1.53	1.6400	3.03030303	6.20
Azadirachta indica	Meliaceae	19	9	2.089092357	14.50	20.2500	13.63636364	48.39
Borassus flabelliformis	Arecaceae	10	8	1.297770701	7.63	12.5796	12.12121212	32.33
Cassia fistula	Fabaceae	7	6	0.774283439	5.34	7.5053	9.090909091	21.94
Ficus religiosa	Moraceae	3	2	0.875796178	2.29	8.4893	3.03030303	13.81
Morinda pubescens	Rubiaceae	9	7	0.889729299	6.87	8.6243	10.60606061	26.10
Pongamia pinnata	Fabaceae	13	5	1.56433121	9.92	15.1634	7.575757576	32.66
Prosopis juliflora	Fabaceae	41	9	0.436968949	31.30	4.2356	13.63636364	49.17

Rd- Relitive Density, Rdo- Relative dominance, Rf – Relative Frequency, IVI – Importance Value Index

**Table 3.26: Species Diversity index of trees in PIZ**

A	Lower	Upper
Taxa	11	11
Individuals	131	131
Dominance	0.1531	0.1908
Simpson	0.8469	0.8845
Shannon	3.077	3.27
Evenness	0.767	0.767
Fisher alpha	2.86	3.8
Berger Parker	0.313	0.313

**Figure 3.17: Species Important Value Index For Trees in PIZ**



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**C.BUFFER ZONE:**

Study area represents varying land use comprising rocky hills ( represented as RF) on the north, south and west of the lease area. Thorny bushes,cactus variety of species only observed in these RF areas. Besides, further north along side the vaigai river, cocunut grooves and agricultural activities are observed. The Dominated species are Prosopis juliflora, Azadirachta indica, Borassus flabellifer, Acacia nilotica, Albizia lebbeck, Acacia leucophloea, Acacia auriculiformis, etc. The detailed list of plants found in the Bufferzone is given in Table no – 3.25.

**Table 3.27: List of Floristic Species in the Buffer Zone**

SI.No	Species Name	Family	Local Name
<b>Trees</b>			
1	Ficus benghalensis	Moraceae	Aalamaram
2	Mangifera indica	Anacardiaceae	Maamaram
3	Pongamia pinnata	Fabaceae	Pungai
4	Bobax ceiba	Malvaceae	Ilavu
5	Tectona grandis	Verbenaceae	Tekku
6	Morinda pubescens	Rubiaceae	Manjanathi
7	Delonix regia	Fabaceae	Gulmohar
8	Mimusops elengi	Sapotaceae	Magizhamboo
9	Sygygium cumuni	Myrtaceae	Naval
10	Tamarindus indica	Fabaceae	Puli
11	Phyllanthus emblica	Euphorbiaceae	Nelli
12	Aegle marmelos	Rutaceae	Vilvamaran
13	Cocus nucifera	Arecaceae	Tennai
14	Psidium guava	Myrtaceae	Koyya
15	Ficus religiosa	Moraceae	Poarasamaram
16	Pithecellobium dulce	Fabaceae	Kodukkapuli
17	Gmelina arborea	Lamiaceae	Kumalaamaram
18	Albizia lebbeck	Fabaceae	Vagai
19	Carica papaya	Caricaceae	Pappali
20	Musa paradisiaca	Musaceae	Valzhlai
21	Acacia nilotica	Fabaceae	Karuvelan
22	Prosopis juliflora	Fabaceae	Seemai karuvel
23	Samanea saman	Fabaceae	Amaivagai
24	Azadirachta indica	Meliaceae	Vembu
25	Polyalthia longifolia	Annonaceae	Nietilingam
26	Cassia fistula	Fabaceae	Konrai
27	Peltophorum pterocarpum	Fabaceae	Kilukiluppai
28	Terminalia arjuna	Combretaceae	Marudha Maram
29	Manilkara zapota	Sapotaceae	Sappota





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Sl.No	Species Name	Family	Local Name
30	Leucaena leucocephala	Fabaceae	Subabul
31	Madhuca longifolia	Sapotaceae	Iluppai
32	Citrus limon	Rutaceae	Lemon
33	Acacia leucophloea	Fabaceae	Valvelam
34	Casuarina equisetifolia	Casuarinaceae	Savukku
35	Bauhinia purpurea	Caesalpiniaceae	Mantharai
36	Acacia auriculiformis	Fabaceae	Pencil tree
37	Moringa oleifera	Moringaceae	Murungai
38	Thespesia populnea	Malvaceae	Puvarasu
39	Borassus flabelliformis	Arecaceae	Panna-maram
40	Morinda tinctoria	Rubiaceae	Nuna
<b>Shrubs</b>			
1	Tecoma stans	Bignoniaceae	Yellow trumpetbush
2	Lantana camara	Verbenaceae	Putus
3	Calotropis gigantea	Apocynaceae	Earukku
4	Abutilon indicum	Malvaceae	Thuthi
5	Hibiscus rosa-sinensis	Malvaceae	Semparuthi
6	Sida cordifolia	Malvaceae	Sida plant
7	Boerhaavia diffusa	Nyctaginaceae	Kagithapoo
8	Justicia adhatoda	Acanthaceae	Adathoda
9	Ixora casei	Rubiaceae	Idlipoo
10	Aloe vera	Asphodelaceae	Chotthu kathalai
11	Cassia auriculata	Fabaceae	Aavarampoo
12	Jatropha glandulifera	Euphorbiaceae	Vellaikattukottai
13	Ricinus communis	Euphorbiaceae	Amanakku
14	Nerium indicum	Apocynaceae	Arali
15	Ziziphus jujuba	Rhamnaceae	Elanthai
16	Ipomoea carnea	Convolvulaceae	Pink morning glory
17	Lawsonia inermis	Lythraceae	Maruthani
18	Vitex negundo	Verbinaceae	Vanili
<b>Herbs</b>			
1	Parthenium hysterophorus	Asteraceae	Parthenium
2	Anisomeles malabarica	Lamiaceae	Peyimarutti
3	Argemone mexicana	Papaveraceae	Mexican poppy
4	Achyranthes aspera	Amaranthaceae	Nayuruvi
5	Phyllanthus niruri	Phyllanthaceae	Keelzhaneeli
6	Leucas aspera	Lamiaceae	Thumbai
7	Acanthospermum hispidum	Asteraceae	Gokul kanta
8	Ocimum tenuiflorum	Lamiaceae	Thulasi
9	Acalypha indica	Amaranthaceae	Kupaimeni keeri
10	Cleome viscosa	Cleomaceae	Naai velai



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Sl.No	Species Name	Family	Local Name
11	Sida acuta	Malvaceae	Palambasi
12	Sida rhombifolia	Malvaceae	Kurundotti
13	Solanum xanthocarpum	Solanaceae	Kandangkattari
14	Anisomeles indica	Lamiaceae	marutti
15	Tridax procumbens	Asteraceae	Vettukai poondu
<b>Climber</b>			
1	Abrus precatorius	Fabaceae	Kundumani
2	Asparagus racemosus	Asparagaceae	Tannir-vittan
3	Cissus quadrangularis	Vitaceae	Pirandai
<b>Grasses</b>			
1	Cynodon dactylon	Poaceae	Arugampillu
2	Cyperus rotundus	Cyperaceae	korai pullu

**Photos Showing the Buffer Zone**



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**3.5.2 FAUNA:**

**Methodology:** Both direct and indirect observation methods were used to survey the fauna. Point Survey Method was used to study the Bird diversity. Besides, discussion with local villagers Collection secondary data from Government records, published reports as well as through discussion with Forest officials, knowledgeable public were used for the study.

**Observation:** There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. There is no Schedule I animals in the buffer zone area. The list of fauna within the study area is given in Table No – 3.26.

**Table 3.28: List of Fauna in the Buffer Zone**

S.No	Common Name	Scientific name	IWPA, Schedule
<b>Mammals</b>			
1	Indian Palm squirrel	Funambus palmarum	IV
2	Indian Grey Mongoose	Herpestes edwardsii	II
3	Common Indian Hare	Lepus ruficaudatus	IV
<b>Birds</b>			
1	Spotted Dove	Streptopelia chinensis	IV
2	Common Kingfisher	Alcedo atthis	IV
3	Common Myna	Acridotheres tristis	IV
4	Rose-ringed Parakeet	Psittacula krameri	IV
5	House Sparrow	Passer domesticus	IV
6	Black Drongo	Dicrurus macrocercus	IV
7	Common Crow	Corvus splendens	V
8	Red-vented Bulbul	Pycnonotus cafer	IV
9	Indian Cuckoo	Cuculus micropterus	IV
10	Little Cormorant	Phalacrocorax niger	IV
11	Purple-rumped Sunbird	Nectarinia zeylonica	IV
12	Little Egret	Egretta garzetta	IV
13	Common Quail	Coturnix coturnix	IV
14	Cattle Egret	Bubulcus ibis	IV
15	Common Babbler	Turdoides caudatus	IV
<b>Reptiles</b>			
1	Garden Lizard	Calotes versicolor	IV
2	Rat Snake	Ptyas mucosa	II
3	Common Indian krait	Bungarus caeruleus	II
<b>Amphibians</b>			
1	Common Indian toad	Bufo melanostictus	IV



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S.No	Common Name	Scientific name	IWPA, Schedule
<b>Butterfly</b>			
1	Small grass yellow	Eurema brigitta	IV
2	Lime butterfly	Papilio demoleus	IV
3	Common crow	Euploea core	IV

### 3.6 HYDROGEOLOGICAL STUDY:

This section delves into the study of the hydrogeological scenario of the study area to evaluate the impact of mining activities on the nearby areas. The study area is located in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu is considered to understand the nature of the general hydrogeological conditions of the area.

#### 3.6.1 PHYSIOGRAPHY AND DRAINAGE:

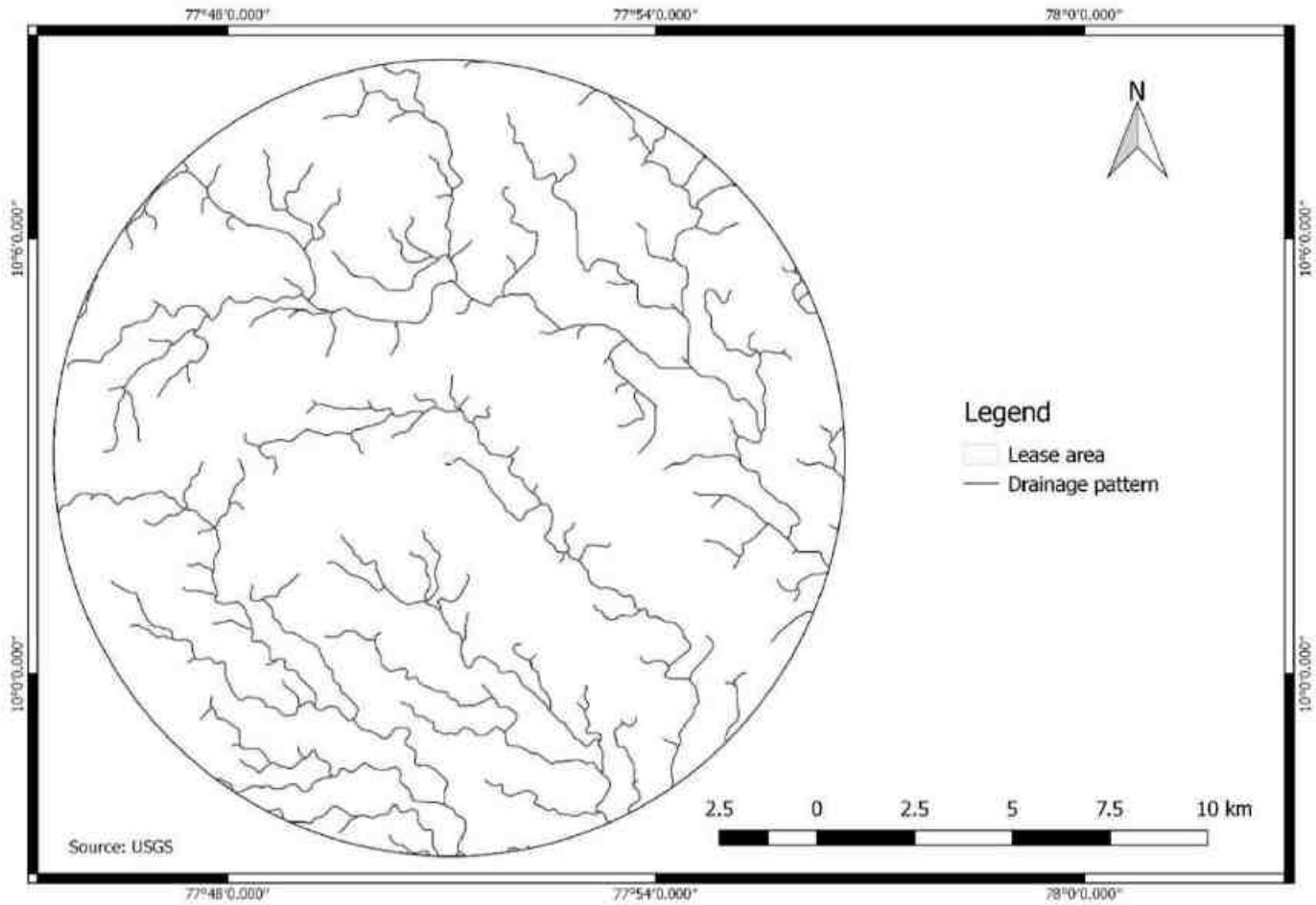
**Physiography:** The lease area exhibits moderately elevated area. Topsoil is covered with red soil upto a depth of 1m and partly capping the limestone outcrops. Intermittent outcrops of limestone are observed at surface continuously throughout the area for mapping. The width of limestone band is observed as 8-12.5m and running to a length of 200m along east-west direction and dip is 80° due to North. The limestone band is folded due to regional complex folding north of Usilampatti.

**Drainage:** The drainage map prepared from the survey of India topographic maps shows the presence of few streams running in a dendritic pattern.



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**Figure 3.18: Drainage Map**

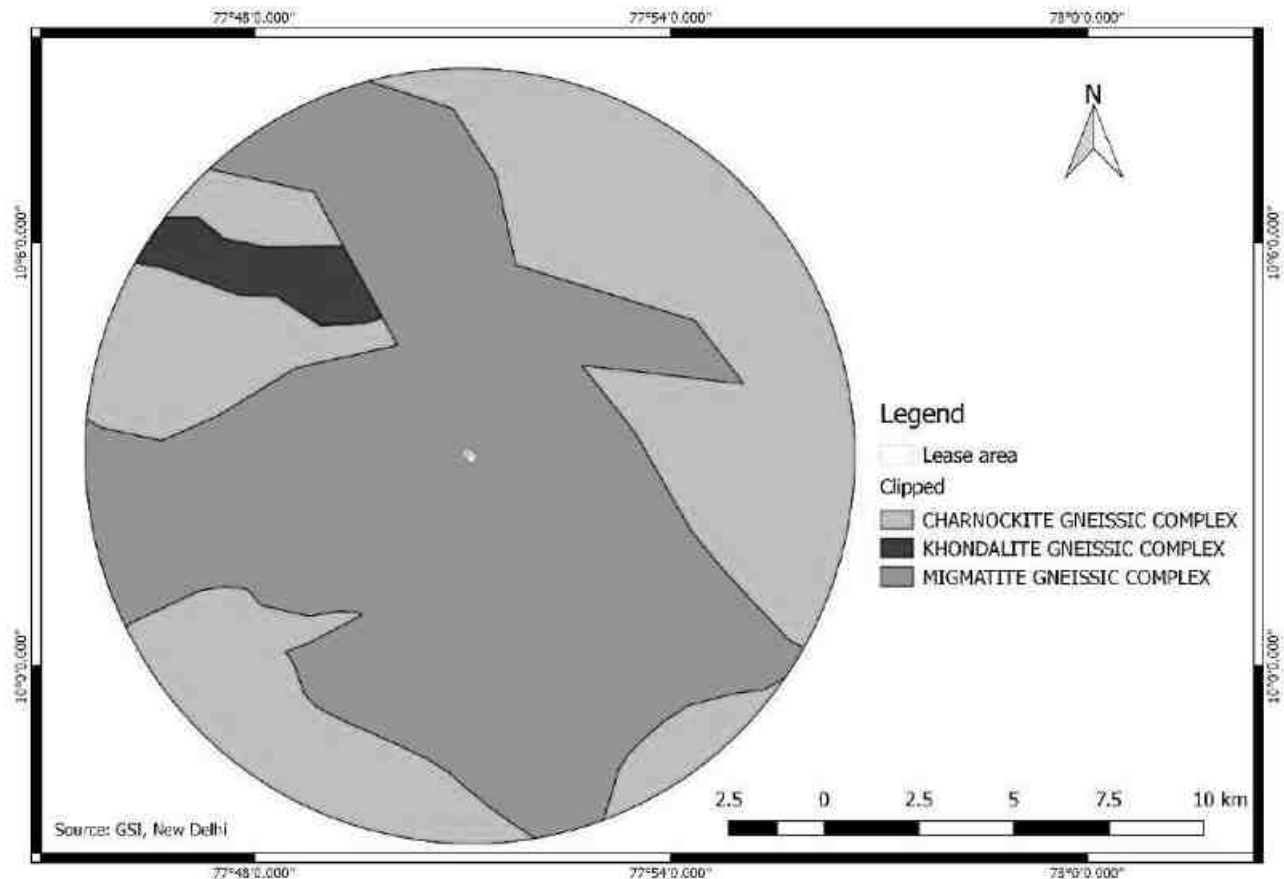


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**3.6.2 GEOLOGY AND GEOMORPHOLOGY**

**Geology:** The type of rock formation in the buffered zone is composed majorly of Migmatite Gneissic complex. The lease area falls under Migmatite Gneissic complex category.

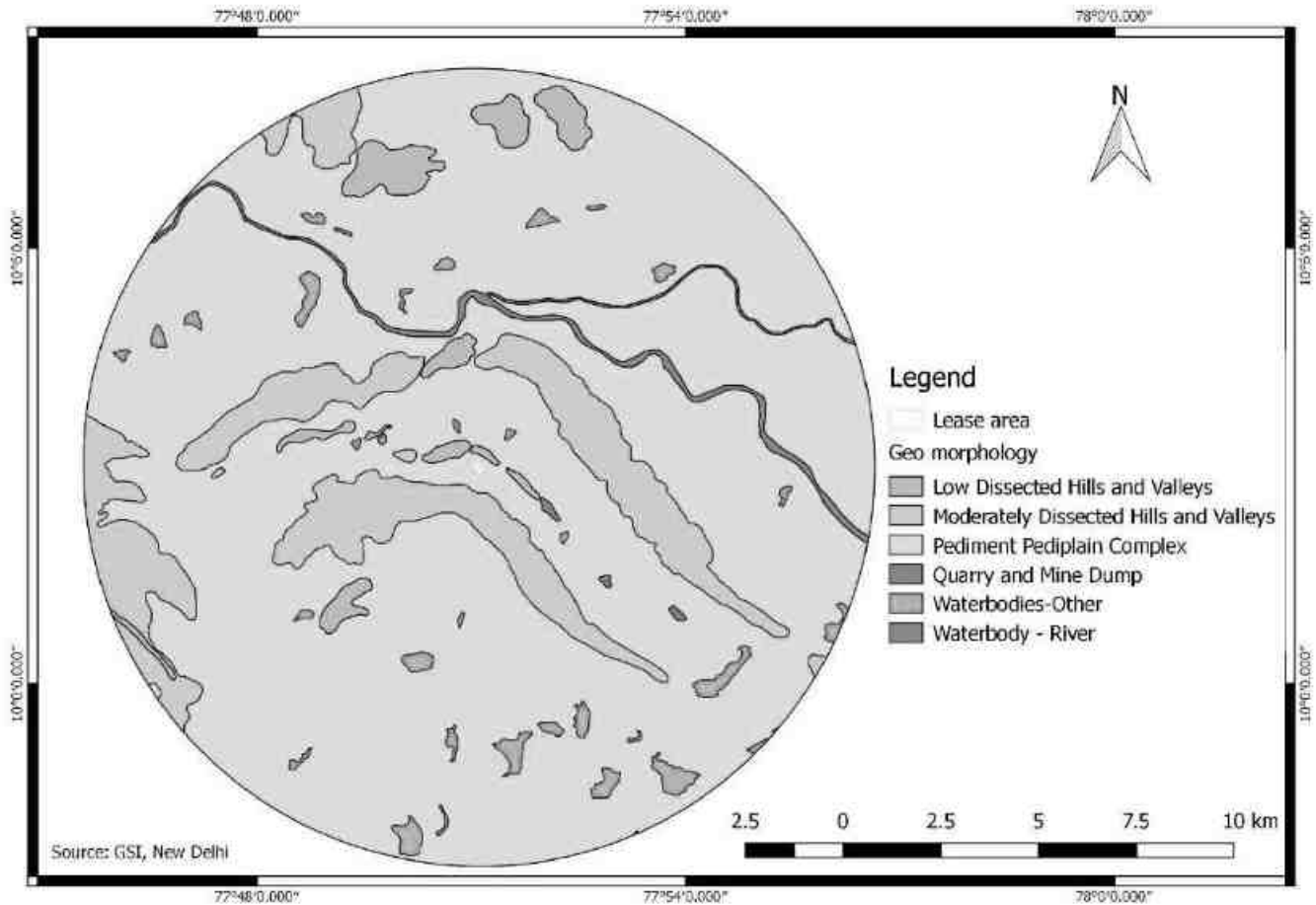
**Figure 3.19: Geology Map**



**Geomorphology:** The geomorphology map of the study derived from the satellite imagery using remote sensing and GIS technique. Predominantly the buffer zone is dominated by Pediment Pediplain complex, and it is the same category that the lease area also falls under.

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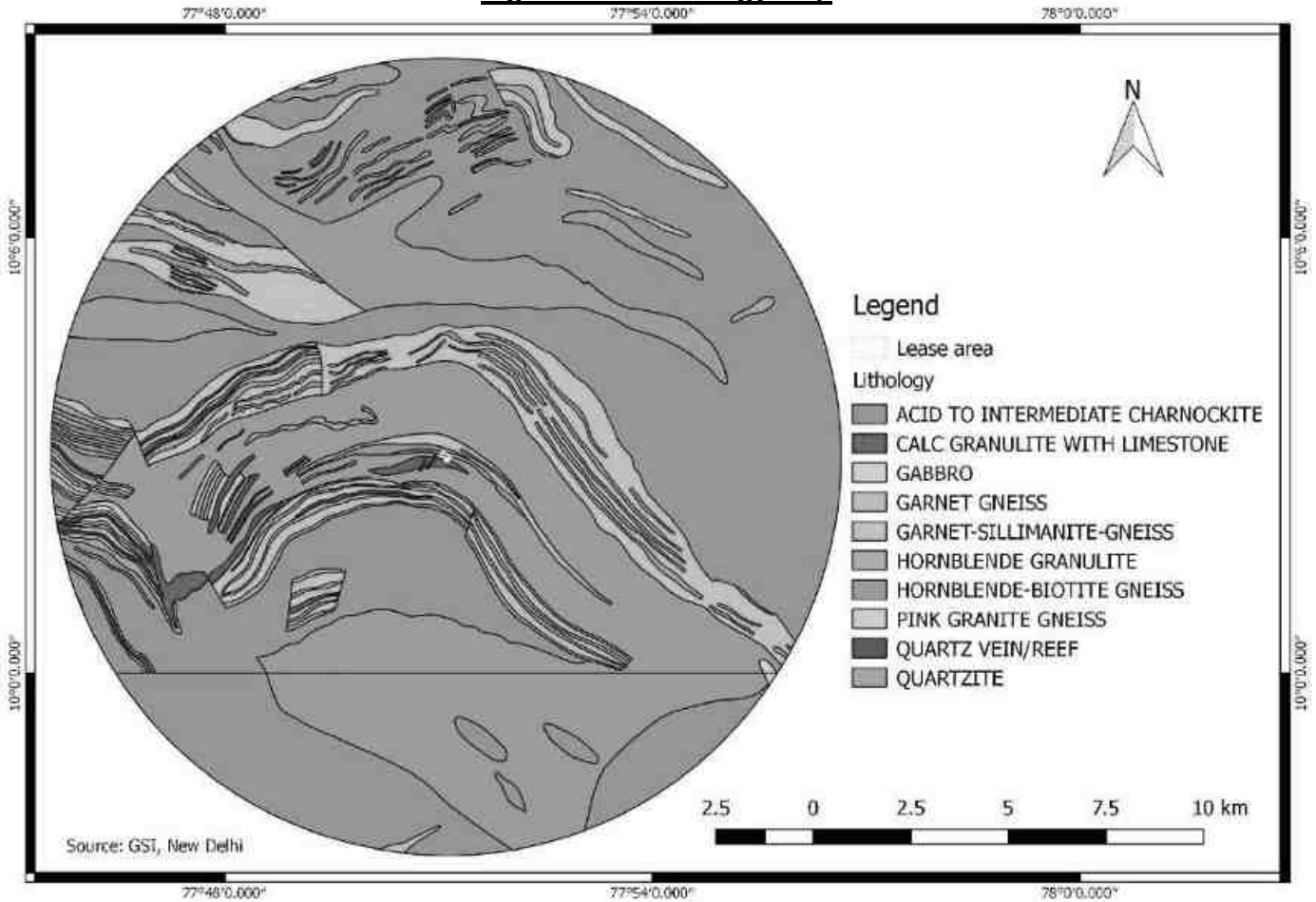
**Figure 3.20: Geomorphology Map**



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**Lithology:** The study area is mainly dominated by Acid to Intermediate Charnockite. The lithology map has been provided below.

**Figure 3.21: Lithology Map**

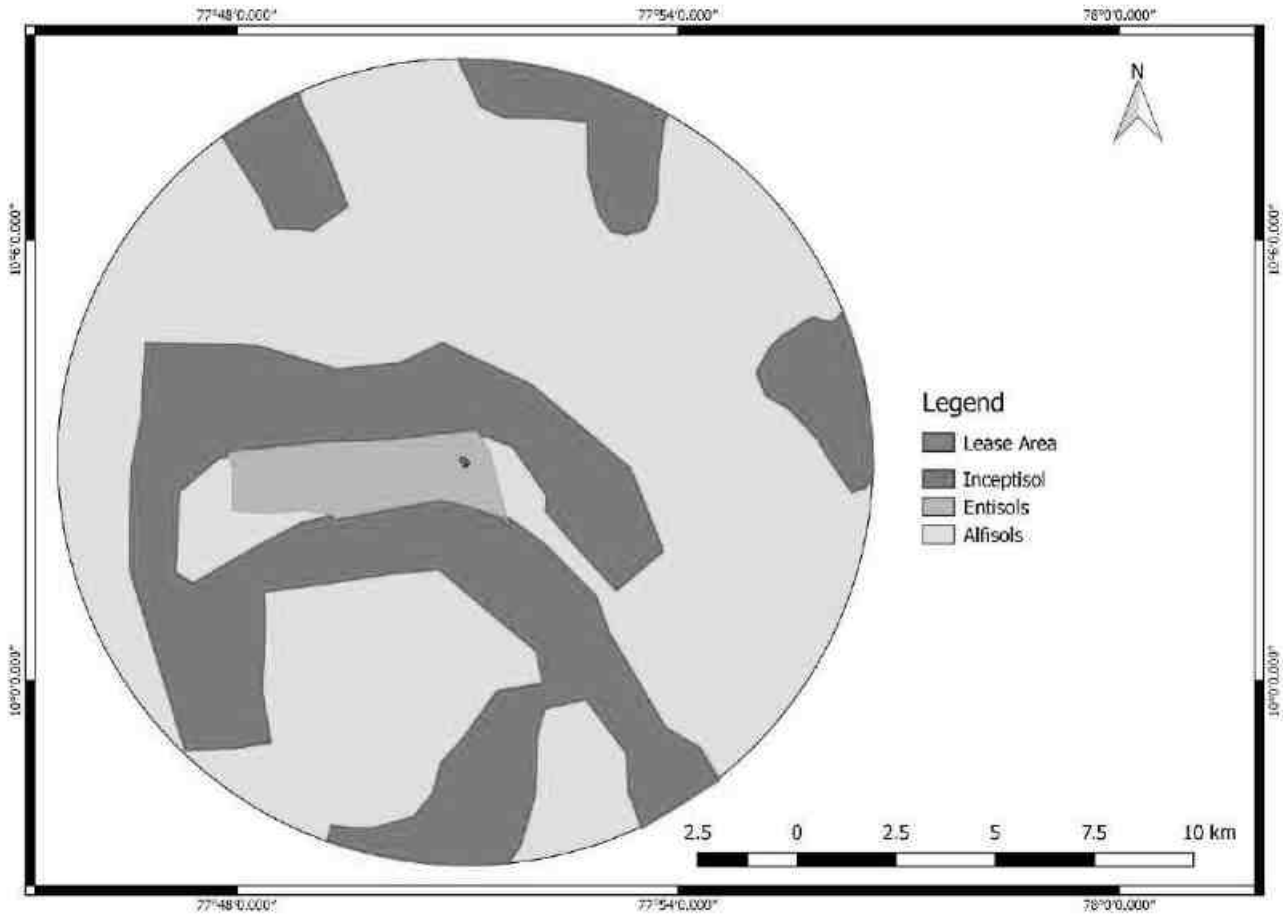




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**Soil:** The study area is characterized by Vertisols, Alfisols and Inceptisol. The project area is dominated with Inceptisol type of soil.

**Figure 3.22: Soil Map**

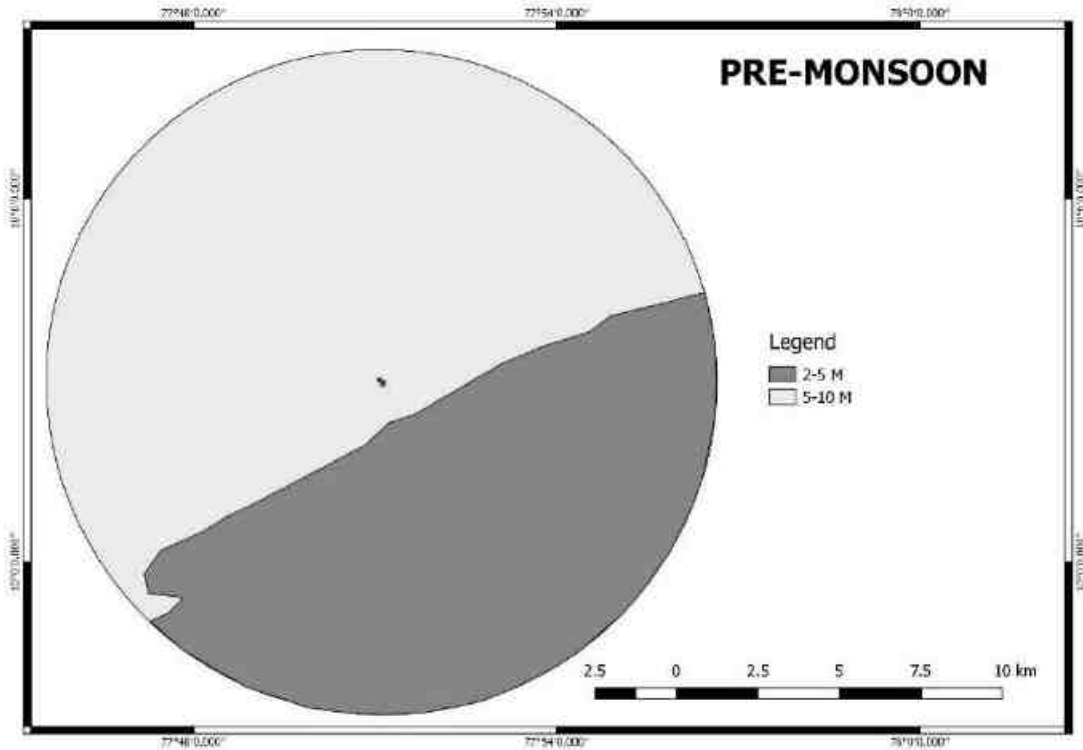


The premonsoon and post monsoon water levels are depicted in Figure No.3.25, and 3.26 and they indicate that the depth to water level in project area ranges between 2.0 to 10.0 m bgl during the pre-monsoon season(April) and 2.0 to 10.0 m bgl during the post monsoon season (November).

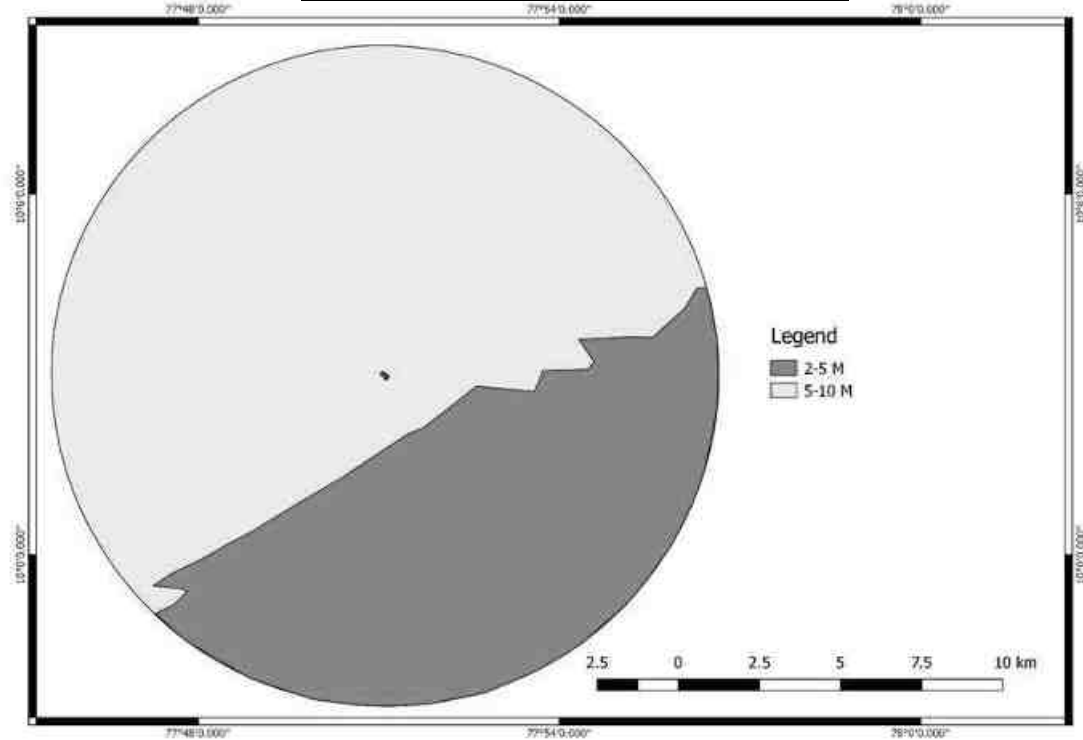


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**Figure 3.23: Pre-Monsoon Water Level**



**Figure 3.24: Post Monsoon Water Level**



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**Field investigation:**

Study of the area shows that the sub-surface formations reveal about 1 to 2m of soil with low recharge potentials. Subsequently hard and massive formations of rock are found.

In the study area, the shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The study has revealed that potential fractures are encountered at deeper levels. The water in the wells are available mainly after post monsoon and it reduces during summer necessitating only dry crops cultivation. Bore wells are as deep as 350 ft also and it reflects that the yield is only better at deeper water levels.

Based on the available information and the geophysical investigations it is concluded that the project area is considered to poor groundwater potential up to 55m. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected. Hence, the quarrying lime stone up to the proposed depth may not have any adverse impact in the area over ground water conditions.

Rain water collected in the tanks in the region acts as a good source of water during post monsoon. In order to increase the recharge, tanks, and percolation ponds may be provided with the recharge wells/recharge shafts penetrating this impervious layer to make it more effective in recharging the aquifer.

\* \* \* \* \*



# **CHAPTER - IV**

## **ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES**

## **CHAPTER 4**

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

#### **4.1 GENERAL**

Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam is a brownfield project. However, no mining operation has yet been carried out after obtaining environmental clearance. Systematic and Scientific Mining operations are proposed to be carried out for preserving the environmental conditions in and around the mine lease area.

Present environmental quality of the project area is within limits prescribed by statutory bodies and it is amply supported by the fact that the monitored data on various environmental attributes are found to be within permissible limits.

The identified impacts due to proposed expansion during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc., and the details of the same are elaborated in this chapter.

#### **4.2 AIR ENVIRONMENT:**

##### **4.2.1 SOURCES OF AIR POLLUTION:**

The existing ambient air quality in the area has been described in Chapter-III. The proposed mining and allied operations may cause deterioration of air quality due to pollution arising from the project operation if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be:

- ❖ Drilling and Blasting Operation
- ❖ Excavation of material.
- ❖ Movement of HEMM such as Excavators, tippers etc.
- ❖ Loading and unloading operation
- ❖ Hauling
- ❖ Transportation outside lease area



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**4.2.2 IMPACTS DUE TO PROJECT OPERATION:**

The various sources of air pollution are listed above in the previous section. The major impacts that arise due to the above listed sources is the generation of particulate and gaseous matter. The direct impact and the indirect impact due to these pollution sources are provided below:

Direct Impact	Impact on humans/surrounding environment
Increase in particulate matter concentration in ambient air	<ul style="list-style-type: none"> <li>• Settling in the bronchi and lungs and cause health problems like Bronchitis, Emphysema, Bronchial Asthma, Irritation of mucus membranes of eyes, etc.</li> <li>• Particles smaller than 2.5 micrometers (PM2.5), tend to penetrate into the lungs and very small particles (&lt; 100 nanometers) may pass through the lungs to affect other organs.</li> <li>• The fine dust can be carried during windy days and be deposited on any structures located nearby causing dust nuisance.</li> <li>• Reduction in visibility in the area.</li> <li>• Workers are prone to dust related diseases such as siderosis, tuberculosis, eye irritations, dust related pneumonia, etc.</li> <li>• Apart from humans, inhalation of dust can also affect animals by way of health disorders such as respiratory problems.</li> <li>• Dust deposition can also be an impediment to growth of vegetation, leading to decreased productivity. It can affect the photosynthesis, respiration and transpiration processes.</li> </ul>
Increase in concentration of gaseous parameters like SO <sub>2</sub> , NO <sub>x</sub> and CO in ambient air	<ul style="list-style-type: none"> <li>• Inhalation of SO<sub>2</sub> in higher concentrations of 8-12 ppm in air causes throat irritation, coughing, constriction of the chest, lachrymation, and smarting of the eyes. A concentration of 150 ppm can be endured only a few minutes, because of eye irritation and the effect on the membranes of the nose, throat and lungs. Exposure to a concentration of 500 ppm by volume in air for a few minutes is very dangerous At high concentrations it can cause life-threatening accumulation of fluid in the lungs (pulmonary edema).</li> <li>• NO<sub>x</sub> reacts with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Small particles can penetrate deeply into sensitive lung tissue and damage it, causing premature death in extreme cases. Inhalation of such particles may cause or worsen respiratory diseases, such as emphysema or bronchitis, or may also aggravate existing heart disease.</li> </ul>



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	<ul style="list-style-type: none"> <li>• At lower concentrations, CO causes fatigue in healthy people and chest pain in people with heart disease. At moderate concentrations it causes angina, impaired vision, and reduced brain function. At higher concentrations it can cause impaired vision and coordination, headaches, dizziness, confusion, nausea, flu-like symptoms that clear up after leaving home.</li> <li>• These emission can react with other compounds in the atmosphere to form fine particles that reduce visibility (haze).</li> <li>• SO2 and NOx can contribute to acid rain which can harm sensitive eco system.</li> <li>• In plants, photosynthesis is one of the first process to be affected by high SO2 concentration. It can also affect the plant growth and productivity. Similarly, NOx is also potentially toxic to plants, as it can injure leaves and reduce growth and yield.</li> <li>• Similarly, animals exposed to high concentration of SO2 show decreased respiration, inflammation of airways, destruction of areas of the lung, etc. Smaller animals with less lung capacity than humans are more susceptible to dangers of increased CO levels as they can become affected with carbon monoxide poisoning.</li> </ul>
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As far as mining projects are concerned, the gaseous emissions like SO<sub>2</sub>, NO<sub>x</sub> & CO are controlled from the source itself by using very low sulphur content fuel, using advanced diesel engines to abate NO<sub>x</sub> & CO emission from the HEMM. Besides, this is also corroborated by the baseline data, which shows that these parameters are well within the norms. Hence, no adverse impact on this front is envisaged from mining and allied activities. In the mining industry, impact is primarily due to fugitive dust emission. In the present mine workings, following measures are adopted to control impact on the air quality in the area. These measures will be suitably upgraded during the present expansion.

**Table 4.1: Impact and Mitigation Measures – Air Environment**

S.No	Activity	Consequence	Mitigation Measures
1	Drilling	Dust Emanation	Usage of Drill bits in good condition
			Covering of drill holes with wet cloth
			Usage of sharp drill bits for drilling of holes.
			Provision of dust filters / mask to workers working at highly dust prone and affected areas.
2	Blasting	Instantaneous dust emanation	Well-designed blasting parameter, effective stemming to achieve optimum breakage occurs without generating fines.
			Use of appropriate explosives for blasting and avoiding



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			overcharging of blast holes. Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality. Use of controlled blasting techniques with Nonel to keep the dust generation, noise as well as vibration level within the prescribed limits.
3	Excavation and Loading	Dust emanation, Gaseous Emission	HEMM will be operated as per the manufacturer's guidelines Enclosures for operator cabin. Imparting sufficient training to operators on safety and environmental parameters. Proper maintenance of hauling equipments. Avoiding overloading of dumpers.
4	Transportation	Dust emanation, Gaseous Emission	Regular wetting of transport road using mobile water tanker. Proper maintenance of haul road and other roads Setting up of tyre wash facility in the transport road. Avoiding overloading of tippers Covering of loaded tippers with tarpaulins during transportation Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
5	Others	Dust emanation, Gaseous Emission	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area. Green netting will be carried out around the lease periphery on all sides.

Due to adoption of all these measures, no major impact on air quality is envisaged due to this proposed opencast mining operation.

Due to well – designed and appropriate mitigative measures adopted and to be adopted in the project, the impact on air environment is expected to be well within statutory limits. This is amply corroborated by the prediction of impact on air quality post expansion which is detailed in the following section. Impact on air quality due to fugitive emissions was estimated based on the latest computer model AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software. Details of the modeling study / estimation including the modeling technique and post project air quality values are elaborated in the following paras.





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**4.2.3 AIR QUALITY IMPACT PREDICTION:**

The model simulations are done for the air pollutant arising from the mining operations, namely, PM<sub>10</sub>, PM<sub>2.5</sub>. **Ground Level Concentration (GLC)** have been computed using hourly meteorological data.

**Table 4.2: Emission Sources**

ACTIVITY	SOURCE TYPE
A. Mining operations	Open pit
B. Transportation	Line

**4.2.2.1 Emission Factors**

Quantification of particulate emissions has been carried out by the emission factor technique. Emission factor is a statistical average of the rate at which a pollutant is released during an activity. This factor when multiplied by the level of that activity in a given situation will give the overall effect. Fugitive emissions have been predicted by using standard equations given and suggested by AP-42, USEPA(1998), Coal S&T Project and for mining & allied activities and other factors. The modeling is done for the peak production to know the worst case scenario. The details of the emission factors used for the same is provided below:

**Table 4.3: Emission Factors**

S.No	Activity	PM10	PM2.5	Unit
1	Ore Loading	1.5 x 10 <sup>-3</sup>	2.1 x 10 <sup>-4</sup>	Kg/T
2	OB Loading	1.4 x 10 <sup>-4</sup>	1.5 x 10 <sup>-5</sup>	Kg/T
3	Hauling inside lease area	0.19	0.019	g/VKT
4	Drilling	0.1	0.04	Kg/hole

**4.2.2.2 Emission Rates:**

Based on the emission factors, after adopting necessary control measures like dust suppression, Proper maintenance of HEMM, using better quality diesel, using latest equipment, proper maintenance of roads, etc. the expected emission rate due to various operations in this project is calculated and is given below:

**Table 4.4: Emission Rate**

ACTIVITIES/POLLUTANTS	PM <sub>10</sub> (g/sec)	PM <sub>2.5</sub> (g/sec)
Ore Loading	0.02	0.00



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Drilling	0.06	0.02
Hauling inside lease area	0.07	0.02
<b>Total</b>	<b>0.15</b>	<b>0.04</b>

**A. Emission Source Coordinates:** The center of mine was assumed (0, 0) in the mathematical modeling.

**B. Meteorological Conditions Used In Predictions:** The hourly meteorological data has been generated for the monitoring period and the same has been used in the predictions.

#### 4.2.2.3 Results and Discussions

**Table 4.5: Peak Incremental Concentration**

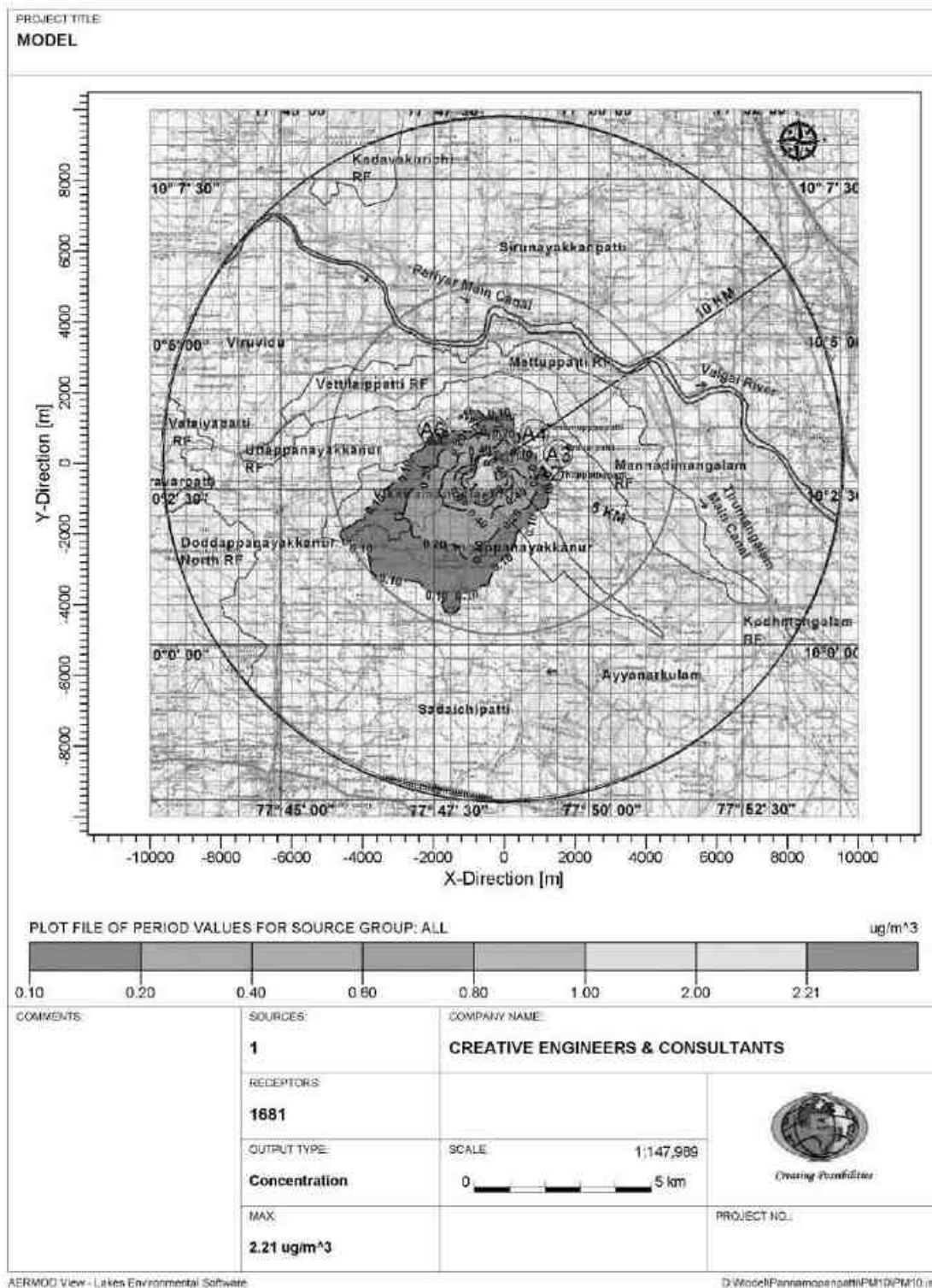
S.No	Parameters	Peak incremental concentration $\mu\text{g}/\text{m}^3$
1	PM <sub>10</sub>	2.21
2	PM <sub>2.5</sub>	0.89

It is observed that the peak incremental concentration for PM<sub>10</sub>, PM<sub>2.5</sub> occurring very near the source. At away from the source the values are getting reduced due to dispersion effects. The Isopleths of PM<sub>10</sub>, PM<sub>2.5</sub> concentrations with control measures scenario have also been drawn and these are given in **Figure No.4.1 and 4.2**. The incremental and predicted concentrations at the locations of ambient air quality have been discussed in the following section.



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**Figure 4.1: Isoleth of GLC Prediction for PM<sub>10</sub>**





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**Predicted Ambient Air Quality:**

The post project Concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, (GLC) (base line + incremental) after adopting necessary control measures is given in Table No - 4.6 to 4.7.

**Table 4.6: Concentrations Of PM<sub>10</sub> after Project Implementation**

Values in  $\mu\text{g}/\text{m}^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	A1-Near Core Zone	49.1	2.2	51.3	-
2	A2-Thappathupatti Village	45.9	<1.0	46.9	100
3	A3-Eravarpatti Village	56.1	<1.0	57.1	
4	A4-Pannamoppanpatti Village	59.3	<1.0	60.3	
5	A5-Perumalpatti Village	53.1	<1.0	54.1	
6	A6-Kalluthu Village	64.9	<1.0	65.9	

**Table 4.7: Concentrations Of PM<sub>2.5</sub> after Project Implementation**

Values in  $\mu\text{g}/\text{m}^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	A1-Near Core Zone	22.6	<1.0	23.6	-
2	A2-Thappathupatti Village	21.1	<1.0	22.1	60
3	A3-Eravarpatti Village	25.8	<1.0	26.8	
4	A4-Pannamoppanpatti Village	27.9	<1.0	28.9	
5	A5-Perumalpatti Village	24.0	<1.0	25.0	
6	A6-Kalluthu Village	30.5	<1.0	31.5	

It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM<sub>10</sub> are in the range of 46.9 $\mu\text{g}/\text{m}^3$  to 65.9 $\mu\text{g}/\text{m}^3$  and with respect to PM<sub>2.5</sub> are in the range of 22.1 $\mu\text{g}/\text{m}^3$  to 31.5 $\mu\text{g}/\text{m}^3$  which are within the statutory limits in each case. For preservation of environment in this mine strict enforcement of management schemes and regular air quality monitoring will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

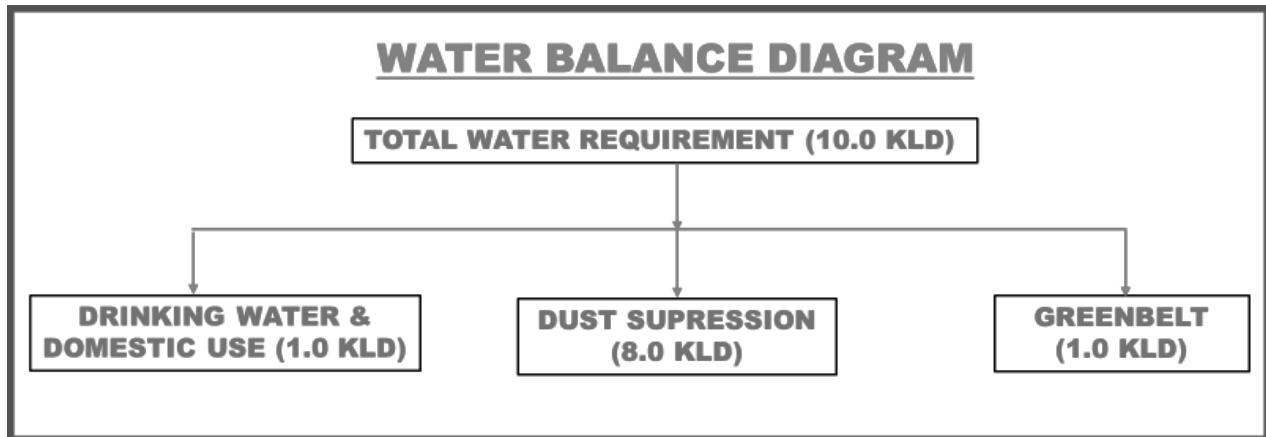


#### 4.3 WATER ENVIRONMENT:

##### 4.3.1 WATER REQUIREMENT:

The water requirement for the mines is mainly for plantation, dust suppression, Domestic & drinking purpose, and work shop. The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The water balance diagram for the same is shown in **Figure No 4.3**.

**Figure 4.3: Water Balance Diagram**



##### 4.3.2 SOURCES OF WATER POLLUTION:

The existing water environment showing water quality at different sampling stations in the area has been described in Chapter-III. In general, during mining operations, the major sources of water pollution are described below:

- A. Generation of effluent water from workshop, service building.
- B. Domestic effluent
- C. Wash off / runoff from mine workings, waste dumps, ore stockpiles in the mine,
- D. Effect on drainage course if any
- E. Ground water and surface water pumping for mining and allied activities

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This being a mining project there will be no harmful or process effluent generation. The major impacts that arise due to the above listed sources if left untreated are expected to be the following:

- Deterioration of water quality due to pollutants from discharged waste water
- Change in natural drainage pattern of nearby water bodies
- Siltation of nearby water courses affecting its quality as well as its course.
- Impact on groundwater regime

**Table 4.8: Impact on water environment**

S.No	Source	Consequence	Impacts	Pollutant	Impacts on Humans/Environment
1	Workshop, service building	Generation of effluent	Deterioration of water quality	Suspended solids and Oil & Grease	<ul style="list-style-type: none"> <li>• Leads to non-potability of water.</li> <li>• Affect microflora</li> <li>• Contract of water borne diseases like diarrhea, jaundice, dysentery, typhoid, etc.</li> <li>• Silt carryover into nearby waterbody from runoff.</li> </ul>
2	Domestic use	Generation of waste water	Deterioration of water quality	Suspended solids and BOD	
3	Rainfall	Runoff from mine faces, waste dump and stack	Deterioration of water quality due to washoff, runoff resulting in siltation	Increased solids level in water quality ( TSS, TDS etc)	

To obviate these significant negative impacts various control measures are devised and continued to be implemented to ensure there are no adverse impact on water environment and its details are given below.

**Table 4.9: Control Measures – Water Environment**

S.No	Source	Proposed Control Measures
1	Workshop, service building	ETP for the workshop effluent with oil & grease trap facility is available.
		The treated water is reused for greenbelt area
		The oil and grease from separate storage tank is safely disposed to CPCB authorized re-processor.
2	Domestic use – Rest area, Canteen	The domestic sewage to be generated from the project will be collected in septic tank with soak pits.
3	Rainfall – Runoff from mine face, waste dump and mineral	Effective monsoon surface run off management like provision of about 890m of Garland in the mine periphery, around waste dumps About 890m of Retaining wall is constructed at the toe of the dump. Drains are connected to the settling ponds and supernatant clear water is let out.
		Plantation of native species on dump tops and slopes with geo-matting to



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	stack	<p>arrest and prevent erosion made.</p> <p>Coir matting is proposed to be carried out to prevent dump erosion</p> <p>Providing dump tops 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 arising out of uncontrolled descent of water</p>
4	Water consumption	<p>Within the lease area, the rainwater falling within the mine pit area will be made to drain to the mine sump in the lowest level of working through proper bench slopes towards the peripheral drains in the bench end. Mine sump itself acts as a good rain water harvesting pit. Collected water will be used for watering of haul roads, greenbelt and plantation, etc.</p>

**4.3.3 TREATMENT SCHEME:**

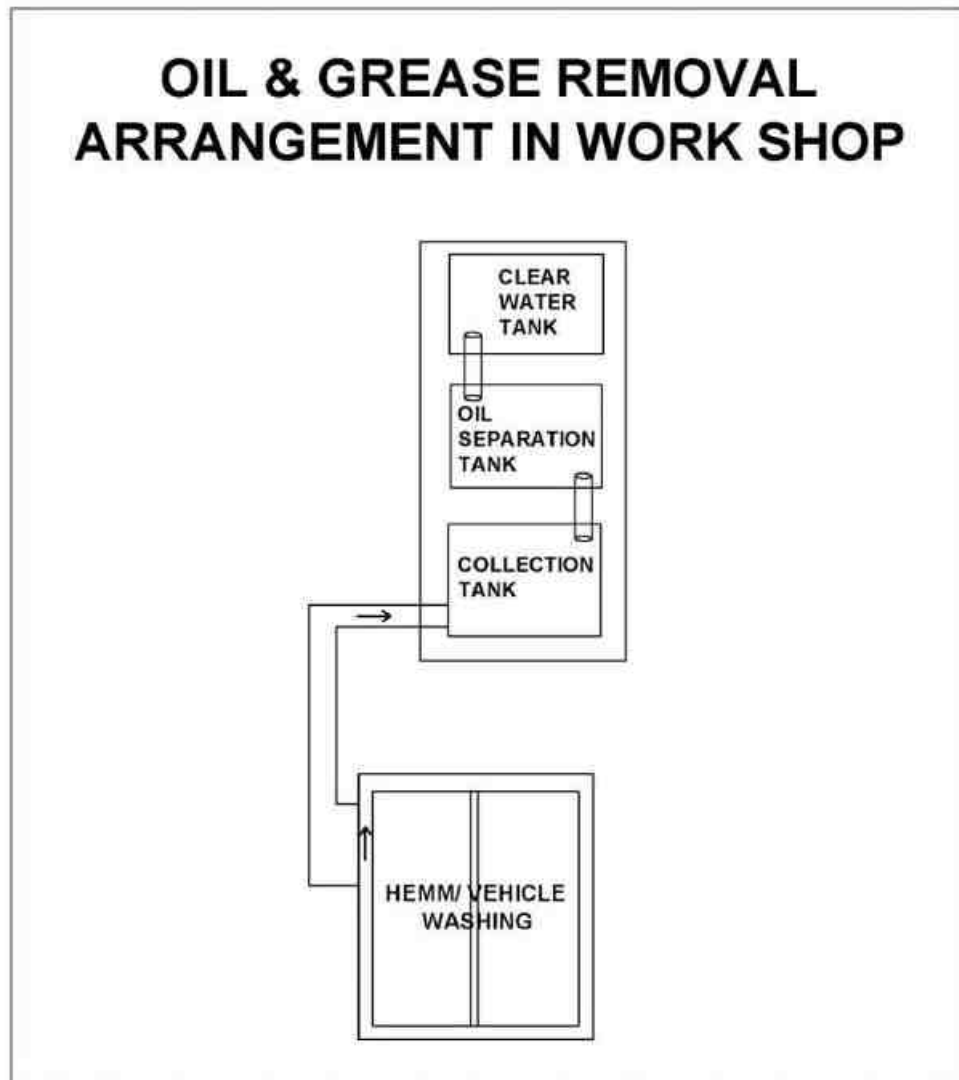
**A. Workshop Effluent:**

The effluent arising from the workshop will be treated through an oil & grease trap and clear water sump. Treated water confirming limits will be re used within the workshop. This oil & grease trap contains 3 chambers where the effluents due to washing of HEMM (Heavy Earth Moving Machines) and vehicles on the ramps will be collected in the oil separation tank. From the oil separation tank, the waste oil will be separated by floating mechanism and the oil will be collected in the oil storage tank. Oil from the storage tank will be collected manually and kept for safe disposal to CPCB authorized re-processor. Remaining water from the oil separation tank will be let into the filtration tanks in the remaining chambers and the treated water is collected in the treated water storage tank and reused within the workshop. The quality of the treated water will be periodically tested and ensured that the treated water quality confirms the SPCB limits.





**Figure 4.4: Oil and Grease Removal Arrangement**



**B. Generation of domestic effluent:**

The domestic sewage to be generated from the project will be collected in septic tank with soak pit arrangement.

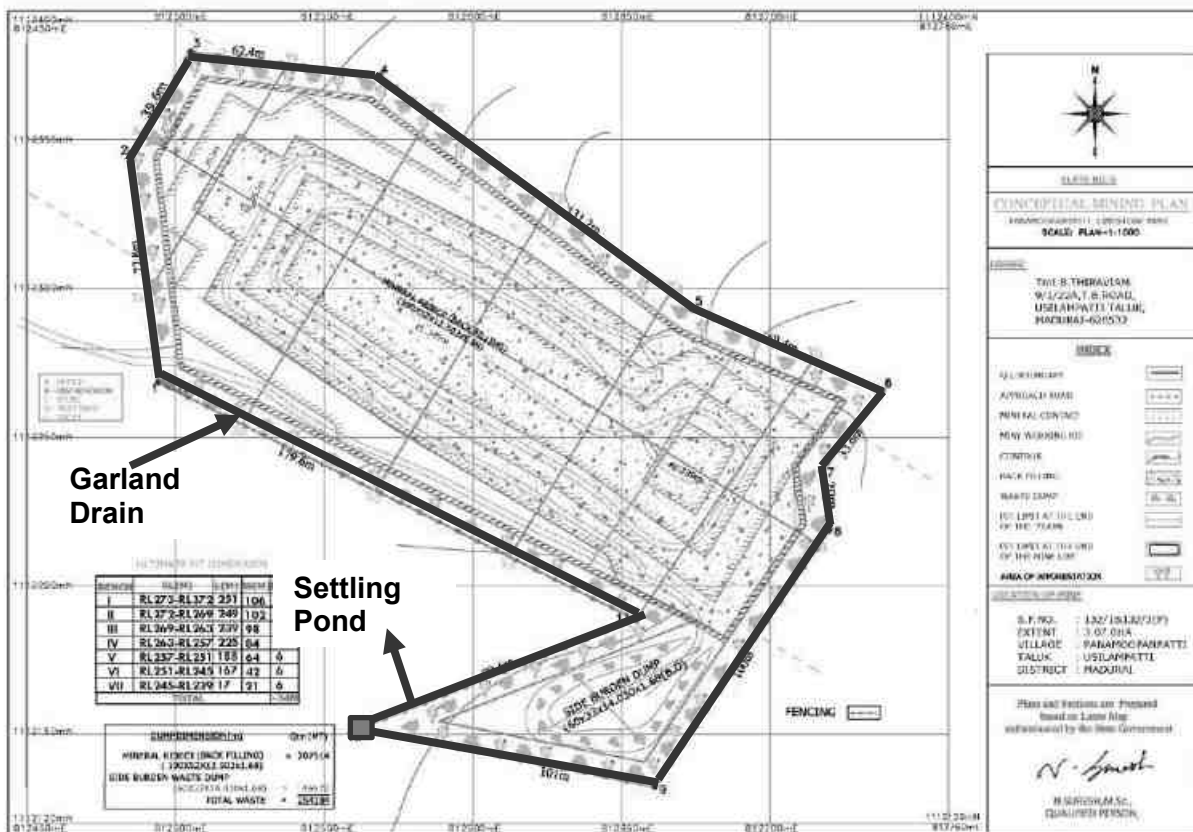
**C. Washouts from overburden, ore stockpile, etc.**

Runoff of waste dumps, limestone stockpiles during monsoon may carry the silt / ore residues and pollute the nearby nalla / streams, land if it is let-out as such. During the mining plan period of 5 years, it is proposed to construct surface runoff management structures such as garland

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drain and retaining walls in the mine periphery and the dumps. A total of 890m of retaining wall and garland drain will be constructed which will be drained to settling ponds. The supernatant clear water in the settling ponds will be reused within the mining. Besides, the mine pit itself acts as a good rainwater harvesting pit. The rainwater collected in the mine sump is reused for watering of haul road, greenbelt and plantation, etc. The surface runoff management structures at the end of the plan period have been depicted below in **Figure No.4.4**.

**Figure 4.5: Surface Runoff Management Structures**



**D. Disturbance to drainage courses**

There is no major waterbodies or drainage courses in and around the lease area. The nearest water body is Tirumangalam Canal which is beyond 3.88Km and Vaigai River which is at 3.4Km. No major impact is envisaged on the water bodies due to project operations



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**E. Generation of mine pit water pumped out from deeper workings if any.**

Hydrogeological study was conducted by Aadhi Bhoomi Mining & Enviro Tech (P) Ltd., during the previous EIA/EMP Report. Perched local water table was inferred at 30-35m and the second fracture line is 50-60m in depth by electrical resistivity method. The yield from the top perched water is less and mainly post monsoon season only. From the pumping test, it is inferred that the transmissivity value is 0.6m<sup>2</sup>/day. From the hydrogeological study it is understood that the study area is composed of Limestone deposit, with little top soil capping and Kankar.

In the nearby region, the formations are compact with less intergranular porosity and fractures leading to less permeability and transmissivity values and as such the ground water level in this area is deep from surface. No major water seepage within the mine is expected from the periphery. The ultimate pit depth of mining is 34m. The ground water table in this area is below this level. Hence, ground water intersection is not envisaged and ground water will not be affected appreciably due to the quarrying operation. As mentioned earlier, the rainfall will be collected in the mine floor sump and advantageously used. Excess water if any in the sump will be pumped to settling pond for downstream users.

**4.3.4 REDUCING WATER CONSUMPTION OVER THE YEARS:**

**4.3.4.1 GENERAL METHODS:**

Use of water will be monitored and used to the minimum required. Awareness will be spread to the employees about the importance of water conservation. Tap and showers will be turned off immediately after use and any leaks will be monitored and immediately controlled. Water requirement for greenbelt and dust suppression can be reduced by choosing the native plants/trees species with low water requirement and which can sustain in such conditions for greenbelt/ plantation and also optimum usage to the required minimum. While the dust suppression itself is an important method of pollution control for air pollution due to dust, the water consumption will be monitored strictly. The water tanker will be examined for any sources of leaks and if found will be immediately sealed so that water can be utilized for dust suppression effectively without loss.



#### 4.3.4.2 RAINWATER HARVESTING PLAN

The rain water falling within the mine pit area is made to drain to the mine sump in the lowest level of working through proper bench slopes towards the peripheral drains in the bench end. Entire water requirement of all mines is met from harvested rain water in this sump. The quantum of rainwater harvesting and net water available for utilization has been shown below:

**Table 4.10: Quantum of Rainwater Harvested in Mine Pit**

Year	Area (Ha)	Average annual rainfall mm	Quantum of water (Ha-m)	Evaporation @ 22%ham	Net Available water for use ham
<b>Present</b>	0.052	700	0.03	0.006	0.024
<b>End of life</b>	2.214	700	1.55	0.34	1.21

About 1,210m<sup>3</sup> of Rainwater is expected to be collected inside the mining pit during monsoons season. The rainwater collected in the mining pit will be reused for dust suppression, greenbelt and plantation.

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

- a) Development of garland drain around the quarry connected to settling tank.
- b) Cleaning of drain periodically to prevent siltation
- c) The supernatant clear water from the settling pond will drain into the nearby drainage on the western side of the lease.
- d) Utilizing the rainwater harvested in the mine pit to meet the water requirement of the project.
- e) Excess water, if any in consultation with local villagers and in line with government practices shall be provided to the downstream users.



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**4.4 NOISE AND VIBRATION:**

**4.4.1 NOISE ENVIRONMENT:**

The ambient noise levels in the study area have been discussed in Chapter - III. The data shows that the existing noise levels are within statutory tolerable limits. The impact prediction and control measure for noise environment due to mining and allied activities is described below:

**4.4.1.1 IMPACT PREDICTION DUE TO NOISE:**

Noise is one of the inevitable causes of pollution in mining operations, largely due to the extensive mechanization adopted. Besides, other operations such as drilling, blasting, movement of vehicles, etc., also produce noise of considerable magnitude in mining operations. The main sources of noise and expected levels are given below in **Table no – 4.9.**

**Table 4.11: Main Sources of Noise**

Sl. No.	Source	Inside Cabin	Noise level at dB(A) 10 m. from source
1	Shovel	84-91	59-68
2.	Dumpers/Tippers	87-96	75-85
3.	Drill	88- 95	75-83

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Prolonged exposure to a high noise level is harmful to the human auditory system and can create mental fatigue, rebellious attitude, annoyance and carelessness, which may lead to neglect of work and also result in accidents. The impact of noise level as per World Health Organization's 1986 notification is given below in **Table No - 4.10.**

**Table 4.12: Impact of Noise Levels**

NOISE LEVELS	ADVERSE EFFECTS
90-115 dB	Partial deafness and nervous irritability
> 115 dB	Permanent deafness
Impulsive noise (>90dB)	Frightens livestock grazing in the nearby areas



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OSHA (Occupational Safety and Health Administration), USA and other similar organisations stipulate that noise level up to 90 dB(A) is acceptable for eight hours exposure Leq (Equivalent sound level) (8hrs) per day. The Directorate General of Mines Safety, in circular No. DG (Tech)/18 of 1975, has prescribed the noise level in mining occupations (TLV) for workers, in an 8 hour shift period with unprotected ear as 90 dB(A) or less.

The noise will be felt only near the active sources. There will be considerable reduction in the noise level due to the absorption factor, environmental surroundings and other attenuation factors. As far as absorption factor is concerned, If the ground cover is vegetated or has a soft texture, sound will decrease at the rate of 4.5 dB(A) every time the distance between the source and the observer is doubled. Besides, there will be shielding factor, which takes into account the environmental surroundings. With every 30m of dense land scape vegetation, 5 dB(A) of additional attenuation can be obtained up to a maximum of 10 dB(A). As such at away places the effect of noise will not be felt.

Anticipated noise levels resulting from operation of the various machineries like excavator, tippers, drill have been computed using point source model. Computation of cumulative noise levels at the nearby villages is made based on the assumption that there are no attenuation paths between the source and the boundary.

Noise modeling is carried out using the following formula:

$Lp2 = Lp1 - 20 \log R2/R1$ , Where,  $Lp1$  and  $Lp2$  are sound pressure levels at points located at distances  $R1$  and  $R2$  respectively from the source. The study results are as follows:

**Table 4.13: Post Project Noise Levels**

SI.No	Location	Baseline Day Eq.in dB(A)	Post project noise Eq in dB(A)	Limit dB(A) as per MoEF&CC
1.	Near Core Zone	40.7	41.6	90
2.	Thappathupatti Village	45.5	45.9	55
3	Eravarpatti Village	49.1	49.5	55
4	Pannamoppapatti Village	51.8	52.2	55
5	Perumalpatti Village	42.6	42.9	55
	Kalluthu Village	51.2	51.5	55

From the studies, it is found that the predicted Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not



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be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding villages.

#### **4.4.1.2 CONTROL MEASURES FOR NOISE ENVIRONMENT:**

Hence, by following mitigative measures for noise control, the impact on noise levels will be insignificant:

- Planting rows of native trees along roads, around mine area and other noise generating centers to act as acoustic barriers.
- Sound proof operator's cabin for equipments like shovel, tippers, etc.
- Proper and regular maintenance of equipments may lead to less noise generation.
- Providing in-built mechanism for reducing sound emissions.
- Providing earplugs to workers exposed to higher noise level.
- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.

Further green belt and afforestation will be planned and executed to abate noise and dust propagation in the area.

#### **4.4.2 GROUND VIBRATIONAL DUE TO BLASTING EFFECTS:**

Vibrations due to blasting may cause damage to nearby structures, if appropriate control measures are not adopted. Flyrock is another possible damage causing outcome of blasting. There are many factors, which influence these, like long explosive column with little stemming column, improper burden, loose material or pebbles near holes and long water columns in the holes.

The following control measures will be planned to reduce ground vibratory conditions to sustainable statutory limits:



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- 1) The peak particle velocity (PPV) of ground vibration will be kept below 10mm/s for 8-25hz frequency range through optimally controlled blasting techniques , after necessary field trials.
- 2) Drilling and charging pattern will be ideally formulated, with less explosive charge, etc., after field trials.
- 3) Use of suitable initiating sequence and millisecond delay detonators.
- 4) It is suggested to carry out blasting with minimum charge per delay so that there will be minimal impact on the surrounding areas due to vibration.
- 5) To contain fly rocks, stemming column will not be less than burden of the hole. Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- 6) Blasting will not be carried out when strong winds are blowing towards the inhabited areas. Blasting will be done during midday time and never at night.
- 7) Surrounding villages will be regularly inspected for any visual cracks on walls and feed backs will be gathered to investigate the reasons for these and for reassessing the charge per delay from time to time.
- 8) Proper care and supervision during blasting by a competent and experienced person.

By adoption of above measures, it will be ensured that the ground level vibration due to blasting are maintained within the limits prescribed by DGMS, Dhanbad at the mining areas vide Circular No. 7 dated 29 -08-1997 as given below

**Table 4.14: Permissible Peak Particle Velocity (PPV) In Mining Areas**

Type of structure	Dominant excitation frequency Hz		
	<8 Hz	8-25 Hz	>25 Hz
In mm/sec			
<b>A. Buildings/structures not belonging to owner</b>			
Domestic houses /structures (Kuchha brick and cement)	5	10	15
Industrial buildings (RCC and framed structures)	10	20	25
Objects of historical importance and sensitive structures.	2	5	10
<b>B. Building belonging to owner with limited span of life</b>			
Domestic houses/structures (Kuchha brick and cement)	10	15	25
Industrial buildings (RCC and framed structures)	15	25	50





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**4.5 LAND ENVIRONMENT:**

The lease area of 3.07 Ha in S.F.No. 132/1, 132/3(P) is a Government Poromboke Land. The present land use pattern, and the post mining land use pattern is shown below:

**Table 4.15: Land Use Table**

S.No	Land Use	Present Land Use (Ha)	During Plan Period (Ha)	Post Project (Ha)
1	Quarrying Pit	0.05.20	1.60.00	2.21.40
2	External Dump	--	0.41.00	0.23.00
2	Infrastructure	0.01.00	0.01.00	0.01.00
3	Roads	0.02.00	0.03.00	0.03.00
4	Green Belt	0.58.60	0.58.60	0.58.60
6	Unused Land	2.40.20	0.43.40	--
	<b>Total</b>	<b>3.07.00</b>	<b>3.07.00</b>	<b>3.07.00</b>

**4.5.1 LAND RECLAMATION:**

In the post mining stage, an area of 2.21.40 Ha of mined out area will be left as water body. 0.01Ha will be infrastructure, 0.03 Ha will be roads. Overall, 0.82.6Ha will be covered with plantation during the post mining stage.

**Table 4.16: Land Use During Post Operational Period**

S.No	Description	Land use (Ha.)			
		Plantation	Water body	Others	Total
1	Quarrying Pit	-	2.21.4	-	2.21.4
2	External Dump	0.23.0	-	-	0.23.0
3	Infrastructure	0.01.0	-	-	0.01.0
4	Green Belt	0.58.6	-	-	0.58.6
2	Road	-	-	0.03.0	0.03.0
	<b>TOTAL</b>	<b>0.82.6</b>	<b>2.21.4</b>	<b>0.03.0</b>	<b>3.07.0</b>

Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals. In the post mining stage, the entire mined out area shall be used as a rainwater harvesting pond.

**4.6 BIOLOGICAL ENVIRONMENT:**

**4.6.1 EXISTING FLORA AND FAUNA:**



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The core zone area is barren with grasses and bushes. Details of flora/fauna pattern in core and buffer zones have been described in chapter - III.

**4.6.2 IMPACT OF MINING ON BIOLOGICAL ENVIRONMENT:**

The significance of impact on biological environment due to mining and allied activities on various fronts is described below:

**Table 4.17: Impact on Biological Environment**

<b>S.No</b>	<b>ISSUES</b>	<b>OBSERVATIONS</b>
1	Clearance of vegetation due to mining and allied activities	Mining was partially carried out during earlier lease periods. Besides, the lease area is mostly barren with thorny bushes. No major clearance of vegetation is involved.
2	Retardation of tree growth, tip burning, etc, due to deposition of dust and the Particulate matter generated from the mining operation.	Necessary mitigative measures like dust suppression, proper maintenance of equipment's, roads will be carried out to prevent dust generation.
3	Proximity to national park/ wildlife sanctuary/reserve forest/mangroves/Coastline/estuary/ sea	Vikkiramangalam R.F. is located at a distance of 320m in the south western side of the lease area. The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.
4	Release of effluents into water body that also supplies water to wildlife	There is no proposal to discharge any effluent into nearby water bodies.
5	Proposed project could increase siltation that would affect nearby biodiversity area	Surface runoff management structures like garland drain, settling pond etc. as explained above will be constructed and as such there will not be any appreciable impact on surface water quality which in turn can affect the bio diversity of the area.
6	Activities of the project affects the breeding/nesting sites of birds and animals	In the present ML area, there is no wetland. A migratory bird needs sufficient wetlands with sufficient food, shelter, roosting places and nesting places which is not possible here.
7	Located near an area populated by rare or endangered species	There are no Schedule 1 animals
8	Risk of fall/slip or cause death to wild animals due to project activities	In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent falling of animals in the mine pits.
9	Project affects the forest-based livelihood/any specific forest product on which local livelihood depends	Not applicable
10	Project likely to affect migration routes	No migration routes are in the area.
11	Project likely to affect flora of an	No such significantly important medicinal value species within



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	area, which have medicinal value	the ML area and its nearby region.
12	The project likely to affect wetlands, fish breeding grounds, marine ecology	There are no any wetlands, fish breeding grounds, marine ecology nearby the ML area which will be affected due to this project.
13	Project affects the Agriculture, Forestry and Traditional Practices	Most of the study area remain uncultivated and only in patches of land away from the lease area, agricultural activities are carried during monsoon rainfall. Due to poor quality of the soil, inconsistent rainfall, water scarcity, high agricultural labor cost, manpower shortage and less yield are reason for very little agricultural activity in this region.
14	Impact on soil health and biodiversity	The dumps will be stabilized by means of plantation. Besides, the safety zone and backfilled area will be covered with plantation by local native species.
15	Climate change leading to droughts, floods, etc.	<ul style="list-style-type: none"> <li>• This being a mining project, no adverse generation of heat is envisaged.</li> </ul>
16	Pollution leading to release of greenhouse gases (GHG) rise in temperature (Hydrothermal/Geothermal effect due to destruction in environment, Bio-geochemical processes and its foot prints including environmental stress) and livelihood of local people.	<ul style="list-style-type: none"> <li>• Certified vehicles with low carbon emissions will only be used. These equipments will be properly and regularly maintained. Besides, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned.</li> <li>• Geologically the area in and around the lease area contains charnokite type rock formation containing mostly fallow land. As such there no major vegetation or agricultural activities are observed.</li> <li>• There are no Protected or Eco-Sensitive Zone or forest land nearby wherein it can have an impact.</li> <li>• It will be ensured that mining will be carried out adhering to all the statutory rules and regulations and maintaining the environmental quality within the prescribed standards by effective implementation of various mitigative measures.</li> <li>• These mitigative measures will be continued for the entire lease period ensuring no impact on the environment.</li> <li>• As such release of Greenhouse gases (GHG), rise in temperature, affecting livelihood of the local people ,loss of Agriculture, Forestry and Traditional Practices is not envisaged. Such a limited scope will not induce any climatic change leading to droughts, floods etc.</li> </ul>
17	Possibilities of water contamination and impact on aquatic ecosystem health and impact on Sediment geochemistry in the surface streams	<ul style="list-style-type: none"> <li>• This being a mining project no process effluent will be generated.</li> <li>• Water generation is expected to be due to <ul style="list-style-type: none"> <li>✓ Direct rainfall falling within the pit</li> <li>✓ Rain water draining near the lease area.</li> </ul> </li> <li>• Direct rain fall will be collected in the mine floor sump. Water from sump will be pumped to settling pond for downstream</li> </ul>



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		<p>users.</p> <ul style="list-style-type: none"> <li>• Rainwater from the mine periphery will be collected through peripheral garland drain. Garland drain will be connected to a settling pond. Supernatant clear water from settling pond confirming to applicable limits will be let out to downstream users for agricultural or other purposes.</li> <li>• Due to above mentioned reasons and absence of perennial water bodies nearby where in any marine ecosystem is observed, no effect on this front is expected.</li> </ul>
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There are no migratory corridors, migratory avian-fauna, rare endemic and endangered species. Therefore, there shall be no impacts due to mining activity on them. Even though there are no adverse impact on bio diversity and flora/fauna status due to project operations, positive impacts will arise due to well-planned reclamation measures for restoration of land status in the area ultimately to productive land category with elaborately planned green belt development activities.

**4.6.3 CONTROL MEASURES FOR BIOLOGICAL ASPECTS:**

To reduce the adverse effects on flora/fauna status of the area due to deposition of dust generated from mining operations, mobile water tanker systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out depending upon the immediate need, priority and availability of land. The plantation will be done along the lease boundary in a phased manner.

The objectives of the greenbelt cover will cover the following:

- Noise abatement
- Reuse of waste water to the extent possible
- Prevention of soil erosion
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

**Greenbelt around mine dumps, etc.:**

- ◆ Tall growing, closely spaced, evergreen trees native to the area.
- ◆ Easy, quick early growth and establishment.
- ◆ Uniform spreading of crown habit.



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- ◆ Timber trees having long gestation period.
- ◆ Trees with high foliage density, leaves with larger leaf area.
- ◆ Attractive appearance with both good flowering and fruit bearing.
- ◆ Bird and insect attracting species.
- ◆ Suitable green cover with minimal maintenance.

**Avenue Trees:**

- ◆ Trees with conical canopy and with attractive flowering.
- ◆ Trees with medium spreading branches to avoid obstruction to the traffic.
- ◆ Trees with branching at 10 feet and above.

**4.6.4 GREEN BELT & PLANTATION:**

In the lease area, safety barrier 7.5m around the periphery. About 1600 trees will be planted in and around the lease area.

**Table 4.18: Proposed Plantation**

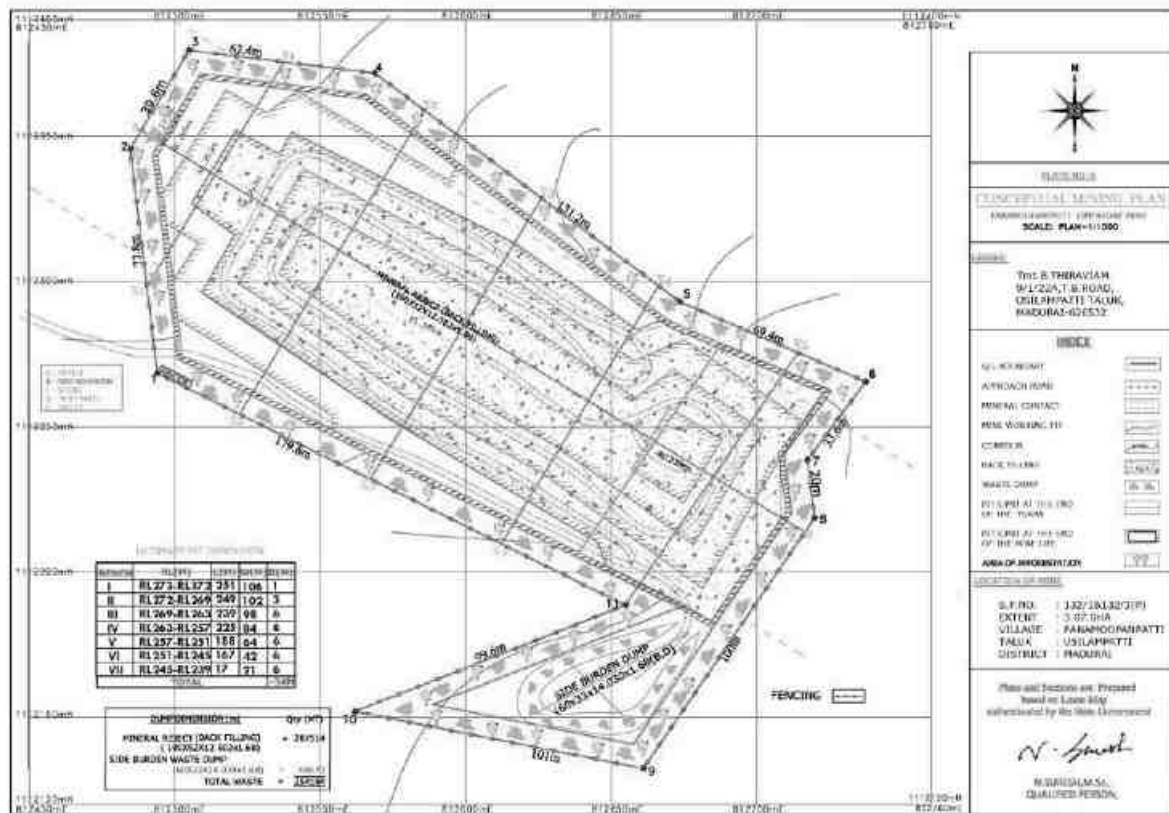
Year	No. of trees proposed to be planted	Name of the species
I	320	Pungai, Vagai, Vembu, Manjal konrai, Naval, Puvarasu, etc.,
II	320	
III	320	
IV	320	
V	320	
<b>Total</b>	<b>1600</b>	

During the conceptual period, the mined-out area will be left as water body. The mineral reject will be backfilled into the mined-out pit and the overburden dump will be stabilized by means of plantation. An area of 2.22.60 Ha of mined out area will be backfilled. The top benches will be covered with plantation and the bottom most benches will be left as a water body. Dumps covering an area of 0.19.80 Ha will be stabilized with plantation. 0.01Ha of infrastructure will be dismantled and 0.58.60 Ha will be the greenbelt and safety zone area. The post mining land use plan showing afforestation and water body is shown in **Figure No- 4.7.**



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**Figure 4.6: Mine Closure Plan**



**4.7 SOCIO ECONOMIC ENVIRONMENT:**

The entire lease area is in the proponent’s possession. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here.

The mining operations in the proposed mine will employ about 22 persons directly and about 50 persons on indirect basis through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations as shown under.

- Project related logistical operations for transport of Rough Stone, etc,
- Various trading services for consumer goods, spare parts, sundry items, etc.
- Contractual services connected with the project.



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- Green belt and horticultural works in the project.
- Casual labor needs for various activities.

Besides, there will be improvement in the following aspects due to project operation:

- ❖ Improvement in infrastructural facilities, providing education aids etc. in nearby schools
- ❖ Betterment of drinking water facilities.
- ❖ Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc from this project directly and also indirectly.

From above details, it is clear that the project operations will have highly beneficial positive impact in the area.

**Table 4.19: CER Cost**

<b>Project Cost (Rs.)</b>	Rs.160 Lakhs
<b>CER Cost Requirement (2% of the Project Cost) (Rs.)</b>	Rs. 3.2 Lakhs
<b>Revised CER cost allocated (Rs.)</b>	Rs. 5.0 Lakhs

However, towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.

#### **4.8 OCCUPATIONAL HEALTH AND SAFETY:**

##### **4.8.1 BASELINE STATUS:**

Primary data collection through field survey conducted in the study area reveals that there is no reported incident of any occupational diseases in the area. Hazardous jobs like blasting, loading, etc. are planned to be executed safely and with all precautionary measures as prescribed in Metalliferrous Mines Regulations of 1961, so as to minimize hazards and incidences of health problems.



#### **4.8.2 IMPACTS ON OCCUPATIONAL HEALTH DUE TO PROJECT OPERATIONS:**

Anticipated occupational illness sequel to mining activities can be as follows:

- Dust related pneumonia
- Tuberculosis
- Rheumatic arthritis
- Segmental vibration
- Miner's Nystagmus
- Eye diseases with irritation of eye, etc.

#### **4.8.3 MITIGATIVE MEASURES FOR OCCUPATIONAL HEALTH:**

To reduce pollution emanation from the project, following measures will be taken:

- Water sprinkling on haul roads etc.
- Green belt creation to arrest dust and reduce noise propagation.
- Acceptance of good control measures for reducing air pollution, as mentioned earlier in the chapter.
- Control of noise levels through good preventive maintenance of machineries, green belt creation, provision of ear plugs to workers, etc.
- In addition to above measures, the following remedial steps are being and will be enforced to ensure minimization of occupational health and safety problems.
- Medical examination of workers by qualified doctors, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

#### **4.8.4 MITIGATIVE MEASURES FOR SAFETY ASPECTS:**

The following safety gadgets will be provided to the staff and workers based on their area of operation and work & requirement:





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SI No	Safety Equipments
1.	Helmets
2.	Shoes
3.	Goggles
4.	Dust Mask
5.	Hand Gloves
6.	Reflective Jackets
7.	Ear Muffs
8.	Signal Lights/Flags

**4.9 LOGISTICAL SYSTEM:**

The mined out limestone will be transported to the end users by road. The expected peak transport will be as follows:

**Table 4.20: Details of Transportation**

Sl.no	Particulars of activity	Quantity
A	Maximum Quantity Transported (TPA)	52039.75
B	No of days in a year	300
C	Transport hours per day	8
D	Truck capacity in T	20
	Trips per hour	1 Trip/hr

From the above table it is seen that there will be about 1 trip per hour. The existing road can absorb this traffic due to this project. However, the following mitigative measures are suggested:

- ❖ Water sprinkling on material in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Plantation on either side of the transport road in consultation with the concerned department.
- ❖ Proper maintenance of transport roads
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.
- ❖ Keeping traffic regulators at vulnerable locations.
- ❖ Distribution of transport vehicles for avoiding choking of roads



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- ❖ Limiting of speed
- ❖ Installation of barriers at vulnerable locations
- ❖ Provision of tyre washing facility at the mine outlet

#### **4.10 WASTE MANAGEMENT:**

**Solid Waste:** Small quantity of waste to be generated will be dumped in external dump within the lease area.

**Liquid waste:** There is no process effluent generation from this mine. Hence no liquid waste is generated.

**Hazardous waste management:** In this project the following management practices will be followed:

- Ensuring availability of different colour bins for collection of different types of waste.
- Storing of Hazardous waste material in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc.
- Ensure that there are no leakages/spillages of hazardous wastes.
- Ensuring that the fire extinguisher system is available at hazardous material storage area.

The hazardous waste if any will be disposed through authorized recyclers or re-processors periodically. The hazardous wastes will be transported in accordance with the provisions of rules. By effective implementation of above said mitigation measures no major impact due to Hazardous waste is expected.

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

\* \* \* \* \*



# **CHAPTER - V**

## **ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)**

## **CHAPTER 5**

### **ANALYSIS OF ALTERNATIVES**

#### **5.1 ALTERNATE TECHNOLOGY:**

This is a proposed Limestone Quarry in which Mechanized Open Cast mining will be carried out. It involves jack hammer drilling, blasting, excavation, loading and transportation. As this method is techno economically proven, consideration of an alternate technology is not warranted.

#### **5.2 ALTERNATE SITE:**

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise.

\* \* \* \* \*



# **CHAPTER - VI**

## **ENVIRONMENTAL MONITORING PROGRAMME**

## **CHAPTER 6**

### **ENVIRONMENTAL MONITORING PROGRAMME**

#### **6.1 GENERAL**

In this project, appropriate environmental monitoring programme are framed. Regular, systematic and sustained programme schedules for implementation and monitoring of various control measures are devised with clear cut guidelines of various concerned plans for keeping a continuous surveillance on the various environmental quality parameters in the area.

The monitoring schedules are planned to aim at regular and systematic study of various pollution levels with respect to air and water quality, noise levels etc., to ensure that they conform to the standards laid down by the Environment Protection Act, 1986 and various Central and State Pollution Control Board Limits.

The various methodologies and frequency of studies of all environmental quality parameters will be as per prescribed norms laid down by MOEF&CC and State Pollution Control Board. This being a small quarry operation, the Mines in-charge will take care of all the environmental related works also.

Environmental control measures include components like air, water and soil quality, noise levels, afforestation measures, etc. For monitoring of environment over the life of the mine, a set of stations for study of quality parameters are fixed as per the actual requirements and prevailing conditions of environmental factors, as dictated from time to time, depending on the prevailing pollution levels.

#### **6.2 MONITORING SCHEDULES FOR VARIOUS PARAMETERS**

The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various statutory Limits. However, based on the need and priority it may be suitably modified / improved in consultation with local authorities. The monitoring schedules to be adopted in this quarry are given below.



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**Table 6.1: Environmental Monitoring Schedule**

S.No	Environmental Parameters	Parameters to be monitored	Monitoring area coverage /locations	Frequency of monitoring
1	Air Quality	Sulphur dioxide (SO <sub>2</sub> ), Oxides of Nitrogen (NO <sub>2</sub> ), Respirable Particulate Matter (PM <sub>2.5</sub> and PM <sub>10</sub> ).	2 locations in the buffer zone and 1 work zone locations.	As per CTO conditions
2	Water Quality	General, Physical, and chemical parameters	Ground Water samples (around the project area) and Mine Pit water samples	As per CTO conditions
3	Water Table Fluctuations	Water Levels	Nearby wells and Borewells	On yearly basis pre and post monsoon level
4	Noise	Leq. Lmax Lmin, Leq Day & Leq Night dB(A)	Work zone locations and buffer zone villages	As per CTO conditions
5	Vibration	Peak Particle Velocity	Mine periphery	Once to arrive at optimum blasting parameters
6	Socio Economic Environment	Socio Economic Survey, Review of implementation of CER activities proposed	Buffer Zone	Yearly basis
7	Occupational Health	Occupational health survey to detect early incidence of diseases, Audiometry Test for workers in noise prone area and review of safety matters.	Staff and Workers involved in the project	Once in a year
8	Greenbelt	Maintenance	Within the lease area	Regularly

**6.3 LEGISLATIVE AND REGULATORY FRAME WORK:**

The project will have environmental policy declaring its responsibility and commitment to protect the environment and to ensure public safety. The existing policy will be available with all concerned officials of the plant. The following environmental standards as per methodologies prescribed, by MOEF/CPCB/TNPCB will be enforced in this project:

**Table 6.2: Environmental Standards**

Standards	Issued By	Reference
National Ambient Air Quality Standards	Central Pollution Control Board	Table No. 6.3
Water quality standards per IS 10500:2012	Bureau of Indian Standards	Table No.6.4
Noise Standards	CPCB / MoEF&CC	Table No.6.5
Permissible Peak Particle Velocity	DGMS, Dhanbad	Table No.6.6



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**Table 6.3: National Ambient Air Quality Standards**

[ NPT III ] – अणु-4

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**NATIONAL AMBIENT AIR QUALITY STANDARDS**  
**CENTRAL POLLUTION CONTROL BOARD**  
**NOTIFICATION**  
 New Delhi, the 18th November, 2009

No. B-2901620/90/PCI-4.—In exercise of the powers conferred by Sub-section (2) (b) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11<sup>th</sup> April, 1994 and S.O. 935(E), dated 14<sup>th</sup> October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

**NATIONAL AMBIENT AIR QUALITY STANDARDS**

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual* 24 hours**	50 80	20 30	- Improved West and Gaeke - Ultraviolet fluorescence
2	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	Annual* 24 hours**	40 80	30 60	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM <sub>10</sub> µg/m <sup>3</sup>	Annual* 24 hours**	60 100	60 100	- Gravimetric - TOEM - Beta attenuation
4	Particulate Matter (size less than 2.5µm) or PM <sub>2.5</sub> µg/m <sup>3</sup>	Annual* 24 hours**	40 60	40 60	- Gravimetric - TOEM - Beta attenuation
5	Ozone (O <sub>3</sub> ) µg/m <sup>3</sup>	8 hours** 1 hour**	100 180	100 180	- UV photometric - Chemiluminescence - Chemical Method
6	Lead (Pb) µg/m <sup>3</sup>	Annual* 24 hours**	0.50 1.0	0.50 1.0	- AAS /ICP method after sampling on EM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/m <sup>3</sup>	8 hours** 1 hour**	02 04	02 04	- Non Dispersive Infra Red (NDIR) spectroscopy
8	Ammonia (NH <sub>3</sub> ) µg/m <sup>3</sup>	Annual* 24 hours**	100 400	100 400	- Chemiluminescence - Indophenol blue method





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4 THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—Sec. 4]

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C <sub>6</sub> H <sub>6</sub> ) µg/m <sup>3</sup>	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m <sup>3</sup>	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m <sup>3</sup>	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m <sup>3</sup>	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

\* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman  
[ADVT-III/4/18409/Exy.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11<sup>th</sup> April, 1994 and S.O. 935(E), dated 14<sup>th</sup> October, 1998.



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**CHAPTER-6 : ENVIRONMENTAL**  
**MONITORING PROGRAM**

PRO CODE: CEC/EMP/MI-212

REV NO : 00/APR/24

6-4

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**Table 6.4: IS – 10500 :2012 Standards**

**Table 1 Organoleptic and Physical Parameters**  
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, <i>Max</i>	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	pH value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, <i>Max</i>	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, <i>Max</i>	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.



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Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts  
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, Max	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, Max	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, Max	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, Max	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, Max	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, Max	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl <sub>2</sub> ), mg/l, Max	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, Max	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, Max	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, Max	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, Min	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When pro- tection against viral infec- tion is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, Max	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, Max	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, Max	0.1	0.3	IS 3025 (Part 59)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, Max	0.5	No relaxation	Clause 6 of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO <sub>3</sub> ), mg/l, Max	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, Max	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, Max	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO <sub>4</sub> ) mg/l, Max	200	400	IS 3025 (Part 24)	May be extended to 400 pro- vided that Magnesium does not exceed 30
xxi)	Sulphide (as H <sub>2</sub> S), mg/l, Max	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, Max	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as CaCO <sub>3</sub> ), mg/l, Max	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, Max	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '\*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.



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**Table 6.5: Noise Level Standards**

Area Code	Category of Area	Limits in dB(A) Leq	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

**Note :**

1. Day time shall mean from 6 a.m. and 10.0 p.m.
2. Night time shall mean from 10.0 p.m. and 6 a.m.
3. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority.
4. Mixed categories of areas may be average as one of the four above mentioned categories by the competent authority.

\* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is energy mean of the noise level over a specified period.

**Table 6.6: Permissible Noise For Industrial Workers As Laid Down By CPCB**

Exposure time (in hr. per day)	Limit in dB(A)
8	90
4	93
2	96
1	99
1/2	102
1/4	105
1/8	108
1/16	111
1/32	114



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**Table 6.7: Permissible Peak Particle Velocity (PPV) In Mining Areas**

In mm/sec.

Type of structure	Dominant excitation frequency Hz		
	<8 Hz	8-25 Hz	>25 Hz
<b>A. Buildings/structures not belonging to owner</b>			
Domestic houses /structures (Kuchha brick and cement)	5	10	15
Industrial buildings (RCC and framed structures)	10	20	25
Objects of historical importance and sensitive structures.	2	5	10
<b>B. Building belonging to owner with limited span of life</b>			
Domestic houses/structures (Kuchha brick and cement)	10	15	25
Industrial buildings (RCC and framed structures)	15	25	50

The above said monitoring location and the frequency of monitoring shall be suitably modified in consultation with the nodal agency as per the actual requirements and prevailing conditions of the mine and environmental factors, as dictated from time to time, depending on the prevailing pollution levels, if required.

**6.4 ENVIRONMENTAL MONITORING COST:**

Towards environmental monitoring it is proposed to allocate a budget of Rs. 50,000 per annum for this project. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

\* \* \* \* \*



# **CHAPTER - VII**

**ADDITIONAL STUDIES**

## **CHAPTER 7 ADDITIONAL STUDIES**

### **7.1 GENERAL:**

The additional studies covered for this EIA / EMP report are:

1. Public consultation of the project as per MoEF&CC mandates.
2. Risk Assessment
3. Cumulative Impact Study
4. R&R Plan
5. Mine closure planning

### **7.2 PUBLIC HEARING:**

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

### **7.3 RISK ASSESSMENT:**

Risk assessment is a process whereby risks are analyzed assessed and risk management priorities are evaluated. It is defined as the characterization of the potential adverse effect to human health & environment due to environmental hazards.

**Objectives of risk assessment are:**

- Identifying hazardous activities
- Assessment of risk level and severity in different operations
- Identification of control measures
- Setting monitoring process
- Reduce the impact of mishaps of all kinds



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- Reduce the inherent potential for major accidents

**Methodology of Risk assessment:**

- Collection of information & identification of hazard
- Classify their severity and probability of occurrence
- Identification of exposed risks
- Assess the risk and risk rating based on
  - ❖ Probability
  - ❖ Exposure
  - ❖ Consequence
- Prioritization of the risks
- Implementation of control measures
- Monitoring risk assessment
- Evaluation and correction

For the various risks, likely to arise, detailed analysis of causes and control measures is given in below:

S.No	Factors	Causes of risks	Control measures
1.	Slope stability of mine face and dumping benches	a) Bench may slide due to its unconsolidated nature. b) Vibration due to movement of vehicles in the benches.	Overall bench slope angle will be maintained optimally as per DGMS requirement. Working bench width will be more than bench height.
2.	Drilling	a)Due to high pressure of compressed air hoses may burst. b) Down the hole drill rod may break due to improper maintenance of rod.	<ul style="list-style-type: none"> <li>• Periodical preventative maintenance and replacement of worn out accessories in the compressor and drill equipment.</li> <li>• As per manufacturers recommendation rod to be replaced and bits will be changed.</li> </ul>
3.	Blasting	a)Fly rock, ground vibration, noise etc. b) Improper charging of explosives	<ul style="list-style-type: none"> <li>• Burden and spacing will be kept optimum on trial basis.</li> <li>• Explosive charge per delay will be minimized.</li> <li>• Controlled blasting with Nonel will be used.</li> </ul>
4.	Excavation	a)Hauling and loading	<ul style="list-style-type: none"> <li>• Operator shall not operate the machine</li> </ul>





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S.No	Factors	Causes of risks	Control measures
		equipment are in such proximity while excavation b)Swinging of bucket over the body of tipper c) Driving of unauthorized person	when person & vehicles are in such proximity. • Shall not swing the bucket over the cab and operator leaves the machine after ensuring the bucket is on ground. • Shall not allow any unauthorized person to operate the machine by effective supervision.
5.	Transportation	a)Operating the vehicle “nose to tail” b) Overloading of material c) While reversal & overtaking of vehicle d) Operator of truck leaving his cabin when it is loaded	• It will be ensured that all these causes will be nullified by giving training to the operators. • No over loading will be done. • Audio visual reverse horn will be provided. • Proper training will be given.
6.	Fire due to electricity and Oil	a)Due to the short circuit of cables & other electrical parts b) Due to the leakage of inflammable liquid like diesel, oil etc.	• Electrical parts shall be cleaned frequently with the help of dry air blower • All fastening parts and places will be tightening. Suitable fire suppression equipment shall be provided.
7.	Natural calamities	Unexpected happenings	The mine management is capable to deal with the situation.

**7.3.1. DISASTER MANAGEMENT PLAN:**

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding a First Class Manager’s certificate of competency. The DGMS have been issuing a number of standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff is being sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation.

- Inundation of mine pit due to flood/excessive rains :
- Slope failure of the pit and waste dumps
- Accident due to heavy mining equipment and



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➤ Blasting and use of Explosives

In order to take care of above hazard / disasters the following control measures have been adopted.

- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Avoiding mining during heavy monsoon period and marching of all the HEMM to the top benches during rainy period.
- Provision of high capacity standby pumps with generator sets with sufficient quantity of diesel for emergency pumping especially during monsoon.
- All safety precautions and provisions of regulations will be strictly followed during all mining operations
- Prohibiting entry of unauthorized persons.
- Provision of Firefighting and first-aid provisions in the mines.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees for their use.
- Training and refresher courses for all the employees working in hazardous premises
- Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- Working of mine, as per approved plans and regularly updating the mine plans
- Cleaning of mine faces regularly
- Proper storage, usage of explosives through competent persons.
- Regular maintenance and testing of all mining equipment as per manufacturers guidelines
- Suppression of dust on the haulage roads with frequent water sprinkling, etc.



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- Increasing the awareness of safety and disaster through competitions, posters and annual safety weeks and environmental weeks, encouraged through suitable rewards and other similar drives.

The management and the EMC will be able to deal with the situations efficiently keeping in view of the likely sources of dangers in the mine.

**7.3.2.1 Structure of Disaster Management Plan:**

The structure of the DMP is described below.

**Outline of Disaster Management Plan:**

The purpose of disaster management plan is to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to abnormalities in the course of mining activity leading to a serious danger to workers or the environment or any machinery.

- **System of Communication:** Internal communication system by means walkie talkie, cell phones are provided for the department head and to their line of command are essential. The telephone Nos. and addresses of adjoining mines, rescue station, police station, fire service station, local hospital, electricity supply agency and standing consultative committee members are maintained by the in-charge of the first aid station.
- **Consultative Committee:** A common standing consultative committee for the ICL's Sankari group of mines in which the head of Mines manager of each lease will be there. The other members consist of safety officer/ medical officer (full time) /Asst.manager / public relation officer/foreman. This team prepares the emergency plan.
- **Emergency Plan:** The emergency plans, adopted and to be adopted to deal with any emergency situation are described below:
- **Organization Plan:** Organization plan includes a clear statement on the line of command and the responsibilities of each person involved in case of emergency situation.
- **Equipment Plan:** Equipment plan includes clearly stipulating make and type of machinery, capacity of machinery, location of operations and field of operations. Emergency plan



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includes Emergency Preparedness Plan and the standing orders will be prepared and displayed at all conspicuous places. Functions of the emergency consultative committee:

1. The team shall meet once in six months to discuss the possible or probable causes/ instances leading to any disaster that may occur in and around the mines.
2. The team shall assess the required resources to deal with the situation that may be identified as above.
3. The team leader shall lay down a detailed procedure or oral information to each member to follow in case of any impending or possible or actual disaster.
4. The team shall conduct mock drill once in a year to understand the practical problems that may arise while implementing the Emergency Preparedness Action Plan including the response time and take necessary steps to make the system effective.
5. The team shall make necessary recommendations/suggestions to the Management for identifying / monitoring/ dealing with any possible or probable disaster.
6. The minutes of the meeting of team shall be prepared including the probable cause of incident, response time and corrective and preventive actions required to be taken to avoid the reoccurrences of the same and kept as record.
7. The team may draw an Action Plan and modify the same from time to time based on changed circumstances.
8. The Emergency Preparedness team shall come into action immediately in case of any disaster.
9. The team shall record the actual performance/procedure followed/short comings while dealing with any actual disaster which will be discussed at various levels to strengthen the plan and approach.
10. Mines Manager shall inspect all the places where disaster occurred, along with Emergency Preparedness Team to give further instructions.



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11. Mines Manager shall ensure that all affected places are safe to resume the normal works and then only shall give permission to start the operations.

- **Facilities and Accommodation:** Accommodation and facilities for first aid station, rescue room and for various working groups will be provided. Regular checking of these facilities shall be under taken by the Asst. Manager (Mines).
- **First Aid and Medical Facilities:** The mine management is having first aid / medical center for use in emergency situation. All casualties would be registered and will be given first aid. The center will have facilities for first aid and minor treatment resuscitation and transport. It will have proper telephone/ mobile phone facility for quick communication with hospitals where the complicated cases are to be referred. Regular checking of these facilities shall be under taken by the in charge of the first aid station.
- **Store and Equipment:** A detailed list of equipment available, its type and capacity and items reserved for emergency will be maintained by the foremen and Asst.Manager.
- **Transport Services:** A well-defined transport control system will be provided to deal with the situation. Foremen shall be made in charge for these services.
- **Functions of Public Relations Group:** It is essential to keep cordial relation with Government officials and other social service organization and working groups. Liaison with representatives of the mine workers is required to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. Management is required to ameliorate the injured, survivors and family members of affected persons by providing material, finance, moral support and establishing contact with relatives of victims. The consultative committee formed, especially the nominated public relation officer shall look into these aspects.
- **Security:** Manning of security posts is very essential during the disaster management. This shall be undertaken by the foremen.
- **Catering and Refreshment:** Arrangements are to be made for the victims, rescue teams and others. The nominated public relation officer shall look into these aspects.



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**7.3.2.3 Care and Maintenance during Temporary discontinuance:**

If the mine is discontinued temporarily for more than 120 days, notice will be given 30 days before the date of such discontinuance to the concerned authorities. During discontinuance period, necessary arrangements will be made to avoid the entry of unauthorized persons. The accessibility to the mine from the surface will be prevented by providing security guards and fencing arrangements. The mines manager shall take all the steps required for the care and maintenance during temporary discontinuance.

**7.3.2.4 Executorial Procedures For Emergency Plan:**

The following procedural methodologies will be adopted for proper execution of emergency plan.

- ❖ On realizing anything serious occurrence happened anywhere in the mine, immediate information has to be passed on to the nearest available mining official and the mine management.
- ❖ On being informed about the emergency it will be verified for its correctness by the mining official who will telephone in particular to the Manager and supervisors of other parts/operations of the mine and managers of adjoining mine so that persons may be withdrawn.
- ❖ On receiving information of emergency intimation, it will be sent to the consultative committee, already formed by the mines manager. The mines manager shall also inform about the disaster to the police, nearest office of mines safety, office of pollution control board, District Collector in charge of emergency plan of the district and other required statutory bodies of State and Central Government. Shift in-charge will ensure that all the materials and transport system to deal with emergency situation are made available at the site.
- ❖ First aid facilities and ambulance to be made ready for providing to the victims. The Doctor should be immediately called upon.

Although there is no likelihood of any possible risks or disasters, pertaining to the mine workings such as inundation consequences, etc., spreading to outside peripheral areas, an “Off-site Emergency Plan” will be planned and documented in consultation with Collector and other



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concerned Government Officials. In case of any unfortunate happening of an emergency in off-site areas, prompt execution of various action plans as laid down in the offsite Emergency plan has to be carried out with the help of the concerned Government officials and local people.

#### **7.4 REHABILITATION AND RESETTLEMENT (R & R) PLAN:**

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

#### **7.5 MINE CLOSURE PLAN:**

In the mine closure stage all necessary measures will be taken as per Act & Rules, There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. As already explained, in the post mining stage the rainwater harvested in the mined out void shall be utilized for irrigation and domestic needs locally. The mine closure plan is provided in **Figure 4.5**.

#### **7.6 PIT SLOPE STABILITY PLAN**

- Factors affecting slope stability of the mine are
  - Geological structure comprising dip, intervening shear zone formation, clay intrusion, joints / discontinuities, faults etc.,
  - Lithology of formation
  - slope geometry
  - Ground water availability which may cause increased thrust on the faces
- Site specific analysis
  - Since the formation is of homogeneous rock type probability of slope failure is low and can be avoided if proper measures are adopted.
  - There will be a 7.5m wide barrier zone which will form a ridge which can also take care of the top section and as such no risk is envisaged on this front.



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- During future workings the following measures will be ensured:
  - Regular inspection of the mine faces to be carried out by mines manager for ensuring absence of any structural features like faults, joints, dyke, intrusive material in the rock strata which may affect the slope stability and cleared.
  - No loose material or boulders is to be stacked on the mine top or pit benches.
  - Height of the benches should be 6m. Working bench width should be at least 2.5 times the bench height. Ultimate pit bench width will be 6m & slope is kept at 45° to ensure slope stability.
  - Haul road formation will be at 1 in 16 slope with adequate road width.
  - There will be no ground water table intersection.
  - No seepage is expected due to formation. Adequate drainage management system comprising peripheral garland drain, settling pond to regulate monsoon water will be created to prevent saturation of compact layers, apparent drainage over the bench slope to avert damages to quarry face and manage the water flow.

The above will ensure safe and stable mine prospects.

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# **CHAPTER - VIII**

## **PROJECT BENEFITS**

## **CHAPTER 8 PROJECT BENEFITS**

The quarry will improve physical and social infrastructures in the area like:

- Direct employment to 22 people.
- Indirect employment to 50 people.
- Financial gains for the governments, through collection of various taxes like royalty, GST, etc.,
- Increase in General Awareness of the People.
- Continual improvements of the local amenities for the local society
- Improvement of the General Living Standard of the People in the Vicinity
- Overall Improvement in HDI (Human Development Index)
- Growth of Allied Industries in the Area.
- Improvement in Per Capita Income.
- Providing certain facilities for the local schools and panchyats

In short, the quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, medical systems, infrastructural build-up, etc in its own way.

By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.5 Lakhs for various activities under CER. The activities will be implemented once the mining operations commence. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.

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# **CHAPTER - IX**

## **ENVIRONMENTAL COST BENEFIT ANALYSIS**

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**CHAPTER 9  
ENVIRONMENTAL COST BENEFIT ANALYSIS**

Appendix-III of the MoEF notification S.O. 1533 dated 14.09.2006, which describes the generic structure of Environmental Impact Assessment document, states that the chapter 'Environmental cost benefit analysis' is applicable if it is recommended during scoping stage.

ToR for this project has been received from SEIAA, Tamil Nadu vide their letter No. SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024. Environmental cost benefit analysis is not prescribed in the terms of reference. Hence, it is not applicable for this project.

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# **CHAPTER - X**

## **ENVIRONMENTAL MANAGEMENT PLAN**

## **CHAPTER 10**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.1 INTRODUCTION:**

This chapter describes the implementation strategies of the environmental management measures described through the course of this EIA/EMP report for the purpose of mitigating significant impacts due to the proposed expanded mining operations.

#### **10.2 COMPONENTS OF THE ENVIRONMENTAL MANAGEMENT PLAN:**

The environmental management plan comprises identification of the major impacts due to project operations and their suitable mitigative measures. (Provided in an elaborate manner in Chapter-IV) Based on the environmental policy of the company, the environmental management cell will oversee the implementation of these mitigative measures. The details of the proponent's environmental policy, environmental management cell and also the budgetary allocation towards various environmental management measures has been elaborated in this chapter.

##### **10.2.1 ENVIRONMENTAL POLICY:**

The proponent has framed a well-planned environmental policy. The salient features of this policy will be.

- ❖ Ensuring risk-free and safe mining operations by following all rules and conditions prescribed in the Indian mines Act, metalliferous mining regulation, mineral conservation and development rules, etc,
- ❖ Ensuring environmental preservation by adoption of remedial measures for control of air, water quality, noise status, biological improvements, green belt creation, etc,.
- ❖ Extending CER activities to cater to the needs of local community for various benefits like improvement of physical and social infrastructures for the welfare of local community.



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- ❖ Ensuring that all mining operations such as deployment of HEMM, conduct of drilling and blasting operations, etc are strictly conducted keeping with regulatory standards & maintaining safe working environment in the area.
- ❖ Providing periodical training on safety, Health, & Environment to all employers.
- ❖ Any infringement / violation of any rule or unsafe mining operations should be reported mines manager, should be reported by the foremen/ blaster mate etc, who will take immediate corrective measures for avoiding major disasters. The report will ultimately reach the owner through upwardly hierarchical communicative channels from the lowest level to superior levels in a quick time bound duration.
- ❖ The mines manager will exercise overall control over entire mining and connected operations and all infringements / violations on any count pertaining to unsafe operations, environmental degradation, etc, should be brought to the notice of the owner of the quarry. Remedial measures for such violations and deviations should be taken care by the mines manager to avoid any hazards or disasters in the mine and nearby areas. The persons responsible for such violations will be punished through appropriate disciplinarily penal actions.
- ❖ The EC conditions and stipulations will be strictly observed by Mines manager of the mine in various issues like prescribed environmental monitoring schedules conducting of vibratory studies due to blasting, creation of green belt, management of mined area, occupational health review, etc.
- ❖ Penalty actions will be taken by the proponent in cases of continuous negligence resulting in violations deviations in this respect.
- ❖ A time schedule of once in 90 days for review of all operational factors as mentioned above is to be enforced, for proper and quick corrective actions needed in the matter.

### **10.2.2 ENVIRONMENTAL MANAGEMENT CELL:**

The Mines Manager/Mine Incharge will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level

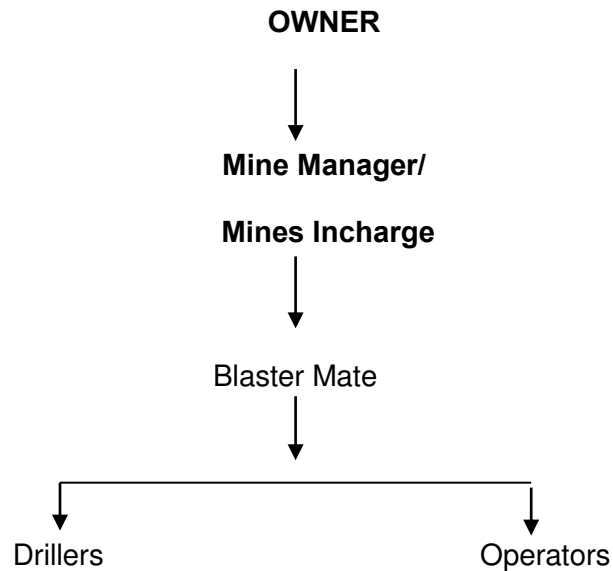


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control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided below:

**Figure 10.1: Organization Chart**



The Mines Manager/Mines Incharge in the mine project site will be directly responsible for various environmental activities in the mine. The owner will correlate and oversee the environmental activities and their effective implementation in consonance with the guidelines in the EMP. The Mines Manager/Mines Incharge will oversee the environmental administration at the mine and he will directly supervise all activities of environmental administration on environmental issues. Necessary assistance from sub ordinates, external consultants and laboratories shall be taken.

Environmental control measures will span various factors like land degradation, air, water and soil quality, noise levels, effective land reclamation for excavated areas, afforestation measures, etc. The administrative functions are given below.

- ❖ To observe the implementation of environmental control measures.
- ❖ To study the effects of project activities on the environment.
- ❖ To ensure implementation of Plantation Programme. Regular monitoring of survival rate of plants is carried out to achieve the desired result.





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- ❖ To keep records of monitoring etc., in a systematic way, so as to facilitate easy access, when needed by statutory agencies, etc. Also send prescribed returns to statutory authorities.
- ❖ To ensure that adequate fencing and plantation is carried out in the safety zones.
- ❖ Conducting environmental studies and reporting to SPCB.
- ❖ To interact and liaise with Government Departments.
- ❖ To evaluate the performance of existing pollution control equipment and systems periodically and take timely action to keep the equipment at its optimum performance condition.
- ❖ To take immediate preventive action in case of some unforeseen environmental pollution attributable to the project.
- ❖ Conducting safety audits and programmes to create safety awareness in workers/ staff.
- ❖ Conducting annual health audits to detect any health problems promptly in the workers/staff. This will reduce occupational health problems.
- ❖ Imparting training on safety and conduct safety drills to educate employees. Firefighting equipment and system has to be kept in ‘ready-to-fight’ condition.
- ❖ Carrying out socio economic study in the surrounding areas to find out the benefits derived by the society due to the project and also to fulfill the deficiency, if any, immediately.
- ❖ Ensuring proper mine closure arrangements

### **10.2.3 ENVIRONMENTAL MANAGEMENT PLAN:**

#### **10.2.3.1 General:**

Systematic monitoring systems and well-conceived and efficient Environment Management Plan will ensure that during the project operations, the various environmental parameters, are well within the statutorily sustainable limits. The environmental control measures proposed to keep



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various environmental parameters of the project in terms of air, water, noise, land, biological environment, etc. has been described below.

**10.2.3.2 Air Quality:**

With regards to air quality, to mitigate the fugitive and gaseous emission resulting from mining and allied activities, the following control measures are proposed to be undertaken:

- Regular water sprinkling in the transport roads using mobile tankers for dust suppression.
- Controlled blasting techniques with NONEL.
- Provision of dust filters / mask to workers working at highly dust prone and affected areas.
- Covering of drill holes with wet cloth, using sharp drill bits
- Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality.
- Proper maintenance of haul roads, HEMM and dumpers.
- Covering of loaded tippers with tarpaulins during transportation
- Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
- Besides, there will be good green belt cover will be developed around mine periphery and in safety zone.
- Green netting will be carried out around the lease periphery on all sides.

**10.2.3.3 Water Environment:**

There will be no process effluent generated from this project. The domestic sewage to be generated will be collected in septic tank with soak pit arrangements.

Surface runoff management structures such as garland drain connected to a settling pond will be constructed around the quarry to collect the rain water. The supernatant clear water from the



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settling pond will be provided to nearby downstream users. Towards rainwater harvesting, the rainwater harvested in the mine will be used to meet the water requirements during mining and excess water in consultation with villagers and in line with government practices will be out in to the nearby stream or shall be distributed to the nearby villages as per their need.

**10.2.3.4 Noise Environment:**

During the project operations, various control measures as listed below will be carried out to mitigate adverse impact due to the noise generated due to mining and allied activities:

- Good plantation will be carried out in the safety zone areas
- Noise protectors, insulation of operator cabins, installation of silencers in machineries, etc.
- Proper and regular maintenance of equipments
- Providing earplugs to workers exposed to higher noise level.
- Providing in-built mechanism for reducing sound emissions.
- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.

**10.2.3.5 Ground Vibration**

During the project operations, various control measures as listed below will be carried out to mitigate adverse impact due to the ground vibration caused due to blasting activities:

- ❖ Controlled blasting techniques to maintain the peak particle velocity (PPV) below DGMS prescribed levels.
- ❖ Ideally formulating drilling and charging pattern and ensuring using less charge per delay.



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- ❖ To contain fly rocks, stemming column will not be less than burden of the hole. Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- ❖ Blasting will not be carried out when strong winds are blowing towards the inhabited areas. Blasting will be done during midday time and never at night.
- ❖ Proper care and supervision during blasting by a competent and experienced person.
- ❖ Besides, different blasting time for the projects in the vicinity is suggested and the timing is to be mentioned in the display board in the respective mines entrance.

Further details regarding the same has been provided under section 4.4.2, Chapter-IV.

**10.2.2.6 Biological Environment:**

The mining lease area and 10km buffer zone are devoid of declared ecologically sensitive features such as national parks, sanctuaries etc. Besides, no Schedule-I animals are observed in the core and buffer zone. There will be no major clearance of vegetation involved in this project. However, good greenbelt and plantation programmes are planned within the lease area.

In the lease area, safety barrier 7.5m around the periphery will be left. About 1600 trees will be planted in and around the lease area. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. This will boost the biological, visual and aesthetic outlook of the area. Elaborate details regarding the same is provided under section 4.6.4, Chapter-IV.

**10.2.2.7 Socio-Economic Environment:**

The proposed project operation will provide positive impacts in the region on the employment area as well as on physical and social infrastructural status. Many other tangible benefits will be gained by the local people in the surrounding areas due to ancillary units, trading operations, contractual needs, casual labor, green belt development, etc. Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner.



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**10.3 ENVIRONMENTAL POLLUTION CONTROL COST:**

In this proposed quarry Implementation of environmental control measures as stated above involves capital as well as recurring expenses. The probable capital and recurring environmental control cost are calculated and given below **Table No – 6.5**

**Table 10.1: Environmental Control Cost**

S. No	Mitigation Measure	Rs. In lakhs	
		Capital cost	Recurring Cost /Annum
<b>Air Environment</b>			
1	Water sprinkling	8.00	0.50
2	Installing wheel wash system near gate of quarry	0.50	0.20
3	Muffle blasting – To control fly rocks during blasting	0.00	0.05
4	Wet Drilling with dust extraction	0.25	0.03
5	Environmental Monitoring	0.00	0.50
6	Transport Trucks -Monitoring exhaust fumes, covering with tarpaulin, monitoring manually with security guard to avoid overloading and installation of speed governors, Parking area with flaggers for traffic management	1.94	0.61
7	Road Maintenance - Haul road maintenance Regular sweeping and maintenance of approach road	0.00	0.61
<b>Sub-Total (A)</b>		<b>10.69</b>	<b>2.50</b>
<b>Noise Environment</b>			
8	Controlled Blasting using NONEL, provision of blaster shed	0.50	6.53
<b>Sub-Total (B)</b>		<b>0.50</b>	<b>6.53</b>
<b>Water Environment</b>			
9	Surface Runoff Management Structures	0.31	0.05
<b>Sub-Total (C)</b>		<b>0.31</b>	<b>0.05</b>
<b>Implementation of EC, Mining Plan &amp; DGMS Condition</b>			
10	Waste Management - Collection and Disposal	0.30	0.22
11	Fencing and Green Net Provision	6.14	0.10
12	Health and Safety - Provision of PPEs, IME, PME, First aid facility	0.88	0.56
13	Sign Boards -safety precaution signages, EC Conditions display board	0.20	0.03
16	Installation of CCTV cameras	0.30	0.05
17	Remuneration of statutory persons	0.00	7.80
<b>Sub-Total (D)</b>		<b>7.82</b>	<b>8.76</b>
<b>Green Belt Development</b>			
34	Plantation Inside the lease area(300 Nos.)	0.80	0.12
35	Plantation Outside the lease area (450 Nos.)	3.45	0.35
<b>Sub-Total (E)</b>		<b>4.25</b>	<b>0.47</b>
<b>Grand Total</b>		<b>23.57</b>	<b>18.30</b>

Towards EMP measures, Rs.23.57 Lakhs is allocated under capital cost. Besides, Rs.18.30 Lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of



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pollution control measures, environmental monitoring etc., will be met from revenue and will be spent for the entire lease period.

**10.4 CONCLUSION:**

A meticulously well planned Environmental Management Plan, with various programme schedules and timely execution objectives, as above, will ensure that the future environmental quality in the area will be maintained within statutory limits. The environmental management strategy as explained above will prove that industrial growth, if properly planned with all environmental concerns and appropriate remedial measures can go a long way to improve life pattern and living conditions of the local community around the project.

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# **CHAPTER-XI**

## **SUMMARY AND CONCLUSION**

## **CHAPTER 11**

### **SUMMARY & CONCLUSION**

#### **11.1 INTRODUCTION:**

**Tmt.B.Thiraviam's Panamooppampatti Limestone Mine** over an area of 3.07 Ha is located in Survey No. 132/1 and 132/3 (P) in Panamooppampatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu. The lease was executed on 02.02.1998 and the lease is deemed to be extended upto 01.02.2048 as per MMDR Act, 2015. Only small scale mining operation is carried out by the lessee in this lease and no mining in this lease is carried out since 09.06.2015 for want of EC.

Environment Clearance for this project was obtained recently vide Lr.No.SEIAA-TN/F.No.6355/1(a)/ EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl after conducting public hearing for this capacity on 23.02.2021.

The proponent has not recommenced mining operations so far since the envisaged production capacity is very low and it will not be economical.

As such, now It is proposed to expand the production capacity from 563T of Limestone and 1313T of rejects (1,876T ROM) upto a depth of 13m to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) upto a total depth of 34m.

Considering that this is a limestone mining project which is a major mineral with a lease area of 3.07Ha, this project falls under Sector 1(a) i.e.; Mining of Minerals under Category B1 and as per MoEF & CC notification, this expansion proposal necessitates preparation of EIA/EMP report along with public hearing and the PP has initiated action towards the same.

#### **11.1.1 PROJECT HISTORY:**

**Mining Lease:** Mining lease was granted for a period of 20 years under G.O.3(D) No.124/Industries (MMD2) Dept. dated 31.07.1997. **(Annexure-1)** The lease was executed on 02.02.1998 and was valid upto 01.02.2018. **(Annexure-2)** Subsequently, application for renewal was submitted and the lease is deemed to be extended upto 01.02.2048 as per MMDR Act, 2015.





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**Production:** During this initial period, mining operations were carried out by the proponent in the lease area. Based on the letter obtained from Department of Geology & Mining, Madurai vide. Roc.No.1123/2015-Mines dated 06.12.2017, it is seen that transport permit was issued on 08.06.2015 for 10T of Limestone. Further it states the following: “..the lessee has not applied for transport permit for transport limestone from 09.06.2015 to till date”. Hence, it is observed that no mining operations were carried out subsequently.

**Environmental Clearance:** Environment Clearance for this project was obtained recently vide Lr.No.SEIAA-TN/F.No.6355/1(a)/ EC.No.5720/2018 dated 09.05.2023 for the production quantity of 563T of Limestone and 1313T of rejects with an ultimate depth of mining of 13m bgl. **(Annexure-3)** The proponent has not commenced mining operations for this production quantity so far.

**Review of Mining Plan for expansion:** Subsequently, Review of Mining Plan for the period 2023-24 to 2027-28 was obtained from IBM vide Lr.No. TN/MDR/ROMP/LST-1712.MDS dated 30.08.2023. **(Annexure-4)** Further explorations carried out for the purpose of preparation of this mining plan shows the availability of 6,97,713T of Limestone as mineable reserves as against the previously approved quantity of 12,135T of Limestone of mineable reserves provided in the Review of Mining Plan for the period 2018-19 to 2022-23.

Due to the availability of good quantum of limestone reserves, and also owing to better cost-benefit of mining operations, it is proposed to expand the peak production capacity to 52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM) and total five-year production of 254448.30T of Limestone and 109049.00T of Mineral Reject (363498.00T ROM) upto a depth of 16m during plan period and total ultimate depth of 34m.

#### 11.1.2 ENVIRONMENTAL CLEARANCE APPLICATION:

Particulars	Details
Terms of Reference for expansion	SEIAA-TN/F.No.10501/SEAC/1(a)/ToR-1663/2024 dated 08.02.2024
Baseline Data Collection	Carried out by Creative Engineers & Consultants , Chennai for Winter Season (Dec 2023 to Feb 2024)



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**11.2 SALIENT FEATURES OF THE PROJECT:**

**Table 11.1: Site Details**

<b>Location</b>	Panamooppampatti Village, Usilampatti Taluk, Madurai District
<b>Survey No.</b>	132/1 and 132/3 (P)
<b>Coordinates</b>	<b>Latitude:</b> 10°02'54.58" N to 10°03'2.63" N <b>Longitude:</b> 77°51'2.11" E to 77°51.10.35" E
<b>Nearest Highway</b>	SH-154, Usilampatti – Vattalagundu – 6.5Km - W
<b>Nearest Village</b>	Karattuppatti – 550m , NE
<b>Nearest Railway Station</b>	Sholavandan R.S – 12.5 Km-E
<b>Nearest Airport</b>	Madurai – 33Km - SE
<b>Topography</b>	Plain terrain, dry lands with scarce vegetation.
<b>Accessibility</b>	The lease area is accessible from Panamooppampatti village from Vikkiramangalam Kovilore Road about 1.5Km on the eastern side of the lease area which joins Kalyanipatti – Kamarajnagar road on the northern side of the lease area.



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**Table 11.2: Environment Setting of The Study Area**

S.No	Particulars	Details	Distance	Direction
<b>I Connectivity</b>				
1.	Highway	SH-154 (Usilampatti-Vattalagundu)	6.5Km	W
2.	Railway Station	Sholavandan R.S	12.5Km	E
3.	Airport	Madurai	33.0Km	SE
4.	Village	Karattuppatti	550m	NE
		Perumalpatti	650m	N
		Panamooanpatti	1.1km	NE
5.	Town/City	Kamarajnar	6.5Km	W
<b>II Environmental Features</b>				
6.	Water Bodies	Tirumangalam Main canal	3.9Km	NE
		Vaigai River	3.4Km	N
7.	Reserve Forests	Vikkiramangalam R.F	320m	SW
		Mettuppatti R.F	2.3km	N
		Mannadimangalam R F	2.6km	E
		Vettalaippatti R.F	3.2km	W
		Uttappanayakkanur R.F	6.4km	W
		Doddappanayakkanur North R.F	7.6km	W
		Kadavakurichi R.F	8.4Km	NW
		Valaiyapatti R.F	8.6Km	W
		Kodhamangalam R.F	9.6Km	SE
<b>III Sensitive Areas</b>				
8.	Notified Archaeologically important places, Monuments	Nil	--	--
9.	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972*	Nil	--	--
10.	Defense Installations	Nil	--	--

**Table 11.3: Technical Description**

PARTICULARS	DETAILS
Geological reserve	10,42,266T of Limestone
Mineable reserve	6,91,713T of Limestone



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<b>PARTICULARS</b>	<b>DETAILS</b>
Method of Mining	Opencast semi mechanized mining using jackhammer drilling, blasting, excavation through excavator, manual sorting and mineral transport through tippers will be carried out. As the mineral occurs as outcrops and exposed mostly in small pits as well as surface and there is no separate development work involved expect side burden to win the material.
Production	52039.75TPA of Limestone and 22302.75TPA of rejects (74,342.5T ROM)
Waste Generation and Management	A total waste of 41,000T and 1,09,049T of mineral reject will be generated during the plan period of 5 years. Mineral reject will be dumped in Waste Dump-1 and Overburden will be dumped in Waste Dump-2.
Ultimate Depth	34m
Man power	22 People directly and more than 50 people indirectly
Mode of transport	By Road
Water requirement	10 KLD
Source of water	The required water will be procured from outside agencies initially. Later, water collected in the mine pit will be used to meet the needs.
Power requirement	All the equipment will be diesel operated. No electricity is needed for mining operation. The minimum power requirement for office, etc will be met from state grid.
Lease period	Upto 01.02.2048
Project cost	Rs.160 Lakhs

### 11.3 EXISTING ENVIRONMENTAL SCENARIO:

#### 11.3.1 GENERAL:

The studies and data collection have been carried out systematically and meticulously as per relevant IS codes, CPCB and MoEF&CC guidelines and as per approved ToR during **Winter Season (December 2023 – February 2024)** For the purpose of this study, the area has been divided into two zones, namely, core and buffer zones. Core zone is considered as the total lease



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area, while buffer zone encompasses an area of 10 km radius distance from the periphery of core zone.

**11.3.2 SOCIO-ECONOMIC STATUS:**

The details of the 10Km radius study area has been provided below:

**Table 11.4: Details of Buffer Zone**

Distance	No. of Villages	Taluk	District
0-2Km	3	Usilampatti	Madurai
2-5Km	3	Usilampatti	Madurai
	1	Vadipatti	Madurai
	2	Nilakottai	Dindigul
5-10Km	6	Vadipatti	Madurai
	17	Usilampatti	Madurai
	17	Nilakottai	Dindigul
<b>Total</b>	<b>49</b>	<b>3 Taluks</b>	<b>2 Districts</b>

**Table 11.5: Social, Economic And Demographic Profile of the Study Area**

Details	Population	Percentage
<b>A. Gender-wise distribution</b>		
Male Population	93803	50.84
Female Population	90719	49.16
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>B. Caste-wise population distribution</b>		
Scheduled Caste	41568	22.53
Scheduled Tribes	906	0.49
Other	142048	76.98
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>C. Literacy Levels</b>		
Total Literate Population	118629	64.29
Others	65893	35.71
<b>Total</b>	<b>184522</b>	<b>100</b>
<b>D. Occupational structure</b>		
Main workers	81120	44.00
Marginal workers	22453	12.20
<b>Total Workers</b>	<b>103573</b>	<b>56.20</b>
<b>Total Non-workers</b>	<b>80949</b>	<b>43.90</b>
<b>Total</b>	<b>184522</b>	<b>100</b>



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**11.3.2.1 SAMPLE SURVEY:**

Nearby villages were visited for conducting sample Village survey on all socio-economic aspects and requirements of the people. The existing socio-economic scenario is studied and CER activities are also suggested to the proponent. The study details are given in **Para 3.2.4, Chapter – III.**

**11.3.3 EXISTING ENVIRONMENTAL QUALITY:**

**Table 11.6: Baseline Data**

<b>A) METEOROLOGICAL DATA</b>		<b>Winter Season (Dec 2023 – Feb 2024)</b>	
<b>PARAMETERS</b>	<b>MINIMUM</b>	<b>MAXIMUM</b>	
Temperature in °C	13.7	37.0	
Humidity in %	29.5	94.6	
Wind speed Km/Hr	<1.8	29.5	
Predominant wind direction (From)	ENE		
<b>B) AMBIENT AIR QUALITY</b>		<b>Monitoring Location – 6 locations</b>	
<b>PARAMETER</b>	<b>RESULT (µg/m<sup>3</sup>)</b>		<b>*LIMIT (µg/m<sup>3</sup>)</b>
<b>Location</b>	<b>Core Zone</b>	<b>Buffer Zone</b>	
Particulate Matter (Size <10 µm)	39.1 – 49.1	41.3 – 64.9	100
Particulate Matter (Size <2.5 µm)	17.9 – 22.6	19 – 30.5	60
Sulphur Dioxide (as SO <sub>2</sub> )	4.7 – 6.2	5.4 – 8.7	80
Nitrogen Dioxide (as NO <sub>2</sub> )	7.1 – 9.6	7.4 – 12.7	80
<b>Conclusion:</b> The existing Ambient Air Quality levels for PM10, PM2.5, SO2 and NO2, are within the NAAQ standards prescribed CPCB limits of 100 µg/m <sup>3</sup> , 60 µg/m <sup>3</sup> , 80 µg/m <sup>3</sup> & 80 µg/m <sup>3</sup> . The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m <sup>3</sup> )			
<b>C) WATER QUALITY</b>		<b>Monitoring Location – 6 locations</b>	
<b>PARAMETER</b>	<b>Result</b>	<b>*LIMIT (µg/m<sup>3</sup>)</b>	
pH at 25 °C	7.06 – 7.55	<b>6.5-8.5</b>	
Total Dissolved Solids, mg/L	342 – 856	<b>2000</b>	
Chloride as Cl <sup>-</sup> , mg/L	98.6 – 216	<b>1000</b>	
Total Hardness (as CaCO <sub>3</sub> ), mg/L	184 – 478	<b>600</b>	
Total Alkalinity (as CaCO <sub>3</sub> ), mg/L	187– 438	<b>600</b>	
Sulphates as SO <sub>4</sub> <sup>2-</sup> , mg/L	32.5 – 152	<b>400</b>	



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Iron as Fe, mg/L	0.02 – 0.05	<b>0.3</b>
Nitrate as NO <sub>3</sub> , mg/L	1.45 – 4.65	<b>45</b>
Fluoride as F, mg/L	0.16 – 0.54	<b>1.5</b>

**Conclusion:** The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.

**D) NOISE LEVELS** **Monitoring Location – 6 locations**

PARAMETER	RESULT dB(A)		*LIMIT (µg/m <sup>3</sup> )
	Day Equivalent	Night Equivalent	
Core Zone	40.7	37.4	<b>90</b>
Buffer Zone	42.6 – 51.2	38.3 – 44.9	<b>Day Equivalent - 55dB(A), Night Equivalent - 45dB(A)</b>

\*Permissible noise for industrial workers as laid down by CPCB (at 8 hrs Exposure Time). While comparing with the MoEF&CC Norms, the monitored ambient noise levels are generally within the limit values.

**E) SOIL QUALITY** **Monitoring Location – 3 locations**

PARAMETER	Range of values
pH	6.97 – 7.65
Electrical Conductivity (µmho/cm)	40.35 – 97.44
Organic matter (%)	94.87 – 97.23
Total Nitrogen (mg/kg)	2.77 – 5.13
Phosphorus (mg/kg)	0.72 – 0.94
Sodium (mg/kg)	432 – 510
Potassium (mg/kg)	310 – 360

Soil is of Loam Type.

**F) LAND ENVIRONMENT:**

For the present study on land use pattern in the study area, remote sensing satellite data have been used. The area estimated of land use categories around the 10km buffer zone is provided below:

**Table 11.7: Land Use in 10Km Buffer Zone**

S.No	Landuse Feature	Area (Sq.Km)	Percentage
1	Agriculture/ Plantation	49.17	15.24
2	Fallow Land	28.49	8.86
3	Land With Scrub	102.33	31.72
4	Land Without Scrub	58.76	18.21
5	Scrub Forest	65.01	20.15



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6	Water bodies	15.30	4.74
7	Settlement	34.93	1.08
8	<b>Total</b>	<b>353.99</b>	<b>100</b>

From the above table it is seen that 15.24 % of the study area is agriculture land and 8.86 % are fallow land. Land with scrub constitutes 18.21 %, Land with scrub constitutes 31.72 %, lands without scrub constitute 18.21 % , Scrub Forest constitute 20.15 % and waterbodies & others constitute 5.82 %.

**G) BIOLOGICAL ENVIRONMENT:**

The lease area is a non-forest, private land. Major part of lease area is barren fallow land with bushes ( Prosopis juliflora) and grasses. Study area represents varying land use comprising rocky hills ( represented as RF) on the north, south and west of the lease area. Thorny bushes, cactus variety of species only observed in these RF areas. Besides, further north along side the vaigai river, cocunut grooves and agricultural activities are observed. The Dominated species are Prosopis juliflora, Azadirachta indica, Borassus flabellifer, Acacia nilotica, Albizia lebbeck, Acacia leucophloea, Acacia auriculiformis, etc. The detailed list of plants found in the Bufferzone is given in Table no – 3.25.

**Fauna:** There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals like Cows, Buffalos, Dogs, Cats etc., are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. There is no Schedule I species in the core & buffer zone. The list of fauna within the study area is given in Table No – 3.26.

**H) HYDROLOGICAL STUDY:**

The lease area exhibits moderately elevated area. Topsoil is covered with red soil upto a depth of 1m and partly capping the limestone outcrops. Intermittent outcrops of limestone are observed at surface continuously throughout the area for mapping.

In the study area, the shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The study has revealed that potential fractures are encountered at deeper levels. The water in the wells are available mainly after post monsoon and it reduces during summer necessitating only dry crops cultivation. Bore wells are as deep as 350 ft also and it reflects that the yield is only better at deeper water levels.





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Based on the available information and the geophysical investigations it is concluded that the project area is considered to poor groundwater potential up to 55m. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected. There is no water seepage noticed in to the already quarried pits situated nearby the proposed quarry area. Hence, the quarrying lime stone up to the proposed depth may not have any adverse impact in the area over ground water conditions.

**11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:**

**11.4.1 GENERAL:**

As already mentioned, only small scale mining operations are carried out in this lease and no mining activities are carried out since year 09.06.2015 . The identified impacts due to this mine during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc.

**11.4.2 AIR ENVIRONMENT:**

The principal sources of air pollution in the area due to mining and allied activities are dust generation in the mine due to various activities such as excavation of material, movement of HEMM, loading, unloading and transportation operations.. Besides, Gas emission also occur as a result of emission of SO<sub>2</sub>, NO<sub>x</sub>, CO etc., from diesel driven mining equipment, compressors, generator sets, etc. The following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

**Table 11.8: Mitigation Measures – Air Environment**

S.No	Activity	Mitigation Measures
1	Drilling	Usage of Drill bits in good condition
		Covering of drill holes with wet cloth
		Usage of sharp drill bits for drilling of holes.
		Provision of dust filters / mask to workers working at highly dust prone and affected areas.
2	Blasting	Well-designed blasting parameter, effective stemming to achieve optimum breakage occurs without generating fines.
		Use of appropriate explosives for blasting and avoiding overcharging of blast holes.



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		Avoiding blasting during high wind periods where the fine dust is carried out away easily affecting the ambient air quality.
		Use of controlled blasting techniques with Nonel to keep the dust generation, noise as well as vibration level within the prescribed limits.
3	Excavation and Loading	Proper maintenance of HEMM
		Enclosures for operator cabin.
		Imparting sufficient training to operators on safety and environmental parameters.
		Proper maintenance of hauling equipments.
		Avoiding overloading of dumpers.
4	Transportation	Regular wetting of transport road using mobile water tanker.
		Proper maintenance of haul road and other roads
		Setting up of tyre wash facility in the transport road.
		Avoiding overloading of tippers
		Covering of loaded tippers with tarpaulins during transportation
		Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
5	Others	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area.
		Green netting will be carried out around the lease periphery on all sides.

Due to adoption of all these measures, no major impact on air quality is envisaged due to this expansion project.

The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. Ground Level Concentration (GLC) have been computed using hourly meteorological data for particulate matter PM<sub>10</sub> and PM<sub>2.5</sub>.

The post expansion added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM<sub>10</sub> are in the range of 46.9 µg/m<sup>3</sup> to 65.9 µg/m<sup>3</sup> and with respect to PM<sub>2.5</sub> are in the range of 22.1 µg/m<sup>3</sup> to 31.5 µg/m<sup>3</sup> which are within the statutory limits in each case.

For preservation of environment in this mine strict enforcement of management schemes will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of



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all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

**11.4.3 WATER ENVIRONMENT:**

**Water Requirement:** The total water requirement for this project will be 10.0 KLD comprising 1.0 KLD for drinking water and domestic use, 8.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose.

The activity / source of pollution, its impact / consequence, proposed control measures are explained below:

**Table 11.9: Mitigation Measures – Water Pollution**

S.No	Source	Consequence	Mitigation Measures
A	Domestic use	Generation of waste water	The domestic sewage to be generated from the project will be collected in septic tank with soak pits.
B	Workshop , Service Building	Generation of waste water	ETP for the workshop effluent with oil & grease trap facility is available. The treated water is reused for greenbelt area. The oil and grease from separate storage tank is safely disposed to CPCB authorized re-processor.
B	Rainfall	Runoff from waste dump and stack	Effective monsoon surface run off management like provision of about 890m of Garland in the mine periphery, around waste dumps About 890m of Retaining wall is constructed at the toe of the dump. Drains are connected to the settling ponds and supernatant clear water is let out.
		Rainwater Harvesting	The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc.
C	Drainage Course	Disturbance to drainage course	There is no major waterbodies or drainage courses in and around the lease area. The nearest water body is Tirumangalam Canal which is beyond 3.88Km and Vaigai River which is at 3.4Km. No major impact is envisaged on the water bodies due to project operations

**Generation of mine pit water:** Hydrogeological study was conducted by Aadhi Bhoomi Mining & Enviro Tech (P) Ltd., during the previous EIA/EMP Report. Perched local water table was inferred at 30-35m and the second fracture line is 50-60m in depth by electrical resistivity method.



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The yield from the top perched water is less and mainly post monsoon season only. From the pumping test, it is inferred that the transmissivity value is 0.6m<sup>2</sup>/day. From the hydrogeological study it is understood that the study area is composed of Limestone deposit, with little top soil capping and Kankar. In the nearby region, the formations are compact with less intergranular porosity and fractures leading to less permeability and transmissivity values and as such the ground water level in this area is deep from surface. No major water seepage within the mine is expected from the periphery. The ultimate pit depth of mining is 34m. The ground water table in this area is below this level. Hence, ground water intersection is not envisaged and ground water will not be affected appreciably due to the quarrying operation. As mentioned earlier, the rainfall will be collected in the mine floor sump and advantageously used. Excess water if any in the sump will be pumped to settling pond for downstream users.

#### **11.4.4 NOISE ENVIRONMENT:**

Anticipated noise levels resulting from operation of the various machineries like excavator, tippers, drill have been computed using point source model. Computation of cumulative noise levels at the nearby villages is made based on the assumption that there are no attenuation paths between the source and the boundary. From the studies, it is found that the predicted Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding village. Hence, by implementing the following mitigative measures for noise control, the impact on noise levels will continue to be insignificant:

- Planting rows of native trees along roads, around mine area and other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipments like shovel, tippers, etc.
- Proper and regular maintenance of equipments may lead to less noise generation.
- Providing in-built mechanism for reducing sound emissions.
- Providing earplugs to workers exposed to higher noise level.



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- Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.
- Provision of green net in lease periphery

Further green belt and afforestation will be planned and executed to abate noise and dust propagation in the area.

#### **11.4.5. VIBRATION:**

To reduce ground vibratory conditions, various control measures will be implemented such as keeping PPV below 10mm/s for 8-25hz frequency range, formulating drilling and charging pattern with less explosive charge, initiating sequence and using NONEL, carrying out blasting with minimum charge per delay, avoiding blasting during strong winds etc. By adoption of above measures, it will be ensured that the ground level vibration due to blasting are maintained within the limits prescribed by DGMS, Dhanbad at the mining areas vide Circular No. 7 dated 29 -08-1997. Besides, different blasting time for the projects in the vicinity is suggested and the timing is to be mentioned in the display board in the respective mines entrance. Elaborate details regarding the same are provided under section 4.4.2, Chapter-IV.

#### **11.4.6 IMPACT ON LAND ENVIRONMENT:**

The lease area of 3.07 Ha in S.F.No. 132/1, 132/3(P) is a Government Poromboke Land. In the post mining stage, an area of 2.21.40 Ha of mined out area will be left as water body. 0.01Ha will be infrastructure, 0.03 Ha will be roads. Overall, 0.82.6Ha will be covered with plantation during the post mining stage. Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals. In the post mining stage, the entire mined out area shall be used as a rainwater harvesting pond.

#### **11.4.7 BIOLOGICAL ENVIRONMENT:**

Necessary mitigative measures like dust suppression, proper maintenance of equipment's, greenbelt and plantation etc., will be carried out to prevent dust generation & any further impact



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on the vegetation. In the lease area, safety barrier 7.5m around the periphery is left. About 1600 trees will be planted in and around the lease area.

**11.4.8 SOCIO ECONOMIC ENVIRONMENT:**

The entire lease area is a Government Poromboke land. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here. The mining operations will employ about 22 people. Besides through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations.

Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner. In consultation with the locals based on the need & priority it will be implemented.

**11.4.9 OCCUPATIONAL HEALTH AND SAFETY ASPECTS:**

In order to ensure minimisation of occupational health and safety problems in the project operation, the following preventive remedial measures will be effectively exercised in the project operations, so as to comply with applicable standards.

- Medical examination of workers at pre-entry level stage of workers, etc., by qualified doctors, with periodical examination of all workers/staff at least once a year, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

**11.4.10 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:**

The mined out limestone will be transported to end users by road. There will be about 1 trip per hour. The transport route can easily absorb this negligible traffic due to this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:



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- ❖ Water sprinkling in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Proper maintenance of transport roads
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.

**11.4.11 WASTE MANAGEMENT:**

Small quantity of waste to be generated will be dumped in external dump within the lease area.. There is no process effluent generation from this mine. Hence no liquid waste is generated.

The hazardous waste generated in this mine will be stored in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc. It will be disposed through authorized recyclers or re-processors periodically. The hazardous wastes will be transported in accordance with the provisions of rules. By effective implementation of above said mitigation measures no major impact due to Hazardous waste is expected.

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

**11.5 ENVIRONMENTAL MONITORING PROGRAMME:**

The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various statutory Limits.

Monitoring location and the frequency of monitoring shall be suitably modified in consultation with the nodal agency as per the actual requirements and prevailing conditions of the mine and environmental factors, as dictated from time to time, depending on the prevailing pollution levels, if required.



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Towards EMP measures, Rs.23.57 Lakhs is allocated under capital cost. Besides, Rs.18.30 Lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

**11.6 ADDITIONAL STUDIES:**

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

**11.7 CONCLUSION:**

By systematic and scientific mining adhering to all the statutory norms and enforcing and strictly implementing the above said mitigation measures mentioned in this report, no adverse impact is envisaged. The proposed mining project will benefit this region in the fields of potential employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, medical healthcare systems, etc. in its own way and also revenue to Government through royalty, taxes etc.

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# **CHAPTER - XII**

## **DISCLOSURE OF CONSULTANTS ENGAGED**

**CHAPTER 12**

**DISCLOSURE OF CONSULTANTS ENGAGED**

**Creative Engineers & Consultants**, Chennai is an **NABL** accredited testing laboratory and **NABET** accredited EIA consultancy. Established over 25 years ago, this company has steadily made good strides in the environmental impact assessment fields, and is also one of the first companies to get accredited by NABET as an Accredited Consultant Organization as early as 2011. Creative Engineers & Consultants has to its credit, successful completion of numerous EIA/EMP reports, grant of environmental clearances and periodic environmental monitoring works. Presently, the company has been accredited by NABET as a ‘Category-A’ organization for the sectors of Mining of Minerals (opencast only), Thermal Power Plants, Mineral Beneficiation and Cement Plants with the accreditation valid upto 11.06.2024. The team of experienced professionals that are a part of this organization has been detailed below.

**Table 12.1: List of People Involved**

<b>EXPERT NAME</b>	<b>QUALIFICATION</b>	<b>POSITION</b>	<b>EXPERIENCE</b>
Mr. P. Giri	AMIE (Mining)	EIA Coordinator & Functional area Expert (AP,NV,HW),	Over 30 years of experience in EIA/EMP report, mine plan preparation, including modeling
Mr. K. Shankar	M.Sc (Geology). PGMEMG	Functional area Expert (GEO, HG, SHW, RH) & IBM approved RQP.	Over 25 years of experience in EIA/EMP report, Mine plan, hydrological report preparation
Mr.S.S.Rajendran	M.Sc. (Pharmaceutical Chemistry)	Lab head	More than 9 years of experience in Environmental laboratory.
Mr. R. Babu raj	M.A (Sociology), B.Com(Y.L&Cost), ITI, Advance Diploma in Computer application	Functional Area Expert (Socio Economy)	Over 13 years of experience in dispersion modeling, computer applications. Specialized in CAD and computer software, applications. 4years experience



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REJECTS (74,342.5T ROM) OVER AN AREA OF 3.07 HA IN PANAMOOPPANPATTI VILLAGE,  
USILAMPATTI TALUK, MADURAI DISTRICT, TAMIL NADU.**

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EXPERT NAME	QUALIFICATION	POSITION	EXPERIENCE
			in the field of socio economy and its allied report preparation.
Mr. B. Govindaraman	B.Sc.	Field technician	Over 20 years of field monitoring & data collection experience
Dr.B.Swamynathan	M.Sc (Ecology & Environmental Sciences), M.Phill (Botany), Ph.D (Ecology & Environmental Sciences)	EIA Coordinator and Functional Area Expert (EB,SC,LU and AP)	More than 10 years of experience in Environment and allied fields.
Ms. G. Sandhya	B. Tech Chemical Engineering M.Tech Environmental Engineering	EIA Coordinator, Functional Area Expert (AQ, WP)	Over 6 years experience in preparation of EIA/EMP reports

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# **ANNEXURES**

## ANNEXURE - III

## GOVERNMENT OF TAMIL NADU

## ABSTRACT

Mines and Minerals - Mining Lease - Limestone - Madurai District, Usilampatti taluk, Pammoppampatti village - S.No.132/1 and 132/3 Part - Over an extent of 3.07.0 hectares - Mining Lease application of Tmt. B.Thiraviam of Usilampatti - Grant of Mining Lease - Orders - Issued.

## INDUSTRIALS (MMD2) DEPARTMENT

G.O. 3(D) No: 124

Dated 31.7.97

Read:

- 1.M.L.Application of Tmt. B.Thiraviam, dated 2.2.95
- 2.From the Collector, Madurai District, Lr.No.Mines/339/95 dated 15.12.95
- 3.From the DGM,Lr.Rc.No.18984/B2/95, dated 11.4.96.
- 4.Govt.Lr.No.10959/MMD2/96-1, dt.30.7.96
- 5.From Tmt. B.Thiraviam, dated 25.10.96
- 6.Govt.Lr.No.10959/MMD2/96-2, dated 18.2.97
- 7.From the GOI, Ministry of Mines, Lr.No.4/111/97-MIV dated 30.6.1997.

...

Orders:

Tmt. B. Thiraviam, Usilampatti has applied for grant of Mining Lease for mining Limestone, Over an extent of 3.07.0 hectares of poramboke lands in S.F.No.132/1 and 132/3 part of Pammoppampatti village, Usilampatti taluk, Madurai District for a period of 20 years. District

2. The Collector, Madurai in his report has stated that the lease applied lands are classified as assessed waste dry in the village accounts. The area applied is slopy terrain surrounded on the south and north by hillocks. The area comprises rock deposits of calcgneiss of Archcan age. A thin band of limestone deposits is noticed in the applied area intruded into the country rock of calcgneiss and subsequently metamorphosed. One stream is passing on the north-western portion of the field from west to east direction. A powerline is passing on the northern side at a distance of 20 metres ~~and~~ from the boundary of the field 132/1 in east-west direction and another power line is passing in the middle portion of the field in SF.No.133/3 in East-west direction approximately. The approximate inferred reserves of limestone are estimated as 18,000 CBM. No objection was received so far. In the circumstances the Collector has forwarded the application of Tmt. B. Thiraviam for the grant of limestone mineral lease over an extent of 3.07.0 hectares in S.Nos.132/1(2.50.5 hectares) and S.No.132/3(0.56.5 hectares) of Pammoppampatti village, Usilampatti taluk, Madurai District, subject to the condition that sufficient safety distance should be provided to the existing powerlines and without causing any disturbance to odai passing nearby at the time of mining operation.

..2..



..2..

3. The Director of Geology and Mining, has stated that the area applied for satisfies section 6(1)(c) of Mines and Minerals (M&D) Act, 1957 and recommended the application of Tmt. B. Thiraviam for grant of Mining Lease for a period of 20 years with certain conditions.

4. This Government after careful consideration of the Mining Lease application of Tmt. B. Thiraviam decided to grant Mining Lease for a period of 20 years for mining limestone over an extent of 3.07.0 hectares. Government poramboke land in SF No. 132/1 and 132/2 part in Pannampattinam village, Usilampatti taluk, Madurai District, and accordingly addressed the Government of India for their approval. The Government of India in their letter seventh read above conveyed their approval under section 5(1) of Mines and Minerals (M&D) Act, 1957 and rule 27(3) of Mineral Concession Rules 1960 to grant of Mining Lease for limestone over an extent of 3.07.0 hectares of land in Pannampattinam village, Usilampatti taluk, Madurai District in favour of Tmt. B. Thiraviam for a period of 20 years.

5. In exercise of the powers conferred under section 10(3) of Mines and Minerals (M&D) Act, 1957 the Governor of Tamil Nadu hereby sanction the grant of Mining Lease for limestone in favour of Tmt. B. Thiraviam, over an extent of 3.07.0 hectares of land in S.Nos. 132/1 and 132/3 (part) of Pannampattinam village, Usilampatti taluk, Madurai District for a period of 20 years, subject to the conditions mentioned in sub-rule (1) of Rule 27 of Mineral Concession Rules 1960 and the appendix to this order and subject to the following conditions:-

- a) A safety distance of 50 metres has to be provided and maintained from the High Tension Powerline and no mining should be done within the safety distance of 50 metres from the low tension power.
- b) No mining should be done within a distance of 50 metres from the odai.
- c) Cement grade limestone should be supplied to cement industry and only limestone of below cement grade with less than 42% CaO should be supplied for use as filler.

6. For surface rights of Government Poramboke lands, the Collector will fix and collect the compensation amount annually under rule 72 of Mineral Concession Rules 1960.

7. The rate of royalty, dead rent and surface rent shall be as follows:-

Royalty: Limestone (including kankar)

- a) L.D. Grade (less than 1.5 percent silica content

: Rs. 50/- (Rupees fifty only) per tonne.  
: Rs. 32/- (Rupees thirty two only) per tonne.

- b) Others

..3..

..3..

Dead Rent:

- First year of the lease : Nil
- Second year to fifth year of the lease : Rs. 60/- (Rupees sixty only) per hectare per annum
- Sixth year to tenth year of the lease : Rs. 120/- (Rupees One hundred and twenty only) per hectare per annum.
- Eleventh year of the lease and onwards : Rs. 180/- (Rupees one hundred and eighty only) per hectare per annum

The rates of royalty, dead rent etc. are liable to such changes as may be notified from time to time.

Surface rent and water rate:

As such rates as the land revenue and other cesses assessable on the land are paid.

8. The applicant should pay a deposit of Rs. 2000/- (Rupees two thousand only) as prescribed in rule 32 of Mineral Concession Rules 1960 before the lease deed is actually executed.

9. The terms and conditions stated in this order are subject to such further modifications additions and alterations as may be included in the lease deed when finalised.

10. The Collector of Madurai District is requested to take necessary further action for the execution of the lease deed in the prescribed form. As soon as the deed is executed the date of such execution should be reported to the Government and Director of Geology and Mining. The Collector is also requested to ensure compliance by the applicant firm of the amended provisions of the Mines and Minerals (M&D) Act, 1957 and Mineral Concession Rules 1960 and other applicable Acts and rules including Forest (Conservation) Act 1980.

(BY ORDER OF THE GOVERNOR)

P. C. CYRIAC,  
SECRETARY TO GOVERNMENT.

To  
The Collector Madurai District, Madurai (w. e.) (BY RPAD)  
The Director of Geology and Mining, Chennai 32.  
Mr. Thirumathi Thiraviam, 9/1/22A, T.B. Road, Usilampatti,  
Madurai District 626 532.  
The Secretary to Government of India, Ministry of Mines,  
Building, I II Floor, Shastri Bhavan, New Delhi 110 001.

...4...



..4..

Copy to:

The Controller of Mines (S),  
Government of India, IBM, No. 29 Industries Suburbs,  
II Stage, Bangalore 22.

The Controller General, IBM,  
Civil Line, Indira Bhavan, Nagpur 440 001.

The Regional Controller of Mines,  
IBM C4A CGO complex, Besant Nagar,  
Chennai 90.

The Directorate of Mines safety,  
Government of India, Ministry of Labour,  
Ooragum Region, Kolar Gold Field,  
Kolar District, Karnataka 456 3120.

The Industries (OP 2) Department, Chennai 9.  
Sf/Sc.

/Forwarded/By order/

*[Handwritten signature]*  
31797

SECTION OFFICER.

*[Handwritten initials]*  
31797

*[Handwritten signature]*  
**S. SURIYAKUMAR**  
M.Sc., M.Phil (Geo), FCC (Mining)  
Qualified Person



ANNEXURE - IV



செ. கோபாலகிருஷ்ணன்  
முத்திரை காக்கி விநியோககர்  
அரசின் சீர் RO-34J1/85  
57, அழகர் கோவில் சாலை  
மதுரை-625002.

MINING LEASE

G.O.(D) No.124, Industries (MMD.2) Department, dated 31.7.97

THIS INDENTURE MADE THIS 2nd day of February 1998 between the Governor of Tamil nadu (herein after referred to as the "State Government" which expression shall were the context so admits be deemed to include the successors and assigns) of the one part, and  
 Smt. B. Thiraviam residing 9-1/22-A, T.B. Road, Usilampatti  
 herein after referred to as the "lessee" which expression shall where the context to admits be deemed to include her respective heirs executers, administrators representatives and permitted assigns



பொது உரிமை

.....  
 .....



-2-

*செ. கோபாலகிருஷ்ணன்*  
 செ. கோபாலகிருஷ்ணன்  
 முத்திரை காசிட விநியோகஸ்தர்  
 காவிரியூர் திட்டம் ROC/3401/85.  
 57, அழகர் கோட்டை சாலை  
 மதுரை-625002.

of the other part.

WHEREAS the lessee/lessees has /have applied to the State Govt. in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said rules, for a mining lease for LIME STONES in respect of the lands described in Part-I of the Schedule here under written has/have deposited with the State Government the sum of Rs.2,000/- as security.

WITNESSETH that in consideration of the rents and royalties covenants and agreements by and in these presents and the Schedule hereunder written reserved and State Government (with the approval of the Central Government) hereby grants and demises unto lessee/lessees.

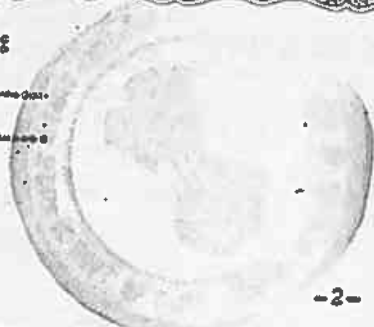
*செ. கோபாலகிருஷ்ணன்*

LESSEE

*செ. கோபாலகிருஷ்ணன்*  
 LESSOR



எண் :  
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*S. Gopalakrishnan*  
 S. கோபாலகிருஷ்ணன்  
 முத்திரை காசிய விநியோகஸ்தர்  
 கலிகத்தன்ஸ் துக் KOC/3401/85  
 57, அழகர் கோட்டம் சாலை  
 மதுரை-625002.

-2-

of the other part.

WHEREAS the lessee/lessees has /have applied to the State Govt. in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said rules, for a mining lease for LIME STONES in respect of the lands described in Part-I of the Schedule here under written has/have deposited with the State Government the sum of Rs.2,000/- as security.

WITNESSETH that in consideration of the rents and royalties covenants and agreements by and in these presents and the Schedule hereunder written reserved and State Government (with the approval of the Central Government) hereby grants and demises unto lessee/lessees.

*B. G. ...*

LESSEE

*[Signature]*  
 LESSOR

ENVIRONMENTAL  
CLEARANCE

**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment**  
**Authority(SEIAA), Tamil Nadu)**

To,

The Proprietor

PANAMOOPANPATTI LIMESTONE MINE

Tmt. B. Thiraviam, w/o Dr. K. Bose, No. 9/1/22A,  
T.B. Road, Usilampatti Taluk, Madurai District, TN -626532

**Subject:** Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/TN/MIN/64391/2018 dated 18 May 2022. The particulars of the environmental clearance granted to the project are as below.

1. EC Identification No.	<b>EC23B001TN135701</b>
2. File No.	6355/2017
3. Project Type	New
4. Category	B1
5. Project/Activity including Schedule No.	1(a) Mining of minerals
6. Name of Project	Pannamoopanpatti Limestone Mine
7. Name of Company/Organization	PANAMOOPANPATTI LIMESTONE MINE
8. Location of Project	Tamil Nadu
9. TOR Date	11 Jan 2019

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 30/05/2023

(e-signed)  
**Thiru.Deepak S.Bilgi**  
 Member Secretary  
 SEIAA - (Tamil Nadu)

*Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH. Please quote identification number in all future correspondence.*

*This is a computer generated cover page.*

PARIVESH

*(Pro-Active and Responsive Facilitation by Interactive,  
and Virtuous Environmental Single-Window Hub)*





THIRU.DEEPAK S.BILGI, I.F.S.  
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY-TAMILNADU  
3rd Floor, Panagal Maaligai,  
No.1, Jeenis Road, Saidapet,  
Chennai - 600 015.  
Phone No. 044-24359973  
Fax No. 044-24359975

**ENVIRONMENTAL CLEARANCE**

**Lr.No.SEIAA-TN/F.No.6355/1(a)/EC.No:5720/2018,dated:09.05.2023**

**Sub:** SEIAA, TN – Proposed Limestone Mine over an extent of 3.07.0 Ha in S.F.No. 132/1 and 132/3(P) at Panamoopanpatti Village of Usilampatti Taluk, Madurai District, Tamil Nadu by Tmt.B.Thiraviyam – under Category "B1" of Item 1(a) "Mining of Mineral Projects" of the Schedule to the EIA Notification, 2006 issue of Environmental Clearance – Regarding.

**Ref:**

1. Your application submitted Terms of Reference dated: 03.03.2017.
2. TOR Issued vide letter No.SEIAA.TN/F.No.6355/2018/ToR-597/2019 dated:11.01.2019.
3. Public Hearing conducted on 23.02.2021.
4. Online Proposal No. SIA/TN/MIN/64391/2018, Dt. 12.07.2021.
5. Project proponent submitted EIA Report to SEIAA-TN on 27.07.2021.
6. Minutes of the 265<sup>th</sup> SEAC meeting held on 21.04.2022.
7. Minutes of the 336<sup>th</sup> SEAC meeting held on 07.12.2022.
8. Reply by the project proponent Dated:30.01.2023.
9. Minutes of the 368<sup>th</sup> SEAC meeting held on 19.04.2023.
10. Minutes of the 615<sup>th</sup> SEIAA meeting held on 08.05.2023 & 09.05.2023.

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**Details of Minor Mineral Activity:-**

This has reference to your application 4<sup>th</sup> & 5<sup>th</sup> cited. The proposal is for obtaining Environmental Clearance for mining / quarrying of minor minerals based on the particulars furnished in your application as shown below.

Sl. No	Details of the proposal	Data furnished
1.	Name of the Owner/Firm	Tmt. B. Thiraviam W/o. Boss No.9/1/22A, T.B. Road Usilampatti Madurai - 626532
2.	Type of quarrying	Limestone
3.	S.F No. of the quarry site	132/1 and 132/3(P)
4.	Village in which situated	Panamoopanpatti
5.	Taluk in which situated	Usilampatti
6.	District in which situated	Madurai
7.	Extent of quarry (in ha.)	3.07.0 Ha
8.	Latitude & Longitude of all corners of the quarry site	10°02'53.79" to 10°03'01.57"N 77°51'02.7" to 77°51'10.90"E
9.	Topo Sheet No.	58 F/16
10.	Type of mining	Open cast- Manual method
11.	Period of current mine plan	5 Years
12.	Production (Quantity in m <sup>3</sup> )	As per the mining plan, the lease period is for 20 years. Production for Five years, <b>563MT of production Limestone @30% and 1,313MT of rejects @70%</b> with an ultimate depth of mining 13m BGL.
13.	Depth of mining	13m BGL
14.	Depth of water table	28m - 30m BGL
15.	Man Power requirement	25 Employees
16.	Water requirement:	<b>6.5 KLD</b>

  
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	1. Domestic & Flushing	2.0 KLD
	2. Dust suppression	2.5 KLD
	3. Green Belt	2.0 KLD
17.	Power requirement	TNEB
18.	Precise area communication approved by the industries (MMD2) Department	GO.3(D) NO:124/Industries (MMD2) Department dated:31.07.1997
19.	Review Mining Plan approved by the regional controller of Mines IBM	TN/MDR/LST/MS -1140.MDS, Dated:01.12.2014
20.	500m cluster letter issued by the Assistant Director(i/c), Dept. of Geology and Mining with date	Re.No.1123/2015-Mines dated 25/04/2023
21.	VAO certificate regarding habitations in 300m radius	Dated:13.04.2023
22.	Project Cost (excluding EMP)	Rs.36.78 lakhs
23.	EMP cost	Rs.28.68 lakhs
24.	ToR details	Lr. No. SEIAA-TN/F. No.6355/2018/TOR-597/2019 dated 11.01.2019.
25.	Public hearing details	Public hearing was conducted on 23.02.2021.
26.	EIA report submitted on	EIA received on: <b>27.07.2021.</b>
27.	CER Cost	Rs.5 lakhs
28.	<p><b><u>Validity:</u></b>  <b>This Environmental Clearance is accorded for the quantity of 563MT of production Limestone @30% and 1,313MT of rejects @70% up to depth of 13m BGL as per the approved mining plan and is valid as per the approved mine plan period and as per MoEF&amp;CC's notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022.</b></p>	

The Proponent has furnished affidavit in Hundred Rupees stamp paper attested by the Notary stating that B.Thiraviam W/o. Dr.K.Bose, aged about 69 years, having registered office at No.9/1/22A, T.B.Road, Usilampatti Taluk, Madurai District, Tamil Nadu, state do hereby solemnly declare and sincerely affirm that,

  
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I have applied for getting environmental clearance to SEIAA Tamil Nadu for quarry lease for Limestone, over an extent of 3.07.0Hectares in S.No. 132/1 and 132/3 (P), Government Poramboke Land in Panamooanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.

1. I swear to state that within 10kms radius of the mines which I have applied for environmental clearance, none of the followings are situated as per the General Conditions of EIA Notification, 2006.

- Protected areas notified under the Wildlife (Protection) Act, 1972
- Critically polluted area as identified by CPCB constituted under Water (Prevention and Control of Pollution) Act, 1974
- Eco Sensitive areas identified by the Forest Dept/State Govt
- Interstate boundaries and International boundaries within 10Km Radius from the proposed site.

2. I will complete the following Corporate Environment Responsibility (CER) activities before commencement of the quarrying activities in addition to CSR and EMP.

CER Activity	Project Cost (Rs. In Lakh)	CER Cost (Rs in Lakh)
Developing Library Facilities to Government High school, Panamooanpatti Village.	18.50	5
<b>Total Cost Allocation</b>	<b>18.50 lakh</b>	<b>5.0 Lakh</b>

3. There are Quarries located within 500m radius from the periphery of our quarry.

1. Proposed Quarry

S. No	Name of the owner	Village & S.F.No	Extent (In Ha.)	Lease Period	Remarks
Nil					

2. Existing Quarries

S. No	Name of the owner	Village	S.F. No	Extent (In Ha.)	Collector Proceedings No & Date	Lease Period
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SEIAA-TN



1.	<b>B.THIRAVIAM</b> W/o. Dr.K.Bose No.9/1/22A, T.B.Road, Usilampatti Taluk, Madurai District, Tamil Nadu. Pin code- 626 532	Panamo op panpatti	132/1 and 132/3 (P)	3.07.0 ha	G.O.3(D) .No:124/Industries (MMD2) Department Dated: 31.07.1997	02.02.1998 - 01.02.2018 (Deemed extension)
<b>Total Extent</b>				<b>3.07.0 Ha</b>		

### 3. Abandoned or Expired Quarries

S.No	Name of the owner	Village & Taluk	S.F.No	Extent	Lease Period
Nil					

4. There will not be any hindrance or disturbance to the people living on enroute / nearby my quarry site while transporting the mined out materials and due to quarrying activities.
5. There are no habitations / villages located within 300 meters radius from the periphery of my quarry.
6. I swear that afforestation will be carried out during the course of quarrying operation and maintained.
7. The required insurance will be taken in the name of the labourers working in my proposed quarry.
8. The existing road from the main road to the quarry is in good condition and the same will be maintained and utilized for transportation of Limestone.
9. I will not engaging any child labour at my mines and I aware that engaging child labour is punishable under the Law.
10. All types of safety/protective equipments will be provided to all the laborers working in my quarry.
11. No permanent structures, temples etc are located within 500 m from the periphery of my quarry.

  
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12. The quarrying activity has not yet commenced and it will be carried out only after obtaining environmental clearance.

I ensure to do all the social and Environment commitment as mentioned in the Mining plan to the best of our knowledge.

**Details of Quarries located within 500M radius from the proposed quarry:**

The Project Proponent has submitted a copy of the letter obtained from the Assistant Director(i/c) Department of Geology & Mining, Madurai District in his letter Rc. No.1123/2015-Mines, dated: 25.04.2023 has stated that the details of other quarries within a radius 500m from the boundary of the proposed quarry site as follows:

**1. Existing Quarries:**

S.No	Name of the Owner	Village	S.F. Nos	Extent (In Hect.)	Collector's proceedings No & date	Lease Period
1.	Tmt. B. Thiraviam W/o. Boss No.9/1/22A, T.B. Road Usilampatti Madurai - 626532	Panamoopp anpatti	132/ 1 and 132/ 3(P)	3.07.0	G.O.3(D).No.124/I ndustries (MMD2)Dept.dt.31 .07.1997	02.02.1998 - 01.02.2018 (deemed extension)
--Nil--						

**2. Expired / Abandoned Quarries:**

S.No	Name of the Owner	Village	S.F.Nos	Extent (In Hect.)	Collector's proceedings No & date	Lease Period
--Nil--						

**3. Present Proposed Quarries:**

S.No	Name of the Owner	Village	S.F.Nos	Extent (In Hect.)	Collector's proceedings No & date	Lease Period
--Nil--						

  
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**Appraisal by SEAC:-**

**Proposed Limestone Mine over an extent of 3.07.0 Ha in S.F.No. 132/1 and 132/3(P) at Panamooanpatti Village of Usilampatti Taluk, Madurai District, Tamil Nadu by Tmt.B.Thiraviyam- For Environmental Clearance.**

**(SIA/TN/MIN/64391/2018 dated: 12.07.2021)**

Earlier, this proposal was placed in 265<sup>th</sup> Meeting of SEAC held on 21.04.2022. The details of the minutes are available in the website (www.parivesh.nic.in).

**The SEAC noted the following:**

1. The project proponent, Tmt.B.Thiraviyam has applied for Environmental Clearance for the proposed Limestone Mine over an extent of 3.07.0Ha at S.F.No. 132/1 and 132/3(P),Panamooanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining of Mineral Projects" of the Schedule to the EIA Notification, 2006.
3. ToR was issued vide Lr.No. SEIAA – TN/F.No.6355/2018/ToR-597/2019, Dated: 11.01.2019.
4. Public hearing was conducted on 23.02.2021.
5. As per the mining plan, the lease period is for 20 years. Production for Five years, 3,123MT of production @30% & 7,287MT of rejects @70% & 2498m<sup>3</sup> of Topsoil with an ultimate depth of mining 13m BGL. The annual peak production is 729 MT of Limestone (3<sup>rd</sup> & 4<sup>th</sup> year) of production, 1701 MT of rejects (3<sup>rd</sup> & 4<sup>th</sup> year).

**The proposal was again placed in 336<sup>th</sup> SEAC meeting held on 07.12.2022.**

The SEAC noted that the PP has applied 3 ToR files in online as mentioned below:

Online File No	ToR / EC	Application Category	Remarks
23622	ToR	Under Violation category	Under Process
27418	ToR	Under Violation category	Under Process
29371	ToR	Without Violation	ToR Issued

Based on the documents available and the presentation made by the PP, SEAC decided to call for the additional details to process the proposal further.

- a. PP and the EIA Coordinator shall furnish explanation for the filing of multiple applications for same project.

  
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- b. The PP shall furnish a letter from AD (Mines) stating that the PP has not committed any violation earlier.
- c. PP shall withdraw all the above three proposals.

Now the proposal was placed in 368<sup>th</sup> SEAC meeting held on 19.04.2023.

The Project proponent has made a presentation along with clarification for the above shortcomings observed by the SEAC.

Sl.No	SEAC Query	Reply by PP
1.	PP and the EIA Coordinator shall furnish explanation for the filing of multiple applications for same project.	Initially we applied online application for Grant of ToR under violation case based on the MoEF & CC Notification No.S.O. 804(E) dated 14.03.2017. Later, PP furnish the letter obtained from Department of Geology and mining for he has not committed any violation. Accordingly, again we applied ToR application under Non- Violation case and we got ToR Conduct PH, Prepared Final EIA report for grant of Prior Environmental Clearance.
2.	The PP shall furnish a letter from AD (Mine, stating that the PP has not committed any violation earlier.	The letter obtained from Department of Geology and mining and submitted to SEIAA office on 30.01.2023.
3.	PP shall withdraw all the above three proposals.	The another two proposals have been withdrawn.

Based on the presentation and documents furnished by the project proponent, SEAC decided to **recommend the proposal for the grant of Environmental Clearance for total excavation quantity of 3,123MT of production Limestone @30% & 7,287MT of rejects @70% & 2498m<sup>3</sup> of Topsoil but not exceeding the annual peak production of 729MT of Limestone (3<sup>rd</sup> & 4<sup>th</sup> year) of production with maintaining an ultimate pit depth of 13m BGL** subject to the standard conditions as per the **Annexure I** of this minutes & normal conditions stipulated by MOEF &CC, in addition to the following specific conditions:

  
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1. The prior Environmental Clearance granted for this mining project shall be valid for the project life including production value as laid down in the mining plan approved and renewed by competent authority, from time to time, subject to a maximum of thirty years, whichever is earlier **vide MoEF&CC Notification S.O. 1807(E) dated 12.04.2022.**
2. **However, the execution of EC is subjected to grant of the deemed extension of the mining lease by the competent authority for the period of fifty years as per section 8 A of Mines and Minerals (Development and Regulation) (MMDR) Act, 1957, on and from the date of commencement of the MMDR Amendment Act, 2015 (w.e.f 12.01.2015).**
3. The mine manager and other statutory competent persons such as blaster (or) mine mate shall be appointed before the commencement of mining operation as per the provisions of Mines Act 1952 and Metalliferous Mines Regulations, 1961.
4. The PP shall inform the 'Notice of Opening' of the quarry to the Director of Mines Safety/Chennai Region before obtaining the CTO.
5. The PP shall ensure that all the statutory competent persons and non-statutory workmen are undergone the 'Initial/Refresher' training under Mines Vocational Training Rules 1961 in DGMS approved Group Vocational Training Centre, Trichy.
6. The Project Proponent (PP) shall submit a 'Slope stability action plan' incorporating the development activities from west to east direction keeping the benches intact for the proposed quarry lease after it is duly vetted by the concerned AD (Mines) before obtaining CTO from TNPCB.
7. The PP shall carry out the tree plantation to act as a barrier to reduce noise level and dust pollution along the boundary of the quarrying site considering the wind direction, shall install fencing and Garland drain before obtaining the CTO from the TNPCB.
8. Further, the PP shall construct the garland drain with proper size, gradient and length along the boundary of the pit leaving behind the mandatory safety zone of 7.5 m as it is designed to take care of run-off water (size, gradient and length).
9. No 'Deep-hole large diameter drilling and blasting' is permitted in the proposed quarries.
10. However, within one year from the commencement of mining operations, the PP shall carry out the scientific studies on 'Design of Blast parameters for reducing the impact of blast-induced ground/air vibrations and fly rock caused due to operation of the quarry by adopting appropriate controlled blasting techniques', by involving a reputed Research and Academic

  
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- Institution such as CSIR-Central Institute of Mining & Fuel Research (CIMFR) / Dhanbad, NIRM, IIT-Madras, NIT-Dept of Mining Engg, Surathkal and Anna University – CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance.
11. The PP shall use the jack hammer drill machine fitted with the dust extractor for the drilling operations such that the fugitive dust is controlled effectively at the source.
  12. The PP shall ensure that the blasting operations are carried out by the blaster/Mine Mate/Mine Foreman employed by him only as per the provisions of MMR 1961 and it shall not be carried out by the persons other than the above statutory personnel.
  13. The PP shall ensure that the blasting operations shall be carried out during a prescribed time interval with a prior notice to the school/other habitations situated around the proposed quarry after having posted the sentries/guards adequately to confirm the non-exposure of public within the danger zone.
  14. The PP shall meticulously carry out the mitigation measures as spelt out in the revised EMP.
  15. The Project Proponent shall ensure that the funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to the MoEF& CC Ministry and its Integrated Regional Office (IRO) located in Chennai.
  16. The Project Proponent shall send a copy of the clearance letter marked to concerned Panchayat from whom any suggestion/representation has been received while processing the proposal.
  17. As per the MoEF& CC Office Memorandum F.No. 22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall adhere EMP furnished.
  18. As accepted by the Project proponent the CER cost is Rs.5 lakhs and the amount shall be spent for the Govt School, Panamoopanpatti Village as committed, before obtaining CTO from TNPCB.

#### ANNEXURE-I

1. The proponent shall mandatorily appoint the required number of statutory officials and the competent persons in relevant to the proposed quarry size as per the provisions of Mines Act 1952 and Metalliferrous Mines Regulations, 1961.

  
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**SEIAA-TN**



2. The proponent shall erect fencing all around the boundary of the proposed area with gates for entry/exit before the commencement of the operation and shall furnish the photographs/map showing the same before obtaining the CTO from TNPCB.
3. Perennial maintenance of haulage road/village / Panchayat Road shall be done by the project proponent as required in connection with the concerned Govt. Authority.
4. The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, over burden, inter burden and top soil etc.. No change in basic mining proposal like mining technology, total excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of the Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State Govt. in the form of Short Term Permit (STP), Query license or any other name.
5. The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.
6. The proponent shall ensure that the slope of dumps is suitably vegetated in scientific manner with the native species to maintain the slope stability, prevent erosion and surface run off. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps.
7. Perennial sprinkling arrangement shall be in place on the haulage road for fugitive dust suppression. Fugitive emission measurements should be carried out during the mining operation at regular intervals and submit the consolidated report to TNPCB once in six months.
8. The Project Proponent shall carry out slope stability study by a reputed academic/research institution such as NIRM, IIT, Anna University for evaluating the safe slope angle if the proposed dump height is more than 30 meters. The slope stability report shall be submitted to concerned Regional office of MoEF&CC, Govt. of India, Chennai as well as SEIAA, Tamilnadu.

  
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9. The Proponent shall ensure that the Noise level is monitored during mining operation at the project site for all the machineries deployed and adequate noise level reduction measures undertaken accordingly. The report on the periodic monitoring shall be submitted to TNPCB once in 6 months.
10. Proper barriers to reduce noise level and dust pollution should be established by providing greenbelt along the boundary of the quarrying site and suitable working methodology to be adopted by considering the wind direction.
11. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
12. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted in proper escapements as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.
13. **Noise and Vibration Related:** (i) The Proponent shall carry out only the Controlled Blasting operation using NONEL shock tube initiation system during daytime. Usage of other initiation systems such as detonating cord/fuse, safety fuse, ordinary detonators, cord relays, should be avoided in the blasting operation. The mitigation measures for control of ground vibrations and to arrest fly rocks should be implemented meticulously under the supervision of statutory competent persons possessing the I / II Class Mines Manager / Foreman / Blaster certificate issued by the DGMS under MMR 1961, appointed in the quarry. No secondary blasting of boulders shall be carried out in any occasions and only the Rock Breakers (or) other suitable non-explosive techniques shall be adopted if such secondary breakage is required. The Project Proponent shall provide required number of the security sentries for guarding the danger zone of 500 m radius from the site of blasting to ensure that no human/animal is present within this danger zone and also no person is allowed to enter into (or) stay in the danger zone during the blasting.  
(ii) Appropriate measures should be taken for control of noise levels below 85 dBA in the work

  
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SEIAA-TN



- environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs/muffs, (iii) Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone.
14. Ground water quality monitoring should be conducted once in every six months and the report should be submitted to TNPCB.
  15. The operation of the quarry should not affect the agricultural activities & water bodies near the project site and a 50 m safety distance from water body should be maintained without carrying any activity. The proponent shall take appropriate measures for "Silt Management" and prepare a SOP for periodical de-siltation indicating the possible silt content and size in case of any agricultural land exists around the quarry.
  16. The proponent shall provide sedimentation tank / settling tank with adequate capacity for runoff management.
  17. The proponent shall ensure that the transportation of the quarried materials shall not cause any hindrance to the Village people/Existing Village Road and shall take adequate safety precautionary measures while the vehicles are passing through the schools / hospital. The Project Proponent shall ensure that the road may not be damaged due to transportation of the quarried rough stones; and transport of rough stones will be as per IRC Guidelines with respect to complying with traffic congestion and density.
  18. To ensure safety measures along the boundary of the quarry site, security guards are to be posted during the entire period of the mining operation.
  19. After mining operations are completed, the mine closure activities as indicated in the mine closure plan shall be strictly carried out by the Proponent fulfilling the necessary actions as assured in the Environmental Management Plan.
  20. The Project proponent shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition that is fit for the growth of fodder, flora, fauna etc.
  21. The Project Proponent shall comply with the provisions of the Mines Act, 1952, MMR 1961 and Mines Rules 1955 for ensuring safety, health and welfare of the people working in the mines and the surrounding habitants.
  22. The project proponent shall ensure that the provisions of the MMRD, 1956, the MCDR 2017 and Tamilnadu Minor Mineral Concession Rules 1959 are complied by carrying out the quarrying

  
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operations in a skillful, scientific and systematic manner keeping in view proper safety of the labour, structure and the public and public works located in that vicinity of the quarrying area and in a manner to preserve the environment and ecology of the area.

23. The quarrying activity shall be stopped if the entire quantity indicated in the Mining plan is quarried even before the expiry of the quarry lease period and the same shall be informed to the District AD/DD (Geology and Mining) District Environmental Engineer (TNPCB) and the Director of Mines Safety (DMS), Chennai Region by the proponent without fail.
24. The Project Proponent shall abide by the annual production scheduled specified in the approved mining plan and if any deviation is observed, it will render the Project Proponent liable for legal action in accordance with Environment and Mining Laws.
25. Prior clearance from Forestry & Wild Life including clearance from committee of the National Board for Wildlife as applicable shall be obtained before starting the quarrying operation, if the project site attracts the NBWL clearance, as per the existing law from time to time.
26. All the conditions imposed by the Assistant/Deputy Director, Geology & Mining, concerned District in the mining plan approval letter and the Precise area communication letter issued by concerned District Collector should be strictly followed.
27. The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.
28. The Project proponent shall install a Display Board at the entrance of the mining lease area/abutting the public Road, about the project information as shown in the **Appendix –II** of this minute.

  
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**Appendix -I**  
**List of Native Trees Suggested for Planting**

No	Scientific Name	Tamil Name	Tamil Name
1	<i>Aegle marmelos</i>	Vilvam	வில்வம்
2	<i>Adenanthera pavonina</i>	Manjadi	மஞ்சாடி, ஆனைக்குன்றிமணி
3	<i>Albizia lebbbeck</i>	Vaagai	வாகை
4	<i>Albizia amara</i>	Usil	உசில்
5	<i>Bauhinia purpurea</i>	Mantharai	மந்தாரை
6	<i>Bauhinia racemosa</i>	Aathu	ஆத்தி
7	<i>Bauhinia tomentosa</i>	Iruvathi	இருவாத்தி
8	<i>Buchanania axillaris</i>	Kattuma	காட்டுமா
9	<i>Borassus flabellifer</i>	Parai	பனை
10	<i>Butea monosperma</i>	Murukkamaram	முருக்கமரம்
11	<i>Bobax ceiba</i>	Ilavu, Sevvilavu	இலவு
12	<i>Calophyllum inophyllum</i>	Purnai	புள்ளை
13	<i>Cassia fistula</i>	Sarakondrai	சரக்கொன்றை
14	<i>Cassia roxburghii</i>	Sengondrai	செங்கொன்றை
15	<i>Chloroxylon sweetenia</i>	Purasamaram	புரசு மரம்
16	<i>Cochlospermum religiosum</i>	Kongu, Manjallavu	கோங்கு, மஞ்சள் இலவு
17	<i>Cordia dichotoma</i>	Naruvuli	நருவுளி
18	<i>Creteva adansonii</i>	Mavalingum	மாவிலங்கம்
19	<i>Dillenia indica</i>	Uva, Uzha	உசா
20	<i>Dillenia pentagyna</i>	SiruUva, Sitruzha	சிறு உசா
21	<i>Diospyro sebenum</i>	Karungali	கருங்காலி
22	<i>Diospyro schloroxylon</i>	Vaganai	வாகை
23	<i>Ficus amplissima</i>	Kalltchi	கல் இச்சி
24	<i>Hibiscus tiliaceou</i>	Aatrupoovarasu	ஆற்றுப்புவரசு
25	<i>Hardwickia binata</i>	Aacha	ஆச்சா
26	<i>Holeptelia integrifolia</i>	Aayili	ஆயா மரம், ஆயிலி
27	<i>Lanea coromandelica</i>	Odhiam	ஒதியம்
28	<i>Lagerstroemia speciosa</i>	Poo Marudhu	பூ மருது
29	<i>Lepisanthus tetraphylla</i>	Neikottaimaram	நெய் கொட்டை மரம்
30	<i>Limonia acidissima</i>	Vila maram	வில்லா மரம்
31	<i>Litsea glutinos</i>	Pisinpattai	பிரம்பா, பிச்சின்பட்டை
32	<i>Madhuca longifolia</i>	Illuppai	இலுப்பை
33	<i>Mamilkara hexandra</i>	UlakkaiPaalai	உலக்கை பாலை
34	<i>Mimusops elengi</i>	Magizhamaram	மகிழ்மரம்
35	<i>Mitragyna parvifolia</i>	Kadambu	கடம்பு
36	<i>Morinda pubescens</i>	Nuna	நுணா
37	<i>Morinda citrifolia</i>	Vellai Nuna	வெள்ளை நுணா
38	<i>Phoenix sylvestre</i>	Eachai	ஈச்சமரம்
39	<i>Pongamia pinnat</i>	Pungam	புங்கம்

  
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40	<i>Premna mollissima</i>	Munnai	முள்ளை
41	<i>Premna serratifolia</i>	Narumunai	நறு முள்ளை
42	<i>Premna tomentosa</i>	Malaijoovarasu	மலை பூவரசு
43	<i>Prosopis cinerica</i>	Vairu maram	வள்ளி மரம்
44	<i>Pterocarpus marsipium</i>	Vengai	வேங்கை
45	<i>Pterospermum canescens</i>	Vernangu, Tada	வேளாளங்கு
46	<i>Pterospermum xylocarpum</i>	Polavu	பலவு
47	<i>Putranjiva roxburghii</i>	Karpala	கற்பலா
48	<i>Salvadora persica</i>	Ugaa Maram	ஊகா மரம்
49	<i>Sapindus emarginatus</i>	Marupungan, Soapukai	மணிப்புகள் சோபுகாய்
50	<i>Saraca asoca</i>	Azoca	அசோகா
51	<i>Streblus asper</i>	Piray maram	பிராய் மரம்
52	<i>Strychnos nuxvomica</i>	Yetti	எட்டி
53	<i>Strychnos potatorum</i>	Therthang Kottai	தேத்தாள கொட்டை
54	<i>Syzygium cumini</i>	Navai	நாவல்
55	<i>Terminalia belleric</i>	Thandri	தாண்டி
56	<i>Terminalia arjuna</i>	Ven narudhu	வேணி மருது
57	<i>Toona ciliata</i>	Sandhana vembu	சந்தன வேம்பு
58	<i>Thespesia populnea</i>	Puvarasu	புவரசு
59	<i>Walsuratrifoliata</i>	valsura	வால்சுரா
60	<i>Wrightia tinctoria</i>	Veppalai	வேப்பாலை
61	<i>Pithecolobium dulce</i>	Kodukkapuli	கொடுக்காய்ப்பூர்

**Appendix-II**

**Display Board**

(Size 6' x5' with Blue Background and White Letters)

**சுரங்கம்**

சுரங்கத்தில் துவாரி செயல்பாடுகளுக்கான சுற்றுச்சூழல் அனுமதி கீழ்க்கண்ட நிபந்தனைகளுக்கு உட்பட்டு வழங்கப்படும் எனது மலர்----- தேதி/விடப்படும் சுற்றுச்சூழல் அனுமதி----- தேதி வரை செயல்படுத்தலாக உள்ளது

பகன்ம பகுதி வளர்ச்சி மேம்பாட்டுக்கான கரங்கத் திட்டம்	துவாரியின் எல்லைவயை சுற்றி செஸ் அமைக்க வேண்டும் கரங்கப்பகுதியின் ஆழம் தளமாட்டத்திலிருந்து மீட்டர்கள் மீளமைப் பூக்க வேண்டும் கரங்கில் மரம் ஏற்படாதவாறு கரங்க பள்ளிகளை மேற்கொள்ள வேண்டும்
நட்புபட்டு பராமரிக்கப்பட வேண்டிய மரங்களை எண்ணிக்கை	வாகனங்கள் செல்லும் பாதையில் மரம் ஏற்படாத அளவிற்கு தளவீரை முறையாக தளவீரை வரிகளின் மூலமாக அல்லப்போது தெரிக்க வேண்டும் இவ்வாறு அமைவதும் துரி மரமாட்ட, உடும் குறைப்பதற்கான துவாரியின் எல்லைவயை சுற்றி அடர்த்தியான பகன்ம பகுதியை ஏற்படுத்த வேண்டும்
கரங்கத்தில் வெடி எவக்கும்போது நிகழ்த்திவுகள் ஏற்படாதவாறு மற்றும் கரங்க பகுக்காதவாறும் பாதுகாப்பு நடவடிக்கைகளை உடனடியாக செயல்படுத்தப்பட வேண்டும்	
கரங்கத்தில் இருந்து ஏற்படும் இரைச்சல் அளவு 85 டி.சி.பெல்ஸ் (dBA) அளவிற்கு மேல் ஏற்படாதவாறு தகுந்த கட்டுப்பாடுகளை மேற்கொள்ள வேண்டும்	
கரங்க சட்ட விதிகள் மீறல் கீழ் கரங்கத்தில் உள்ள பள்ளிக்குகளுக்கு தகுந்த பாதுகாப்பு கருவிகள் வழங்குவதோடு கைதளமுள்ள கழிப்பறை வசதிகளை செய்து தர வேண்டும்	
கிணம் அல்லது பூச்சியத்து வரிடாக வாகனங்கள் செல்லும் சாலைவழி தொடர்ந்து நடை பாதுகாக்க வேண்டும்	
கரங்கப்பள்ளிகளில் அருகில் உள்ள விவசாயப் பள்ளிகள் மற்றும் தீர்த்தலைகள் பாதிக்கப்படக்கூடாது	
நீர்நிலைகள் பாதிக்கப்படாமல் இருப்பதை உறுதி செய்யும் வகையில் தீவிர நடவடிக்கைகள் மேற்கொள்ள வேண்டும்	
கரங்கத்திலிருந்து கவிய பொருட்களை எடுத்துச் செல்லு கிராம மக்களுக்கு எந்த சிமத்தினையும் ஏற்படுத்தாதவாறு பாதுகாப்போடும் மற்றும் சுற்றுச்சூழல் பாதிக்கவாத வகையில் வாகனங்கள் இயக்க வேண்டும்	
கரங்கப்பள்ளிகள் முடிக்கப்பட்டவுடன் கரங்க மூடல் திட்டத்தில் உள்ளவாறு கரங்கத்தினால் மூட வேண்டும்	
கரங்க நடவடிக்கைகளை முடித்தபின்னர் கரங்கப் பகுதி மற்றும் கரங்க நடவடிக்கைகளால் இடையூறு ஏற்படக்கூடிய வேறு எந்தப் பகுதியையும் மறுகட்டுமளவில் செய்த தரவரங்க விவகாரம் ஆகியவற்றின் வளர்ச்சிக் குறி வாகனத்தில் பகன்மப்பகுதியை உருவாக்க வேண்டும்	
முன்னையான நிபந்தனைகளை அடிய பாரிவேஷி ( <a href="http://www.seiaa.com">http://www.seiaa.com</a> ) மீறிய இணைப்பதனைப் பற்றியவீடும் மேலும் ஏதாவது சுற்றுச்சூழல் சார்ந்த புகர்களுக்கு சென்னைவில் உள்ள சுற்றுச்சூழல் மற்றும் வன அமைச்சரின் குருப்பினார்து வட்டார அலுவலகம் 044 - 20222325 (அல்லது) தமிழ்நாடு வன கட்டுப்பாட்டு வாய்ப்புள்ள மாவட்ட சுற்றுச்சூழல் பொறியாளரை அணுகவும்	

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### **Discussion by SEIAA and the Remarks:-**

The subject was placed in 615<sup>th</sup> authority meeting held on 08.05.2023 & 09.05.2023. The authority noted that this proposal was placed for appraisal in 368<sup>th</sup> meeting of SEAC held on 19.04.2023. SEAC has furnished its recommendations for granting Environmental Clearance subject to the conditions stated therein.

**After detailed discussions, the Authority taking into account the recommendations of SEAC and decided to grant Environmental Clearance for the quantity of 563MT of production Limestone @30% and 1,313MT of rejects @70% by restricting the depth of mining up to 13m BGL as per the mine plan approved by the Department of Geology & Mining. This is also subject to the standard conditions as per Annexure - (I) of SEAC minutes, other normal conditions stipulated by MOEF&CC & all other specific conditions as recommended by SEAC in addition to the following conditions and the conditions in Annexure 'A' of this minutes. The Authority also accepts the withdrawal request of two proposals vide online no.23622 and 27418.**

1. Keeping in view of MoEF&CC's notification S.O.1533(E) dated.14.09.2006 and S.O. 1807(E) dated 12.04.2022, this Environmental Clearance is valid as per the approved mine plan period.
2. The EC granted is subject to review by District Collector, Mines Dept. and TNPCB on completion of every 5 years till the project life. They should also review the EC conditions to ensure that they have all been adhered to and implemented.
3. The project proponent shall furnish a Certified Compliance Report obtained from MoEF&CC while seeking a renewal of the mining plan to cover the project life.
4. The progressive and final mine closure plan including the green belt implementation and environmental norms should be strictly followed as per the EMP.
5. As per the OM vide F. No. IA3-22/1/2022-IA-III [E- 172624] Dated: 14.06.2022, the Project Proponents are directed to submit the six-monthly compliance on the environmental conditions prescribed in the prior environmental clearance letter(s) through newly developed compliance module in the PARIVESH Portal from the respective login.
6. The amount allocated for EMP should be kept in a separate account and both the capital and recurring expenditures should be done year wise for the works identified, approved and as committed. The work & expenditure made under EMP should be elaborated in the bi-annual compliance report submitted and also should be brought to the notice of concerned authorities during inspections.

  
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## Annexure-'A'

### EC Compliance

1. The Environmental Clearance is accorded based on the assurance from the project proponent that there will be full and effective implementation of all the undertakings given in the Application Form, Pre-feasibility Report, mitigation measures as assured in the Environmental Impact Assessment/ Environment Management Plan and the mining features including Progressive Mine Closure Plan as submitted with the application.
2. All the conditions as presented by the proponent in the PPT during SEAC appraisal should be addressed in Full.
3. The proponent shall submit Compliance Reports on the status of compliance of the stipulated EC conditions including results of monitored data. It shall be sent to the respective Regional Office of Ministry of Environment, Forests and Climate Change, Govt. of India and also to the Office of State Environment Impact Assessment Authority (SEIAA).
4. Concealing the factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

### Applicable Regulatory Frameworks

5. The project proponent shall strictly adhere to the provisions of Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act, 1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002 and Biological diversity Rules, 2004 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter

### Safe mining Practices

6. The AD/DD, Dept. of Geology & Mining shall ensure operation of the proposed quarry after the submission slope stability study conducted through the reputed research & Academic Institutions such as NIRM, IITs, NITS Anna University, and any CSIR Laboratories etc.

  
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7. The AD/DD, Dept. of Geology & Mining & Director General of Mine safety shall ensure strict compliance and implementation of bench wise recommendations/action plans as recommended in the scientific slope stability study of the reputed research & Academic Institutions as a safety precautionary measure to avoid untoward accidents during mining operation.
8. A minimum buffer distance specified as per existing rules and statutory orders shall be maintained from the boundary of the quarry to the nearest dwelling unit or other structures, and from forest boundaries or any other ecologically sensitive and archeologically important areas or the specific distance specified by SEIAA in EC as per the recommendations of SEAC depending on specific local conditions.

**Water Environment – Protection and mitigation measures**

9. The proponent shall ensure that the activity does not disturb the water bodies and natural flow of surface and groundwater, nor cause any pollution, to water sources in the area.
10. The proponent shall ensure that the activities do not impact the water bodies/wells in the neighboring open wells and bore wells. The proponent shall ensure that the activities do not in any way affect the water quantity and quality in the open wells and bore wells in the vicinity or impact the water table and levels. The proponent shall ensure that the activities do not disturb the river flow, nor affect the Odai, Water bodies, Dams in the vicinity.
11. Water level in the nearest dug well in the downstream side of the quarry should be monitored regularly and included in the Compliance Report.
12. Quality of water discharged from the quarry should be monitored regularly as per the norms of State Pollution Control Board and included in the Compliance Report.
13. Rain Water Harvesting facility should be installed as per the prevailing provisions of TNMBR/TNCDBR, unless otherwise specified. Maximum possible solar energy generation and utilization shall be ensured as an essential part of the project.
14. Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial nallahs flowing in and around the mine lease area shall be carried out and reported in the compliance reports to SEIAA.
15. Regular monitoring of ground water level and water quality shall be carried out around the mine area during mining operation. At any stage, if it is observed that ground water table is getting depleted due to the mining activity; necessary corrective measures shall be carried out.

  
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16. Garland drains and silt traps are to be provided in the slopes around the core area to channelize storm water. De-silting of Garland canal and silt traps have to be attended on a daily basis. A labour has to be specifically assigned for the purpose. The proponent shall ensure the quality of the discharging storm water as per the General Effluent Discharge Standards of CPCB.

**Air Environment – Protection and mitigation measures**

17. The activity should not result in CO<sub>2</sub> release and temperature rise and add to micro climate alternations.
18. The proponent shall ensure that the activities undertaken do not result in carbon emission, and temperature rise, in the area.
19. The proponent shall ensure that Monitoring is carried out with reference to the quantum of particulate matter during excavation; blasting; material transport and also from cutting waste dumps and haul roads.

**Soil Environment – Protection and mitigation measures**

20. The proponent shall ensure that the operations do not result in loss of soil biological properties and nutrients.
21. The proponent shall ensure that activity does not deplete the indigenous soil seed bank and disturb the mycorrhizal fungi, soil organism, soil community nor result in eutrophication of soil and water.
22. The activities should not disturb the soil properties and seed and plant growth. Soil amendments as required to be carried out, to improve soil health.
23. Bio remediation using microorganisms should be carried out to restore the soil environment to enable carbon sequestration.
24. The proponent shall ensure that the mine restoration is done using mycorrhizal VAM, vermin-composting, Biofertilizers to ensure soil health and biodiversity conservation.
25. The proponent shall ensure that the topsoil is protected and used in planting activities in the area.
26. The proponent shall ensure that topsoil to be utilized for site restoration and Green belt alone within the proposed area.
27. The top soil shall be temporarily stored at earmarked place (s) and used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The OB dumps should be scientifically vegetated with suitable

  
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native species to prevent erosion and surface run off. At critical points, use of geotextile shall be undertaken for stabilization of the dump. Protective wall or gabions should be made around the dump to prevent erosion / flow of sediments during rains. The entire excavated area shall be backfilled.

**Noise Environment – Protection and mitigation measures**

28. The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
29. The sound at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Hence, the PP shall ensure that the biological clock of the villages are not disturbed because of the mining activity.

**Biodiversity - Protection and mitigation measures**

30. The proponent should ensure that there is no disturbance to the agriculture plantations, social forestry plantations, waste lands, forests, sanctuary or national parks. There should be no impact on the land, water, soil and biological environment and other natural resources due to the mining activities.
31. No trees in the area should be removed and all the trees numbered and protected. In case trees fall within the proposed quarry site the trees may be transplanted in the Greenbelt zone. The proponent shall ensure that the activities in no way result in disturbance to forest and trees in vicinity. The proponent shall ensure that the activity does not disturb the movement of grazing animals and free ranging wildlife. The proponent shall ensure that the activity does not disturb the biodiversity, the flora & fauna in the ecosystem. The proponent shall ensure that the activity does not result in invasion by invasive alien species. The proponent shall ensure that the activities do not disturb the resident and migratory birds. The proponent shall ensure that the activities do not disturb the vegetation and wildlife in the adjoining reserve forests and areas around.
32. The proponent shall ensure that the activities do not disturb the agro biodiversity and agro farms. Actions to be taken to promote agroforestry, mixed plants to support biodiversity conservation in the mine restoration effort.
33. The proponent shall ensure that all mitigation measures listed in the EIA/EMP are taken to protect the biodiversity and natural resources in the area.

  
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34. The proponent shall ensure that the activities do not impact green lands/grazing fields of all types surrounding the mine lease area which are food source for the grazing cattle.

#### **Climate Change**

35. The project activity should not in any way impact the climate and lead to a rise in temperature.
36. There should be least disturbance to landscape resulting in land use change, contamination and alteration of soil profiles leading to Climate Change.
37. Intensive mining activity should not add to temperature rise and global warming.
38. Operations should not result in GHG releases and extra power consumption leading to Climate Change.
39. Mining through operational efficiency, better electrification, energy use, solar usage, use of renewable energy should try to decarbonize the operations.
40. Mining Operation should not result in droughts, floods and water stress, and shortages, affecting water security both on site and in the vicinity.
41. Mining should not result in water loss from evaporation, leaks and wastage and should support to improve the ground water.
42. Mining activity should be flood proof with designs and the drainage, pumping techniques shall ensure climate-proofing and socio-economic wellbeing in the area and vicinity.

#### **Reserve Forests & Protected Areas**

43. The activities should provide nature based support and solutions for forest protection and wildlife conservation.
44. The project activities should not result in forest fires, encroachments or create forest fragmentation and disruption of forest corridors.
45. There should be no disturbance to the freshwater flow from the forest impacting the water table and wetlands.
46. The project proponent should support all activities of the forest department in creating awareness to local communities on forest conservation.
47. The project activities should not alter the geodiversity and geological heritage of the area.
48. The activities should not result in temperature rise due to increased fossil fuels usage disrupting the behaviour of wildlife and flora.

  
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49. The activities should support and recognise the rights and roles of indigenous people and local communities and also support sustainable development.
50. The project activities should support the use of renewables for carbon capture and carbon storage in the project site and forest surrounds.
51. The project activities should not result in changes in forest structure, habitats and genetic diversity within forests.

**Green Belt Development**

52. The proponent shall ensure that in the green belt development more indigenous trees species (Appendix as per the SEAC Minutes) are planted.
53. The proponent shall ensure the area is restored and rehabilitated with native trees as recommended in SEAC Minutes (in Appendix).

**Workers and their protection**

54. The project proponent is responsible for implementing all the provisions of labour laws applicable from time to time to quarrying /Mining operations. The workers on the site should be provided with on-site accommodation or facilities at a suitable boarding place, protective equipment such as ear muffs, helmet, etc.
55. The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
56. The workers shall be employed for working in the mines and the working hours and the wages shall be implemented/enforced as per the Mines Act, 1952.

**Transportation**

57. No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a bypass road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly.

  
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Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.

58. The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.

#### **Storage of wastes**

59. The project proponent shall store/dump the granite waste generated within the earmarked area of the project site for mine closure as per the approved mining plan.

#### **CER/EMP**

60. The CER Should be fully Implemented and fact reflected in the Half-yearly compliance report.  
61. The EMP Shall also be implemented in consultation with local self-government institutions.  
62. The follow-up action on the implementation of CER Shall be included in the compliance report.

#### **Directions for Reclamation of mine sites**

63. The mining closure plan should strictly adhere to appropriate soil rehabilitation measures to ensure ecological stability of the area. Reclamation/Restoration of the mine site should ensure that the Geotechnical, physical, chemical properties are sustainable that the soil structure composition is buildup, during the process of restoration.  
64. The proponent shall ensure that the mine closure plan is followed as per the mining plan and the mine restoration should be done with native species, and site restored to near original status. The proponent shall ensure that the area is ecologically restored to conserve the ecosystems and ensure flow of goods and services.  
65. A crucial factor for success of reclamation site is to select sustainable species to enable develop a self-sustaining eco system. Species selected should easily establish, grow rapidly, and

  
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possess good crown and preferably be native species. Species to be planted in the boundary of project site should be un palatable for cattle's/ goats and should have proven capacity to add leaf-litter to soil and decompose. The species planted should be adaptable to the site conditions. Should be preferably pioneer species, deciduous in nature to allow maximum leaf-litter, have deep root system, fix atmospheric nitrogen and improve soil productivity. Species selected should have the ability to tolerate altered pit and toxicity of and site. They should be capable of meeting requirement of local people in regard to fuel fodder and should be able to attract bird, bees and butterflies. The species should be planted in mixed association.

66. For mining area reclamation plot culture experiments to be done to identify/ determine suitable species for the site.
67. Top soil with a mix of beneficial microbes (Bacteria/Fungi) to be used for reclamation of mine spoils. AM Fungi (Arbuscular mycorrhizal fungi), plant growth promoting Rhizo Bacteria and nitrogen fixing bacteria to be utilized.
68. Soil and moisture conservation and water harvesting structures to be used where ever possible for early amelioration and restoration of site.
69. Top soil is most important for successful rehabilitation of mined sites. Topsoil contains majority of seeds and plant propagation, soil microorganism, Organic matter and plant nutrients. Wherever possible the topsoil should be immediately used in the area of the for land form reconstruction, to pre mining conditions.
70. Over burdens may be analyzed and tested for soil characteristics and used in the site for revegetation. Wherever possible seeds, rhizome, bulbs, etc of pioneering spices should be collected, preserved and used in restoring the site.
71. Native grasses seeds may be used as colonizers and soil binders, to prevent erosion and allow diverse self- sustaining plant communities to establish. Grasses may offer superior tolerance to drought, and climatic stresses.
72. Reclamation involves planned topographical reconstruction of site. Care to be taken to minimize erosion and runoff. Topsoils should have necessary physical, chemicals, ecological, properties and therefore should be stored with precautions and utilized for reclamation process. Stocked topsoil should be stabilized using grasses to protect from wind. Seeds of various indigenous and local species may be broad casted after topsoil and treated overburden are spread.

  
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73. Alkaline soils, acidic soils, Saline soils should be suitably treated/amended using green manure, mulches, farmyard manure to increase organic carbon. The efforts should be taken to landscape and use the land post mining. The EMP and mine closure plan should provide adequate budget for re-establishing the site to pre-mining conditions. Effective steps should be taken for utilization of over burden. Mine waste to be used for backfilling, reclamation, restoration, and rehabilitation of the terrain without affecting the drainage and water regimes. The rate of rehabilitation should be similar to rate of mining. The land disturbed should be reshaped for long term use. Mining should be as far as possible be eco-friendly. Integration of rehabilitation strategies with mining plan will enable speedy restoration.
74. Efforts should to taken to aesthetically improve the mine site. Generally, there are two approaches to restoration i.e Ecological approach which allows tolerant species to establish following the succession process allowing pioneer species to establish. The other approach i.e plantation approach is with selected native species are planted. A blend of both methods may be used to restore the site by adding soil humus and mycorrhiza.
75. Action taken for restoration of the site should be specifically mentioned in the EC compliances.

**Part-A: Conditions to be Complied before commencing mining operations:-**

**1. The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing the public that**

**I. The project has been accorded Environmental Clearance.**

**II. Copies of clearance letters are available with the Tamil Nadu Pollution Control Board.**

**III. Environmental Clearance may also be seen on the website of the SEIAA.**

**IV. The advertisement should be made within 7 days from the date of receipt of the clearance letter and a copy of the same shall be forwarded to the SEIAA.**

2. Mining activity should be reviewed by the District Collector after three years and decide for further extension.
3. NOC from the Standing committee of the NBWL shall be obtained, if protected areas are located within 10 Km from the proposed project site.

  
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4. The project proponent shall comply the conditions laid down in the Section V, Rule 36 of Tamil Nadu Minor Minerals Concession Rules 1959.
5. **A copy of the Environment Clearance letter shall be sent by the proponent to the concerned Panchayat, Town Panchayat / Panchayat union/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the proponent and also kept at the site, for the general public to see.**
6. Quarry lease area should be demarcated on the ground with wire fencing to show the boundary of the lease area on all sides with red flags on every pillar shall be erected before commencement of quarrying.
7. The proponent shall ensure that First Aid Box is available at site.
8. The excavation activity shall not alter the natural drainage pattern of the area.
9. The excavated pit shall be restored by the project proponent for useful purposes.
10. The proponent shall quarry and remove only in the permitted areas as per the approved Mining Plan details.
11. The quarrying operation shall be restricted between 7AM and 5 PM.
12. The proponent shall take necessary measures to ensure that there shall not be any adverse impacts due to quarrying operation on the nearby human habitations, by way of pollution to the environment.
13. A minimum distance of 50mts. from any civil structure shall be kept from the periphery of any excavation area.
14. The mined out pits should be backfilled where warranted and area should be suitably landscaped to prevent environmental degradation. The mine closure plan as furnished in the proposal shall be strictly followed with back filling and tree plantation.
15. Wet drilling method is to be adopted to control dust emissions. Delay detonators and shock tube initiation system for blasting shall be used so as to reduce vibration and dust.
16. Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
17. Blasting shall be carried out after announcing to the public adequate through public address system to avoid any accident.

  
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18. A study has to be conducted to assess the optimum blast parameters and blast design to keep the vibration limits less than prescribed levels and only such design and parameters should be implemented while blasting is done. Periodical monitoring of the vibration at specified location to be conducted and records kept for inspection.
19. The Proponent shall take appropriate measures to ensure that the GLC shall comply with the revised NAAQ norms notified by MoEF& CC, GoI on 16.11.2009.
20. The following measures are to be implemented to reduce Air Pollution during transportation of mineral
- i. Roads shall be graded to mitigate the dust emission.
  - ii. Water shall be sprinkled at regular interval on the main road and other service roads to suppress dust
21. The following measures are to be implemented to reduce Noise Pollution
- i. Proper and regular maintenance of vehicles and other equipment
  - ii. Limiting time exposure of workers to excessive noise.
  - iii. The workers employed shall be provided with protection equipment and earmuffs etc.
  - iv. Speed of trucks entering or leaving the mine is to be limited to moderate speed of 25 kmph to prevent undue noise from empty trucks.
  - v. All noise generating machinery the compressor, generator to be enclosed in acoustic enclosure so as to reduce noise in working area.
22. Measures should be taken to comply with the provisions laid under Noise Pollution (Regulation and Control) (Amendment) Rules, 2010, dt: 11.01.2010 issued by the MoEF& CC, GoI to control noise to the prescribed levels.
23. Suitable conservation measures to augment groundwater resources in the area shall be planned and implemented in consultation with Regional Director, CGWB. Suitable measures should be taken for rainwater harvesting.
24. Permission from the competent authority should be obtained for drawl of ground water, if any, required for this project.
25. Topsoil, if any, shall be stacked properly with proper slope with adequate measures and should be used for plantation purpose.
26. The following measures are to be adopted to control erosion of dumps:-
- i. Retention/ toe walls shall be provided at the foot of the dumps.

  
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- ii. Worked out slopes are to be stabilized by planting appropriate shrub/ grass species on the slopes.
27. Waste oils, used oils generated from the EM machines, mining operations, if any, shall be disposed as per the Hazardous & other wastes (Management, and Trans Boundary Movement) Rules, 2016 and its amendments thereof to the recyclers authorized by TNPCB.
28. Concealing the factual data or failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
29. Rain water harvesting to collect and utilize the entire water falling in land area should be provided.
30. Rain water getting accumulated in the quarry floor shall not be discharged directly to the nearby stream or water body. If it is to be let into the nearby water body, it has to be discharged into a silt trap on the surface within the lease area and only the overflow after allowing settling of soil be let into the nearby waterways. The silt trap should be of sufficient dimensions to catch all the silt water being pumped out during one season. The silt trap should be cleaned of all the deposited silt at the end of the season and kept ready for taking care of the silt in the next season.
31. The lease holder shall undertake adequate safeguard measures during extraction of material and ensure that due to this activity, the hydro-geological regime of the surrounding area shall not be affected. Regular monitoring of ground water level and quality shall be carried out around the mine lease area during the mining operation. If at any stage, if it is observed that the groundwater table is getting depleted due to the mining activity; necessary corrective measures shall be carried out. District Collector/mining officer shall ensure this.
32. No tree-felling shall be done in the leased area, except only with the permission from competent Authority.
33. To take up environmental monitoring of the proposed quarry site before, during and after the mining activities including vibration study data, water, air & flora/fauna environment, slurry water generated/disposed and method of disposal, involving a reputed academic Institution.
34. It shall be ensured that the total extent of nearby quarries (existing, abandoned and proposed) located within 500 meter radius from the periphery of this quarry is not exceeding 5 hectares within the mining lease period of this application.

  
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35. It shall be ensured that there is no habitation is located within 300 meter radius from the periphery of the quarry site and also ensure that no hindrance will be caused to the people of the habitation located within 300m radius from the periphery of the quarry site.
36. Free Silica test should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.
37. Air sampling at intersection point should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.
38. Bunds to be provided at the boundary of the project site.
39. The project proponent shall undertake plantation/afforestation work by planting the native species on all side of the lease area at the rate of 400/Ha. Suitable tall tree saplings should be planted on the bunds and other suitable areas in and around the work place.
40. Floor of excavated pit to be levelled and sides to be sloped with gentle slope (Except for granite quarries) in the mine closure phase.
41. The Project Proponent shall ensure a minimum of 2.5% of the annual turnover will be utilized for the CSR Activity
42. The Project Proponent shall provide solar lighting system to the nearby villages.
43. Earthen bunds and barbed wire fencing around the pits with green belt all along the boundary shall be developed and maintained.
44. Safety equipment's to be provided to all the employees.
45. Safety distance of 50m has to be provided in case of railway, reservoir, canal/odai
46. The Assistant/Deputy Director, Department of Geology & mining shall ensure that the proponent has engaged the blaster with valid blasting license/certificate obtained from the competent authority before execution of mining lease.
47. The proponent shall furnish the Baseline data covering the Air, Water, Noise and land environment quality for the proposed quarry site before execution of mining lease.
48. The proponent shall erect the pillars in accordance with the Rules for depicting GPS details in the earmarked boundary of the quarry site to monitor electronically before execution of mining.
49. The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
50. The proponent has to display the name board at the quarry site showing the details of Proponent, lease period, extent, etc., with respect to the existing activity before execution of mining.

  
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51. Heavy earth machinery equipment's if utilized, after getting approval from the competent authority.
52. The Proponent shall ensure that the project activity including blasting, mining transportation etc should in no way have adverse impact to the other forests, such as reserve forests and social forests, tree plantation and bio diversity, surrounding water bodies etc.
53. The proponent shall provide Green Belt development at the rate of not less than 400 trees/Hectare. The tree saplings shall be not less than 3m height.
54. The fugitive emissions should be monitored during the mining activity and should be reported to TNPCB once in a month and the operation of the quarry should no way impact the agriculture activity & water bodies near the project site.
55. All the commitment made by the project proponent in the proposal shall be strictly followed.
56. The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.
57. The Project proponent has to strictly comply the outcome/direction of the Hon'ble NGT, Principle Bench. New Delhi in the O.A No.186 of 2016 (M.A.No.350/2016), O.A. No.200/2016, O.A.No.580/2016 (M.A.No.1182/2016), O.A.No.102/2017, O.A.No.404/ 2016 ( M.A.No. 758/2016, M.A. No. 920 /2016, M.A.No.1122/2016, M.A.No. 12/2017 & M.A.No.843/2017), O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No.981/2016, M.A.No.982/2016 & M.A.No.384/2017).
58. All required sanitary and hygienic measures should be in place before starting construction activities and they have to be maintained throughout the construction phase.
59. The company shall stress upon the preventive aspects of occupational health.
60. A separate environment and safety management cell with qualified staff shall be set up before commissioning of construction activities and shall be retained throughout the lifetime of the industry, for implementation of the stipulated environmental safeguards.
61. A scientific site/ ecological rehabilitation and restoration plan on long term basis should be drawn to carryout restoration with native species and Bio diversity.
62. The Green/Blue plan should guide the restoration of the site. The rehabilitation/restoration plan should be submitted to SEIAA-TN within one month. If applicable.

  
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63. The existing water bodies should not be disturbed to ensure sustainable environment for aquatic life forms.
64. The proponent should completely implement all environmental pollution control measures as detailed in the EIA report and in the additional report.
65. Avenue plantation wherever needed has to be carried out along the route for dust suppression.
66. The green belt developed for the prevention of dust pollution should not form a part of the larger green belt development envisaged in the EIA report.
67. Regular monitoring and check up for pulmonary and carcinogenic diseases to be carried out regularly, not only for the workers involved in the mines but also to the people in the villages adjoining the mines. Interaction with the Primary Health Centre & district medical officer should be on regular basis to monitor the incidence of the diseases if any and to provide suitable medical facility for the patients.
68. Monitoring of well water levels and water quality of the wells in the locations furnished in the EIA report shall be done during pre-monsoon and post monsoon period and results submitted to the Regional Office of MoEF, Chennai and SEIAA.
69. Monitoring of water quality and air quality in and around the project site in the selected monitoring points as mentioned in the EIA report shall be continued regularly involving Academic Institutions.
70. Hydro geological study including infiltration test shall be conducted by any reputed agency to estimate leachate quantity.
71. Regular medical check-up for mine workers and nearby residents around the project site involving community medical centre/NIMH shall be conducted.
72. As per norms, the health study should be conducted through competent/approved health organization and report submitted for one year.
73. The effective safe guard measures shall be provided to control particulate dust level in critical areas, transfer points and haul road within the mine area.
74. NOC from the State GWA for drawing ground water shall be obtained, if ground water table is intersected.
75. Green belt shall be provided as per norms of MoEF & CC, GOI, in consultation with local DFO.
76. All the recommendations made in the EIA report of the project shall be effectively implemented.

  
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77. A booklet containing the Dos and Don'ts shall be prepared in vernacular languages for the use of the mine engineers/ managers and the workers to ensure that all necessary environmental, safety and health measures are undertaken.
78. All the environmental protection measures and safeguards as recommended in the EIA report shall be complied with.
79. Hydro geological study of the area shall be reviewed annually and report submitted to the Authority. No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the operation of the Mining activity.
80. A separate Environmental Management Cell equipped with full fledged laboratory facilities to carry out the various Environmental Management and Monitoring functions shall be set up under the control of a Senior Executive.
81. The project proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF at Chennai, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; RSPM, SO<sub>2</sub>, NO<sub>x</sub> or critical sector parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

**Part B: General Conditions:**

1. EC is given only on the factual records, documents and the commitment furnished in non judicial stamp paper by the proponent.
2. The Proponent shall obtain the Consent from the TNPC Board before commencing the activity.
3. No change in mining technology and scope of working should be made without prior approval of the SEIAA, Tamil Nadu.
4. No change in the calendar plan including excavation, quantum of mineral (minor mineral) should be made.
5. Effective safeguard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.

  
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6. Effective safeguards shall be adopted against health risks on account of breeding of vectors in the water bodies created due to excavation of earth.
7. A berm shall be left from the boundary of adjoining field having a width equal to at least half the depth of proposed excavation.
8. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.
9. Vehicular emissions shall be kept under control and be regularly monitored. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.
10. Access and haul roads to the quarrying area should be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.
11. All Personnel shall be provided with protective respiratory devices including safety shoes, masks, gloves etc. Supervisory people should be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.
12. Periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly. The workers shall be provided with personnel protective measures such as masks, gloves, boots etc.
13. Workers/labourers shall be provided with facilities for drinking water and sanitation facility for Female and Male separately.
14. The project proponent shall ensure that child labour is not employed in the project as per the sworn affidavit furnished.
15. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Chennai.
16. The Environmental Clearance does not absolve the applicant/proponent of his obligation/requirement to obtain other statutory and administrative clearances from other statutory and administrative authorities.

  
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17. This Environmental Clearance does not imply that the other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would be considering the project on merits and be taking decisions independently of the Environmental Clearance
18. The SEIAA, Tamil Nadu may alter/modify the above conditions or stipulate any further conditions in the interest of environment protection.
19. The SEIAA, Tamil Nadu may cancel the Environmental Clearance granted to this project under the provisions of EIA Notification, 2006, at any stage of the validity of this Environmental Clearance, if it is found or if it comes to the knowledge of this SEIAA, TN that the project proponent has deliberately concealed and/or submitted false or misleading information or inadequate data for obtaining the Environmental Clearance.
20. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.
21. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act, 1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002 and Biological diversity Rules, 2004 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter.
22. Any other conditions stipulated by other Statutory/Government authorities shall be complied.
23. Any appeal against this Environmental Clearance shall lie with the Hon'ble National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
24. The Environmental Clearance is issued based on the documents furnished by the project proponent. In case any documents found to be incorrect/not in order at a later date the Environmental Clearance issued to the project will be deemed to be revoked/ cancelled.

  
MEMBER SECRETARY  
SEIAA-TN

**Copy to:**

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Principal Secretary to Government, Environment and Forests Department, Tamil Nadu.
3. The Principal Secretary to Government, Industries Department, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
6. The Chairman, TNPC Board, 76, Mount Salai, Guindy, Chennai - 32.
7. The District Collector, Madurai District.
8. The Commissioner of Geology and Mines, Guindy, Chennai - 32.
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Spare.



By e-mail

**GOVERNMENT OF INDIA  
MINISTRY OF MINES  
INDIAN BUREAU OF MINES  
OFFICE OF THE REGIONAL CONTROLLER OF MINES, CHENNAI**

No. TN/MDR/ROMP/LST-1712.MDS

Dt : 30/08/2023

Shri/M/s. B.THIRAVIAM ,  
D.NO.15/22A, KAVANDANPATTI ROAD USILAMPATTI USILAMPATTI

PANAMOOPPANPATTI LST (64079001)

**Sub** Approval of Review of Mining Plan (including Progressive Mine Closure Plan) for Panamooppanpatti Limestone Mine over an extent of : 3.07 hectares in Panamooppanpatti Village, Usilampatti Taluk, Madurai District, Tamilnadu State submitted by Tmt. B. Thiraviam under Rule 17(2) of MCR, 2016 & 23 of MCDR,2017.

**Ref** : (i) Your online submission of draft Review of Mining Plan in MPAS portal on 05.04.2023 in respect of aforesaid M.L.Area.  
(ii) This office letter of even no. dated 20.04.2023.  
(iii) Your online submission of final Review of Mining Plan document in MPAS portal on 24.08.2023 in respect of aforesaid ML area.

Sir,

In exercise of the powers delegated to me under Rule 16 of Minerals (Other than Atomic & Hydro Carbon Energy Minerals) Concession Rules, 2016 vide Gazette Notification No. S.O. 1857(E) dated 18.5.2016, I hereby accord approval for the above said Review of Mining Plan for **Limestone** mineral only. This approval is subject to the following conditions:

**A. General Conditions:**

- 1) That the Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other law applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.
- 2) That this approval of the Review of Mining Plan (including Progressive Mine Closure Plan) does not in any way imply the approval of the Government in terms of any other provision of the Mines & Mineral (Development & Regulation) Act, 2015 or the Mineral Concession Rules, 2016 or any other law including Forest (Conservation) Act, 1980, Environment Protection Act, 1986 and the rules made there under.
- 3) That this Review of Mining Plan (including Progressive Mine Closure Plan) is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- 4) Provisions of the Mines Act, 1952 and Rules & Regulations made thereunder including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
- 5) The Provisions made under MM(D&R) Act, 2015 (Amended) and Rules made thereunder shall be complied with.
- 6) The contents of circular No. 2/2010 issued by the Chief Controller of Mines, IBM, Nagpur vide his letter No. 11013/3/MP/90-CCOM Vol. VII dated 06.04.2010 shall be complied with.
- 7) The execution of Mining Plan / Review of Mining Plan shall be subjected to vacation of prohibitory orders / notices, if any.
- 8) This approval of mining operations and associated activities is restricted to the mining lease area only. The mining lease area is as shown on the statutory plans under rule 32 of Mineral Conservation and Development Rules, 2017, by the lessee. Indian Bureau of Mines does not take any responsibility regarding correctness of the boundaries of the lease shown on the ground with reference to the lease map and other plans furnished by the lessee.
- 9) The Environmental Monitoring Cell of the Company shall continue monitoring ambient air quality, dust fall rate, water quality, soil sample analysis and noise level measurements on various stations established for the purpose both in the core zone and buffer zone, as per Department of Environment guidelines and keeping in view IBM's Circular No.3/92, season-wise every year or by engaging preferably the services of an Environmental laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer on demand.

10) If anything is found to be concealed as required by the Mines Act in the contents of Review of Mining Plan and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

11) Yearly report as required under Rule 26(2) of MCDR,2017 setting for the extent of protection and rehabilitation works carried out as envisaged in the approved progressive mine closure plan and if there is any deviations, reasons thereof shall be submitted before 1<sup>st</sup> July of every year to the regional office, IBM , Chennai.

12) The Review of Mining Plan is approved for the proposals contained therein and as applicable from 01.04.2023 for the mining activities to be carried out within the mining leasehold. The earlier instances of irregular mining/illegal mining, if any, shall not be regularized through the approval of this document.

13) The financial assurance submitted should be renewed before expiry of the same.

14) In case mining lease falls within a radius of 10 kms. of National Park/Sanctuary, recommendations of NBWL have to be obtained as per the orders of the Hon'ble Supreme Court in I.A. No. 460/2004.

15) This approval is subject to the mining operations as per the proposals shall be carried out only after obtaining necessary clearances from MOEF, Pollution Control Board, Forest Department etc.

16) This approval is subject to submission of DGPS Plan duly authenticated by the State Government and submission of modifications in the approved Mining Plan if, consequent to the authentication of DGPS Survey Plan, any change in mining lease area is accepted by the State Government. PANAMOOPANPATTIL (64079001)

17) This approval is subject to the conditions as per the directions given in W.P.(c) No. 114/2014 given by the Hon'ble Supreme Court of India should be taken care while implementing the proposals given in the PMCP part of the documents.

#### **B. Special Conditions:**

1. This approval is subjected to the final orders issued by the State Government/Directorate of Geology and Mining in continuation to their letter No.Rc.No.5808/MMS/2016 dated 05.08.2023 regarding status of mining lease as per section 4(A)(4), 8(A)(5) of MMDR Act, 2015(amended).

2. It shall be mandatory for the project proponent, abstracting ground water, to obtain **No Objection Certificate** from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

Yours faithfully,

Encl: Soft copy of approval letter of Review of Mining Plan.

( G.C. Sethi )

**Regional Controller of Mines**

Copy forwarded for information to Shri.P. Viswanathan, Qualified Person, Old No.260-B, New No.17, Advaita Ashram Road, Alagapuram, Salem – 636 004.

( G.C. Sethi )

**Regional Controller of Mines**

Not on first two copies:

Copy forwarded for kind information to:

- 1) The Director, Department of Mines & Geology, Government of Tamilnadu, Guindy, Chennai - 600032.
- 2) The Controller of Mines (SZ), Indian Bureau of Mines, Bengaluru.
- 3) The Director of Mines Safety, DGMS, Chennai Region, Chennai.

( G.C. Sethi )

**Regional Controller of Mines**

## Chapter 1 : General Information

### 1.1 : Lease Details

IBM Registration Number :	IBM/18563/2014
Lease Code :	64079001
Mine Code :	38TMN06022
Name of Lessee :	B.THIRAVIAM
Address of Lessee :	D.NO.15/22A, KAVANDANPATTI ROAD USILAMPATTI USILAMPATTI
Type of Lessee :	Individual
Name of Mining Lease :	PANAMOOPPANPATTI LST
State :	TAMIL NADU
District :	MADURAI
Tehsil/ Taluk/ Mandal :	Usilampatti
Village :	Panamooopanpatti
Lease Area (Ha) :	3.07
Forest Area (Ha) :	0.0000
Name of Minerals :	LIMESTONE
Name of associated minerals :	

Type :	Existing Lease
Period of the proposal (FY) from :	2023 - 24
Period of the proposal (FY) to :	2027 - 28
Type of working :	Opencast
Nature of Use :	Non Captive
Category of Mine :	Category A

**1.1.1 : Initial/subsequent Lease grant details**

Grant	From	To	Lease deed execution date	Lease registration date
Initial Grant	02/02/1998	01/02/2018	02/02/1998	02/02/1998

**1.1.2 : Mining Plan Submission Criteria Details**

Type of Document :	Review Of Mining Plan Under Rule 17(2) Of MCR, 2016
Reason/s For Modification :	Review Of Mining Plan Is Prepared For Optimum Exploitation Of Deposit By Systematic And Scientific Mining For Every Five Years Ones. This ROMP Is Prepared For The Period Of 2023 24 To 2027 28
Period for which modification is proposed :	2023-2024 to 2027-2028

**1.2 : Land Ownership Details**

View Land Ownership Details Excel	<a href="#">Land ownership details.xlsx</a>
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**1.3 : Existing Lease**

Date of Execution :	02/02/1998
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**1.3.1 : Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order**

S.N.	Letter Number	Date	Period		Type Of Approved Document	Remark
			From	To		
1	TN/MDR/LST/MS-114 0/MDS	02/12/2014	02/12/2014	31/03/2018	Review Of Mining Plan	Approved
2	TN/MDR/LST/ROMP- 1512.MDS	14/08/2018	14/08/2018	31/03/2023	Review Of Mining Plan	Approved

**1.3.2 : Partial Surrenderd Area During Stages of Operations in Chronological Order**

Not Applicable

**1.3.3 : Transfer of Lease Area Subsequent to Grant**

Not Applicable

**1.3.4 : Statutory Compliances****1.3.4.1 : Environment Clearance**

Applicable :	Yes
Letter No :	Under Process

Date :	29/03/2023
Validity :	29/03/2023
ROM Mineral :	10410.0000 (Tonnes)

**1.3.4.2 : SPCB Approvals**

Letter No :	Under Process
Approval of :	Consent To Operate
Date :	29/03/2023
Validity :	29/03/2023
ROM Mineral :	10410.0000 (Tonnes)

**1.3.4.3 : Forest Clearance**

Applicable :	No
Letter No :	Nil
Date :	Nil
Validity :	Nil
Area (Ha) :	Nil

**1.3.4.4 : Land Acquisition Details**

Total Area Acquired in hectare:	3.0700
Total Amount Paid (INR) :	1000000.0000

**1.3.5 : Mine Location Details**

Toposheet Number :	58 F/16
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**1.3.5.1 : Location of Boundary Pillars**

View Location of Boundary Pillars Excel	<a href="#">Location.xlsx</a>
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**1.3.6 : Owner/Nominated Owner Details**

Name	PAN of owner / Nominated Owner	Address of owner/ Nominated Owner	Mobile Number	Email	Please attach Minutes of Board Resolution in case of Nominated Owner
B.THIRAVIAM	BABPT4328N	D.NO.15/22A, KAVANDANPATTI ROAD USILAMPATTIUSILAMPAT TI	9789598555	kb.kannan@gmail.com	<a href="#">Thiraviyam_pan_card.pdf</a>

**1.3.7 : Qualified Person Details as per M(OAHCEM)CR, 2016**

S.N.	Prefix	Name	PAN of QP	Address	Mobile no.	Qualification	Exp in years as prescribed under the rule	Email
1	Mr	N Suresh	EGZPS9248P	3-82, Mel Street, Amaragundhi Post, Omalur Taluk, Salem -636503	9994289822	Msc Geology	6	sureshydrogeology@gmail.com

## Chapter 2A : Geology & Exploration

### 2A.1 : Geology

#### 2A.1.1 : Topography

Terrain :	Undulating
Highest Level (m) from MSL :	273.0000
Lowest Level (m) from MSL :	261.0000
Average Level (m) from MSL :	267.0000
Drainage Pattern :	Dendritic
Order of Stream :	Order 1
Min Dist of Stream from Lease Area(m) :	60.0000

#### 2A.1.2 : Details of Physiographic features and Infrastructures available in and around the lease/ block area

Description	Location if existing Within the lease/block area	Distance from boundary periphery in kms, if existing outside the lease/block area. (within 5.00Kms)	Remark if any
River/Nallah/Reservoir	Nil	3.3	Vaiai River-North
Public roads (Tar road, cart road)	Nil	1.76	5mwide-Tar Road
Railway track	Nil	9.7	South, Maduai-Theni rail line
Human settlements	Nil	0.7	North side
Archaeological monuments/ places of worships/public utilities etc	Nil	10	There is no archaeological monuments within 5kms radius
Wild life sanctuaries/ national parks	Nil	35.5	Megamalai Wild life sanctuary



Coastal Regulation Zone (CRZ)	Nil	129	Bay of Bengal
Powertransmision lines/telephone lines	Nil	0.1	southern side of Mining lease area
Firing range	Nil	Nil	Above 5km
Ordinance factory	Nil	10	Above 5km
grazing land/ burial ground or cremation ground	Nil	0.5	Above 500m
Any other specify	Nil	0	Nil

Particulars	Distance from lease boundary in kms
Near by village	1.20
Nearest Railway station	10.60
Nearest Port	146.00
Distance of SH/NH from lease area	7.30

### 2A.1.3 : Regional Geology

Regional Geology
<p>Madurai district is covered by granulite facies high grade metamorphic rocks and younger intrusives which fall under the following categories: 1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet- sillimanite <math>\pm</math> biotite <math>\pm</math> cordierite <math>\pm</math> spinel gneiss, minor garnet-cordierite gneiss and garnetiferousquartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite. 2. Charnockite Group consisting of acid charnockite and pyroxene granulite. 3. Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (maficsultramafics). 4. Migmatite group made up of banded hornblendebiotite gneiss, grey granitic gneiss, pink granitic gneiss and grey hornblende granite. 5. Younger Acid Intrusives consisting of granite and pegmatite. Metasedimentary group: This consists of rocks of arenaceous, calcareous and argillaceous composition metamorphosed under granulite facies and represented by quartzite, calc gneiss/diopside granulite, marble, garnet sillimanite gneiss (Khondalite) with minor bands of garnetiferousquartzo-feldspathic gneiss (leptynite), garnet cordierite gneiss. These rocks occur as either individual bands or as 'enclaves' or as tectonic slices within the predominantly charnockite-migmatite country. Quartzite is the important member of the Metasedimentary Group and occupies the crest of the linear ridges in the district. Thickness of the individual quartzite bands varies from less than a metre to 150m. The quartzite is white or dirty white in colour and composed essentially of interlocking grains of quartz and Feldspar which is often kaolinised. Calc gneiss is grayish white, medium grained, granular or gneissose rock with typical ribbed weathering. The thickness of calc gneiss varies from 1m to 30m. With the decrease of silicate minerals and increase of carbonates the calc gneiss grades into crystalline limestone at a few places.</p>

### 2A.1.4 : Local Geology & Structure

**2A.1.4.1 : Local Geological Set-up**

The lease area exhibits undulated terrain with elevation ranges from 261m-273m above MSL. The topsoil found to be up to 1m. Outcrops of Lime stone exposed in to the surface, the Mineral Limestone is occur as banded formation of crystalline white to off white in colour with more Calcium which made the limestone suitable for cement purposes. The strike of the formation is NW-SE direction and dipping 80 due North East direction. Biotite Schist, Calc. Gneiss, Quartzite and Granites found on regional scale. The old formations of country rock followed by limestone and younger injections like pegmatite and quartz veins. Usilampatti area covered with folded formations and the limestone occupies in the lower elevations on flat terrain in the anticlinal part of the fold. The band is mapped using GPS and total station to generate geological map in 1: 2000 scale after geo referencing of cadastral map.

**2A.1.4.2 : Structure**

The limestone found in this area as a banded formation and the country rock is Biotite schist. The deposit is found in the anticlinal part of the folded formation. The trend is almost NW-SE direction and dipping 80 due North East direction. The lease area contains crystalline Limestone mostly contain  $\text{CaCO}_3$ , the top portion of the formation is weathered. The oldest formation is Biotite Schist followed by limestone and younger injections like pegmatite and quartz veins. Limestone band occur as outcrops with intermittent top soil capping and with inter-clastic rejects of biotite schist and quartz veins.

**2A.1.4.3 : Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals**

The limestone found in this area as a banded formation and the country rock is Biotite schist. The deposit is found in the anticlinal part of the folded formation. The trend is almost NW-SE direction and dipping 80 due North East direction. The lease area contains crystalline Limestone mostly contain  $\text{CaCO}_3$ , the top portion of the formation is weathered. The Country rock is sheared and weathered. No Petrographic studies conducted. No other associated minerals found in the area. Sample collected from the lease area analysed from a NABL Laboratory

**2A.1.4.4 : Mode of Occurance & Controls of Mineralization**

Crystalline limestone is formed by recrystallisation of limestone as a result of metamorphism. Crystalline limestone, calc-gneisses, etc., are the metamorphosed equivalents of originally sedimentary carbonate rocks changed by contact and regional metamorphism. The limestone found in this area as a banded formation and the country rock is biotite schist. Crystalline limestone has been temperature-soaked for a considerable time, recrystallization results in coarsening of the grain size.

**2A.1.4.5 : Extent of Weathering/ Alteration**

The country rock, biotite schist is weathered, where as Limestone is partly altered by surface water. Out crops of limestone found on the surface and Crystalline limestone of cement grade found below the topsoil. Some inclusions of country rocks are also observed in the band.

<b>2A.1.4.6 : Nature/Form of Mineral</b>	Lump
Specify If any other	Limestone

<b>2A.1.4.7 : Extent of Mineralization</b>
The crystalline limestone band is passing throughout the lease are in the North south direction, cement grade lime stone with Cao 53% is observed in the band. The country rock, biotite schist is weathered, where as Limestone is partly altered by surface water. Out crops of limestone found on the surface and Crystalline limestone of cement grade found below the topsoil. Some inclusions of country rocks are also observed in the band.

<b>2A.1.4.8 : Deposit Type (as per MEMC Rule)</b>
Strike / Trend of the Ore Body: NW 45 SE Amount of dip of Orebody:80 degree Norh West Dip Direction of the Ore Body: North East

Strike / Trend of the Ore Body						
N	45	W	to	S	45	E

Amount of Dip of the Ore Body (degree)			Amount of Dip of the Ore Body (degree)			
80			80			
(from)			(to)			

Dip Direction of the Ore Body			Plunge of Mineral Body (degree) (if any)	Direction of Plunge		
N	45	E	0	N	45	E

**2A.2: Exploration****2A.2.1: Summary of The Previous Exploration (for fresh grant) / During Last Plan Period (for existing leases)**

Name of The Agency
--------------------

Ganapathy Core drilling Non Core drilling

**2A.2.1.1: Geological Mapping**

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	09/03/2023	10/03/2023	1:2000	3.0700

**2A.2.1.2: Airborne Geophysical Survey**

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	NIL	0	0.00	0.0000	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.1.3: Ground Geophysical Survey**

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	Resistivity	50	1	3.0700	10:02:59.01	10:02:59.84	77:51:06.18	77:51:04.68

**2A.2.1.4: Geochemical Survey**

SI.No.	Type of Sample	No of Samples	Aanlysis report	Area Covered (Ha)
1	Nil	0	Nil	Nil

**2A.2.1.5: Pitting**

Number of Pits
2

Sl.No.	Year		Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av Grade(in %)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	03/03/2000	09/05/2000	1	27.00	14.00	4.00	273.00	269.00	4.00	Limestone	Cao MgO SiO2 Fe2O3 Al2O3 LOI	93.00	10:03:00.71	10:03:00.60	77:51:02.52	77:51:02.66
2	03/03/2000	09/05/2000	2	15.00	10.00	3.00	270.00	267.00	3.00	Limestone	Cao MgO SiO2 Fe2O3 Al2O3 LOI	93.00	10:02:58.97	10:02:58.85	77:51:04.37	77:51:04.55

**2A.2.1.6: Trenching**

Number of Trenches
0

**2A.2.1.6.1: Spacing**

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

Sl.No.	Year		Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av. Grade	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	Nil	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0	0.0000	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.1.7 Exploratory Drilling(Core/non Core)**

SI.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	
1	10/03/2000	03/06/2021	Tvl.Thiraviam Limestone Mines	0	0.00	3	90.00	3	90.00	<a href="#">Bore hole Log sheet.xlsx</a>

**2A.2.1.8: Exploratory Mining**

SI.No.	Pit/Adit ID	Length in Mtr	Width in Mtr	Depth in mtrs	Volume (m <sup>3</sup> )
1	0	0.00	0.00	0.00	0.00

**2A.2.1.9: Sampling**

SI.No.	Type of sample	No of samples collected	Number of samples analyzed	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remark if any
				From	To	From	To	
1	Rock Chip	1	1	10:03:00.71	10:03:00.60	77:51:02.52	77:51:02.66	Nil

**2A.2.1.10: Chemical Analysis**

SI.No.	Sample ID	Minerals	Radical with garde in %	Name of Agency	Type of agency	Attachment
1	1	Limestone	LOI: 41.05%, CaO : 52.04%, SiO <sub>2</sub> : 4.07%, MgO : 0.73%, Fe <sub>2</sub> O <sub>3</sub> : 0.14%, Al <sub>2</sub> O <sub>3</sub> :0.51	Global Lab and Consultancy Services	NABL accredited	<a href="#">LABRESULT.xlsx</a>

\* Chemical analysis of core /non vore samples may be uploaded in CSV file which shall normally include Five files namely collar file, survey file and Geology log file, Assay file & RQD File.

**2A.2.1.11: Petrology & Mineralogical Studies**

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
--------	----------------	------------------------	---------------------------	---------------------------

1	Mineral	1	1	GLCS 4679 Thiraviam Limestone.pdf
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**2A.2.1.12: Beneficiation Studies**

SI.No.	Type of Beneficiation	Number of Samples	Attach
1	Others	0	NOT.pdf

**2A.2.1.13: Bulk Density Study as per M(EMC) Rules, 2015 and SOP of CGPB**

Method adopted for calculating bulk density of ore and waste
Tonnage Conversion Factor: For the purpose of estimation of reserves and resources, the bulk density of in-situ limestone has been considered as 2.5 ie. one cubic meter of limestone by volume is equivalent to 2.5 tonnes of limestone by weight. The in-situ tonnage factor of the limestone deposit is calculated by weighing the limestone collected from a pit of dimension 1m*1m*1m. The weighment is done at the laboratory. Hence the tonnage factor of the limestone deposit is arrived to 2.5

SI.No.	Nature of Ore/OB	Mineral	Number of samples	Bulk Density Established (t/m <sup>3</sup> )
1	Lump	Limestone	1	2.50

**2A.2.1.14: Area Covered under Exploration**

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	0.000000	3.070000	3.070000
G-2	0.000000	0.000000	0.000000
G-3	0.000000	0.000000	0.000000
G-4	0.000000	0.000000	0.000000
Area proved as Non-mineralized	0.000000	0.000000	0.000000
Area to be explored	0.000000	0.000000	0.000000
Total	0.000000	0.000000	3.070000

**2A.2.2: Summary of The Previous Exploration (Before Last Plan Period)**

Name of The Agency
Ganapathy Core drilling with Non Core

**2A.2.2.1: Geological Mapping**

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	02/02/1998	01/02/2003	1:2000	3.07
2	02/02/2003	01/02/2008	1:2000	3.07
3	02/02/2008	01/02/2013	1:2000	3.07
4	02/02/2013	01/02/2018	1:2000	3.07
5	02/02/2018	01/02/2023	1:2000	3.07

**2A.2.2.2: Airborne Geophysical Survey**

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	NIL	0.00	0.000000	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.2.3: Ground Geophysical Survey**

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	Resistivity	50	1	3.0700	10:02:59.01	10:02:59.84	77:51:06.18	77:51:04.68

**2A.2.2.4: Geochemical Survey**

SI.No.	Type of Sample	No of Samples
--------	----------------	---------------



1	Nil	0
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**2A.2.2.5: Pitting**

SI.No.	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Litho units exposed	Litho Unit From (m)	Litho Unit To (m)	Average Grade(%)	Running Metres (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
										Form	To	Form	To
1	1	27.00	14.00	4.00	Limestone	273.00	269.00	93.00	4.00	10:03:00.71	10:03:00.60	77:51:02.52	77:51:02.66
2	2	15.00	10.00	3.00	Limestone	270.00	267.00	93.00	3.00	10:02:58.97	10:02:58.85	77:51:04.37	77:51:04.55

**2A.2.2.6: Trenching**

Number of Trenches
0

**Spacing**

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

**Area Covered Under Trenching****Co-ordinates****Latitude**

North	00:00:00.00
North	00:00:00.00
North	00:00:00.00
North	00:00:00.00

**Longitude**

East	00:00:00.00
East	00:00:00.00
East	00:00:00.00
East	00:00:00.00

SI.No.	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Litho Units Exposed	Average Grade	Running mtr	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
								From	To	From	To
1	0	0.0000	0.0000	0.0000	0	0	0.0000	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.2.7: Exploratory Drilling****2A.2.2.7.1: Core/Non-core Drilling**

SI.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtrs	
1	10/03/2000	03/06/2021	Nil	0	0.00	3	90.00	3	90.00	<a href="#">Bore hole Log sheet.xlsx</a>

**2A.2.2.8: Exploratory Mining**

SI.No.	Pit / Adit ID	Volume (m <sup>3</sup> )
1	Nil	Nil

**2A.2.2.9: Sampling**

SI.No.	Type of sample	Number of Samples	Area Covered (Ha)	Latitude (dd:mm:ss.ss)	Longitude (dd:mm:ss.ss)
--------	----------------	-------------------	-------------------	------------------------	-------------------------

				From	To	From	To
1	Rock Chip	1	3.07	10:03:00.71	10:03:00.60	77:51:02.52	77:51:02.66

**2A.2.2.10: Chemical Analysis**

SI.No.	Sample ID	Minerals	Radical Analysis	Attachment
1	1	Limestone	LOI: 41.05%, CaO : 52.04%, SiO <sub>2</sub> : 4.07%, MgO : 0.73%, Fe <sub>2</sub> O <sub>3</sub> : 0.14%, Al <sub>2</sub> O <sub>3</sub> :0.51	<a href="#">Chemical analysis_Thiraviam.pdf</a>

**2A.2.2.11: Petrology & Mineralogical Studies**

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	Nil	0	0	<a href="#">NIL.pdf</a>

**2A.2.2.12: Beneficiation Test**

SI.No.	Type of Beneficiation	Number of Samples	Attachment
1	Others	0	<a href="#">NOT.pdf</a>

**2A.2.2.13: Bulk Density**

SI.No.	Rock Type	Number of Samples	Minerals	Bulk Density Established (t/m <sup>3</sup> )
1	Lump	1	Limestone	2.50

**2A.2.2.14: Area Covered under Exploration**

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	0.0000	3.0700	3.0700

G-2	0.0000	0.0000	0.0000
G-3	0.0000	0.0000	0.0000
G-4	0.0000	0.0000	0.0000
Area proved as Non-mineralized	0.0000	0.0000	0.0000
Area to be explored	0.0000	0.0000	0.0000
Total	0.0000	3.0700	3.0700

SI.No.	Year		Area converted to G1 from G2, G3 & G4	% increase in G-1 Area	Remaining Area % in G2	Remaining Area % in G3	Remaining Area % in G4	Remaining Area in G2	Remaining Area in G3	Remaining Area in G4
	From	To								
1	05/05/1998	10/03/2023	3.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potentially Mineralised area (Ha)										3.07

### 2A.2.3 Ore Body Geometry & Grade

SI.No.	Name of the ore band	General Strike / Trend	Dip Of Mineral Body	Average Strike Length (m)	Average Width (m)	Chemical parameters				
						Average Depth (m)	Name of the radical	Min Grade (%)	Max Grade (%)	Avg Grade (%)
1	Limestone	NW-SE	NE	260.00	76.00	34.00	CaO : 52.04%, SiO2 : 4.07%, MgO : 0.73%, Fe2O3: 0.14%, Al2O3 :0.51, LOI: 41.05%	40.00	52.00	46.00

### 2A.2.4: Reserve / Resource Estimation Method

#### 2A.2.4.1: Methodology

Resource / Reserve Estimation Method

Sectional Area Method
Methodology
The geological and recoverable reserves are estimated by cross-sectional methods up to a depth of 34m from the surface. The Geological plan has been prepared in 1:2000 scales. Totally six sections have been drawn, One along longer axis (A-B) and five cross section are perpendicular to the strike (X1-Y1, X2-Y2, X3-Y3, X4-Y4,X5-Y5) to cover the maximum area of influence in the scale of 1: 2000, Horizontal sections drawn in 1:1000 and vertical section 1:500 to illustrate the final pit configuration of the mine and method of working the deposit systematically. The geological and recoverable reserves are estimated by cross-sectional Methods up to a depth of 34m. Recovery of Limestone taken as 70% and rejects as 30%.

#### 2A.2.4.2: Resource Calculation

SI.No.	Cross Section/Block	Section Area/ Block Area(sq mt)	Influence(m)	Depth in mtr	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	Level of Exploration	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	AB X1Y1	71	47.00	34.00	3337.00	2.50	8343.00000	333	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
2	AB X3Y3	8	50.00	34.00	400.00	2.50	1000.00000	333	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
3	AB X4Y4	67	50.00	34.00	3350.00	2.50	8375.00000	333	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
4	AB X5Y5	7	54.00	34.00	378.00	2.50	945.00000	333	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
5	AB X1Y1	432	47.00	34.00	20304.00	2.50	50760.00000	332	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
6	AB X2Y2	636	50.00	34.00	31800.00	2.50	79500.00000	332	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
7	AB X3Y3	474	50.00	34.00	23700.00	2.50	59250.00000	332	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
8	AB X4Y4	504	50.00	34.00	25200.00	2.50	63000.00000	332	Government	Cao MgO	46	Cross

									Land	SiO2 Fe2O3 Al2O3 LOI		sectional Method
9	AB X5Y5	588	54.00	34.00	31752.00	2.50	79380.00000	332	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
10	AB X1Y1	621	47.00	34.00	29187.00	2.50	72968.00000	331	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
11	AB X2Y2	1322	50.00	34.00	66100.00	2.50	165250.0000 0	331	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
12	AB X3Y3	1308	50.00	34.00	65400.00	2.50	163500.0000 0	331	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
13	AB X4Y4	1011	50.00	34.00	50550.00	2.50	126375.0000 0	331	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
14	AB X5Y5	1212	54.00	34.00	65448.00	2.50	163620.0000 0	331	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross sectional Method
Total					416906.00		1042266.000 00					

#### 2A.2.4.3: Mineral Resource Estimate for Conversion to Mineral Reserve

No Mineral resource converted to Reserve. The Depth of mining and area proposed is already proved as 111

#### 2A.2.4.4: Threshold value & Cut off Parameters

Limestone threshold value : 45%

#### 2A.2.4.5: Mining Factors or Assumptions

Open cast mining by other than mechanized mining is adopted to raise the production in this area. As the mineral occur as outcrops and exposed mostly in the small pits as well as at the surface and there is no separate development work involved except side burden to win the mineral. Drilling is carried out using hired tractor attached with compressor and their team and blasting carried out departmentally with qualified blaster/Manager. The Limestone is broken into the required size . The rejects and waste are being removed manually using tippers. The useable minerals are transported to nearby cement factory or crushing plant in accordance with grade by using public carriers on hire basis.

#### 2A.2.4.6: Metallurgical Factors or Assumptions

NA

#### 2A.2.4.7: Cost & Revenue Factors

The yearly working days in mine are 300 days. Exploration & Development cost is Rs.50 Salary & Wages –Rs.120 Drilling & BlastingRs.60 Internal Transport-Rs.25 Over heads Pumping- Rs.23 Sale Tax- Rs.19, Royalty-Rs.80, DMF-Rs.8, NMET-Rs.1.6 and Total production cost is 386.

#### 2A.2.4.8: Market Assessment

Since, the entire mined out mineral is been utilized by the cement factory and refractory based industries and manufacturing units nearby areas. The grade is been already approved and fit for cement and Refractory industries. The limestone has good demand from customers and the sale value is not less than of 450/- per tonnes in the market. The cement grade limestone is transported to nearby cement factories, using public carriers on hire basis.

#### 2A.2.4.9: Other Modifying Factors

NA

#### 2A.2.4.10: Classification

The mined out Limestone is consumed in the cement & Refractory industries

#### 2A.2.4.11: Calculation of blocked resources

Sl.No.	Reserves blocked due to	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	Other	ABX1Y1	432.00	47.00	34.00	20304.00	2.50	50760.00000	221	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
2	Other	ABX2Y2	636.00	50.00	34.00	31800.00	2.50	79500.00000	221	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
3	Other	ABX3Y3	474.00	50.00	34.00	23700.00	2.50	59250.00000	221	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
4	Other	ABX4Y4	504.00	50.00	34.00	25200.00	2.50	63000.00000	221	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
5	Other	ABX5Y5	588.00	54.00	34.00	31752.00	2.50	79380.00000	221	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
6	7.5 Meter Safety Barrier	ABX1Y1	71.00	47.00	34.00	3337.00	2.50	8343.00000	222	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
7	7.5 Meter Safety Barrier	ABX3Y3	8.00	50.00	34.00	400.00	2.50	1000.00000	222	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
8	7.5 Meter Safety Barrier	ABX4Y4	67.00	50.00	34.00	3350.00	2.50	8375.00000	222	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method



9	7.5 Meter Safety Barrier	ABX5Y5	7.00	54.00	34.00	378.00	2.50	945.00000	222	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	cross section method
Total						140221.00		350553.00					

**2A.2.4.12: Calculation of Reserves - I**

SI.No.	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m <sup>3</sup> )	Bulk Density (t/m <sup>3</sup> )	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	AB- X1Y1	621	47.00	34.00	29187.00	2.50	72968.00	111	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross Sectional method
2	AB-X2Y2	1322	50.00	34.00	66100.00	2.50	165250.00	111	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross Sectional method
3	AB-X3Y3	1308	50.00	34.00	65400.00	2.50	163500.00	111	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross Sectional method
4	AB-X4Y4	1011	50.00	34.00	50550.00	2.50	126375.00	111	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross Sectional method
5	AB-X5Y5	1212	54.00	34.00	65448.00	2.50	163620.00	111	Government Land	Cao MgO SiO2 Fe2O3 Al2O3 LOI	46	Cross Sectional method
Total					276685.00		691713.00					

**2A.2.4.13: Calculation of Reserves -II**

Mineral	LIMESTONE
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Reserves/ Resources estimated as on	01/04/2023
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UNIT of estimation	tonnes
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## A. Mineral Reserve

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Proved Mineral Reserve (A)	111	0.00	691713.00	691713.00	0	46	Grade is 46%
2. Probable Mineral Reserve (A)	121	0.00	0.00	0.00	0	0	NA
3. Probable Mineral Reserve (A)	122	0.00	0.00	0.00	0	0	NA

## B. Remaining Resources

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Feasibility Mineral Resource (B)	211	0.00	0.00	0.00	0	0	NA
2. Prefeasibility Mineral Resource (B)	221	0.00	331890.00	331890.00	0	46	Grade is 46%
3. Prefeasibility Mineral Resource (B)	222	0.00	18663.00	18663.00	0	0	Grade is 46%
4. Measured Mineral Resource (B)	331	0.00	0.00	0.00	0	0	NA
5. Indicated Mineral Resource (B)	332	0.00	0.00	0.00	0	0	NA
6. Inferred Mineral Resource (B)	333	0.00	0.00	0.00	0	0	NA
7. Reconnaissance Mineral Resource (B)	334	0.00	0.00	0.00	0	0	NA

Total Mineral Resources (A+B) :	1042266.00
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**2A.2.4.13: Calculation of Reserves -III**

No associate minerals are available!

**2A.2.5: Future Exploration Proposal****2A.2.5.1: Geological Mapping**

SI.N.	Year	Scale	Area Covered (Ha)
1	2023-2024	1:1000	3.07
2	2024-2025	1:1000	3.07
3	2025-2026	1:1000	3.07
4	2026-2027	1:1000	3.07
5	2027-2028	1:1000	3.07

**2A.2.5.2: Ground Geophysical Survey**

SI.No.	Year	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	Nil	NIL	0	0	0.0000	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.5.3: Pitting**

Number of Pits									
0									

SI.No.	Year	Land Type	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To

1	Nil	Non Forest Land	0	0.00	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00
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**2A.2.5.4: Trenching**

Number of Trenches	
0	

**2A.2.5.4.1: SPACING**

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

**2A.2.5.4.2: Area Covered Under Trenching****Co-ordinates**

SI.No.	Year	Land Type	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Non Forest Land	0	0.0000	0.0000	0.0000	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**2A.2.5.5: Exploratory Drilling****2A.2.5.5.1: Core Drilling & Non-Core Drilling**

SI.No.	Year	In Forest Area				In Non Forest Area				Total Borehole	Total Meter
		No. of Borehole	Total Mtr	Type Borehole	Grid Interval	No. of Borehole	Total Mtr	Type Borehole	Grid Interval		

1	2023-2024	0	0.00	Nil	0.00	3	105.00	Core	50.00	3	105.00
2	2023-2024	0	0.00	Nil	0.00	2	70.00	Non Core	50.00	2	70.00

**2A.2.5.6: Exploratory Mining**

SI.No.	Year	Pit ID	Length in meter	Width in meter	Depth in meter	Volume (m <sup>3</sup> )
1	Nil	0	0.00	0.00	0.00	0.00

**2A.2.5.7: Sampling**

SI.No.	Year	Type of Sample	Number of Samples Proposed	Area Covered(Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	2023-2024	Drill Core	6	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78
2	2024-2025	Rock Chip	1	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78
3	2025-2026	Rock Chip	1	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78
4	2026-2027	Rock Chip	1	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78
5	2027-2028	Drill Core	1	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78
6	2023-2024	Rock Chip	4	3.07	10:03:01.50	10:02:57.38	77:51:02.11	77:51:09.78

**2A.2.5.8 Petrographic & Mineralgraphic Studies**

SI.No.	Year	Type of Sample	Number of Samples Proposed
1	Nil	None	0

# **Chapter 2B : Geology & Exploration UG : NA**

Approved

### Chapter 3: Mineral Beneficiation / Processing

Name of The Ore/Mineral	Limestone
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#### 3.1: Mineralogy of the ROM ore/ Mineral

SI.No	Valuable Mineral Name	Approx. Mineral %	Gangue Mineral/s name	Approx. Mineral Gangue %
1	Limestone	70.0000	Waste	30.0000

#### 3.2: Complete Chemical Analysis of the ROM Ore/Mineral

SI.No	Radical	Wt%
1	CaO MgO Fe <sub>2</sub> O <sub>3</sub> Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub> LOI	100.0000

#### 3.3: Crushing Section

##### 3.3.1: Primary Crushing

SI.No	Type of Crusher	Make	Capacity of Crusher(tph)	Feed Size(mm)	Product Size(mm)
1	Other	0	0	0.0000	0.0000

##### 3.3.2: Secondary Crushing

Not Applicable

##### 3.3.3: Tertiary Crushing

Not Applicable

**3.4: Grinding Section**

**3.4.1: Dry Grinding**

Not Applicable

**3.4.2: Wet Grinding**

Not Applicable

**3.5: Dry Processing**

**3.5.1: Screening and Classification**

Not Applicable

**3.5.2: Other Operations**

Not Applicable

**3.5.3: Product Quality**

Approved



Not Applicable

**3.6: Wet Processing****3.6.1: Scrubbing / Washing**

SI.No	Type of Scrubbers / washers	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product Size (mm)	Product Quality, if available	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	0	Not applicable	0	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000

**3.6.2: Screening and Classification**

SI.No	Type of screen / classifiers	Stages, if applicable	Make	Capacity(tph)	Aperture Size of Screen/Classifier (mm), if applicable	Feed Size(mm)	Product Size (mm)	Product Quality, if available	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	0	Not applicable	0	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000

**3.6.3: Gravity Separation**

SI.No	Type of separators (jig, table, spiral, etc.)	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product (Conc) (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

**3.6.4: Magnetic Separation**

SI.No	Type of magnetic separators (magnetic intensity)	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Mag (tph)	Product-Mid (tph), if available	Product non-Mag (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

**3.6.5: Flotation**

SI.No	Type of flotation equipment (froth/ column)	Stages (rougher/ cleaner, etc), if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Float (tph)	Product non-Float (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

**3.6.6: Other Operations**

SI.No	Type of equipment / operation	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Conc (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	Not applicable	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

**3.6.7: Product Quality (wet processing)**

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

**3.7: Overall Product Quality (Dry cum Wet Processing)**

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

**3.8: Disposal Method for tailing/ rejects**

a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing	<a href="#">NOT.pdf</a>
b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralise its effect (if any)	<a href="#">NOT.pdf</a>
c) Any other data (if available)	<a href="#">NOT.pdf</a>

**3.9: Overall water requirement of mining and mineral processing**

Indicate quantity, source of supply, disposal of water and extent of recycling and chemical analysis of water	<a href="#">NOT.pdf</a>
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**3.10: Flow sheets and charts**

Material balance chart of mineral processing plant(s) (each stage of process)	<a href="#">NOT.pdf</a>
Attach flow sheet of beneficiation of plant(s)	<a href="#">NOT.pdf</a>
Any other data (if applicable)	<a href="#">NOT.pdf</a>

## Chapter 4A: Mining Operations

<b>4A.1.1: Existing Method of Mining</b>	Manual			
<b>4A.1.2: Proposed Method of Mining</b>	Mechanized			
Choose one or more	HEMM without deephole drilling	Combination of loaders and tippers	None	None
Reasons for Proposed Changes	Open cast mining by other than Fully mechanized is adopted to raise the production in this area due to demand of the mineral is high in this area and the production proposed is higher than the previous proposal			

### 4A.2: Operational Parameters

#### 4A.2.1: Inventory of Existing Pits & Dumps

##### 4A.2.1.1: Pits

SI.No.	Pit ID	Pit Status	Area Covered by Pit(Ha)	Pit Dimensions(L*W*D)
1	1	Active	0.04	27*14*4
2	2	Active	0.02	15*10*3

##### 4A.2.1.2: Dumps and Stacks

**4A.2.1.2.1: Dump Details**

SI.No.	Dump ID	Dump Status	Type of Dump	Total of Dump Quantity(t)	Area Covered by Dump(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	0	Stabilised	Mineral Reject	0.00	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**4A.2.1.2.2: Stack Details**

SI.No.	Stack ID	Type of Stack	Total Stack of Quantity(t)	Area Covered by Stack(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	0	Stack for mineral	0	0	0	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

**4A.2.1.3: Details of stabilised dumps**

SI.No.	Dump ID	Number of Terraces	Average Height of Terraces(m)	Lenght of Toe Wall(m)	Lenght of Garland Drain(m)	Area Stablized(Ha)	Method of Stablization
1	0	1	0.00	0.00	0.00	0.00	Nil

**4A.2.2: Opencast Mining****4A.2.2.1: Bench Parameters**

Pit ID	Year	Max Height of the Benches in Over Burden (m)	Min Width of the Benches in Over Burden (m)	Slope of the Bench in Over Burden (degree)	Max Height of the Benches in Mineral (m)	Minimum Width of the Benches in Mineral (m)	Slope of the Bench in Mineral (degree)	Overall Slope of Pit (degree)	Number of Benches in Top Soil	Number of Benches in Over Burden	Number of Benches in Mineral	Max Depth of Workings (m)	Depth of Water Table (mRL)	Max Slope Angle of Haul Roads (1xx in)
1	2023-2024	1.00	1.50	60.00	6.00	6.00	60.00	45.00	1	0	2	10.00	38.00	10
1	2024-2025	1.00	1.50	60.00	6.00	6.00	60.00	45.00	1	0	1	16.00	38.00	10
1	2025-2026	1.00	1.50	60.00	6.00	6.00	60.00	45.00	1	0	2	16.00	38.00	10

1	2026-2027	0.00	0.00	0.00	6.00	6.00	60.00	45.00	0	0	1	16.00	38.00	10
1	2027-2028	6.00	6.00	60.00	6.00	6.00	60.00	45.00	0	1	1	16.00	38.00	10

**4A.2.2.2: Yearwise Opencast Development - I Continue**

SI.No.	Year	Pit ID	Bench	Direction	Bulk Density of Overburden (BD1) (ton/m <sup>3</sup> )	Bulk Density of Mineral (BD2) (tonn/m <sup>3</sup> )	Top Soil Volume (Length x Width x Height) (m <sup>3</sup> )	Over Burden Volume (Length x Width x Height) (m <sup>3</sup> )	Over Burden Quantity (t)	ROM Volume (Length x Width x Height) (m <sup>3</sup> )	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB Ratio to Ore (m <sup>3</sup> /ton)
1	2023-2024	1	1-2	North West	2.50	2.50	8590.00	2600.00	6500.00	29737.00	74342.50	0.70	22302.75	52039.75	0.00	0.0350
2	2024-2025	1	2	West & center	2.50	2.50	1850.00	8400.00	21000.00	29100.00	72750.00	0.70	21825.00	50925.00	0.00	0.1155
3	2025-2026	1	1	Center	2.50	2.50	6800.00	2400.00	6000.00	28950.00	72375.00	0.70	21712.50	50662.50	0.00	0.0332
4	2026-2027	1	2	Center	2.50	2.50	0.00	0.00	0.00	28800.00	72000.00	0.70	21600.00	50400.00	0.00	Nil
5	2027-2028	1	2-3	Western	2.50	2.50	0.00	3000.00	7500.00	28812.00	72030.00	0.70	21609.00	50421.00	0.00	0.0416
Total									41000.00		363497.50		109049.25	254448.25	0.00	

**4A.2.2.2 Yearwise Opencast Development - I End**

SI.No.	Year	Pit ID	Total Topsoil Volume (m <sup>3</sup> )	Total Over Burden Volume (m <sup>3</sup> )	Total Over Burden Quantity (t)	Total ROM Volume (m <sup>3</sup> )	Total ROM Quantity (t)
1	2023-2024	1	8590.00	2600.00	6500.00	29737.00	74342.50
2	2024-2025	1	1850.00	8400.00	21000.00	29100.00	72750.00
3	2025-2026	1	6800.00	2400.00	6000.00	28950.00	72375.00

4	2026-2027	1	0.00	0.00	0.00	28800.00	72000.00
5	2027-2028	1	0.00	3000.00	7500.00	28812.00	72030.00
Total			17240.00	16400.00	41000.00	145399.00	363497.50

#### 4A.2.2.3: Transportation & Hauling Equipment

SI.No.	Type	Make	Capacity (m <sup>3</sup> )	No. of Equipments
1	Tipper	Ashok Leyland	6.00	2

#### 4A.3: Material Handling Summary

##### 4A.3.1: Studies Undertaken

Title	Study Undertaken	Attachment (only pdf allowed)
Blast Vibration Study Report	No	Nil
Slope Stability Study Report	No	Nil
Recovery Study Report	No	Nil
Hydrological Study Report	No	Nil
Mineral Beneficiation Study Report	No	Nil
Subsidence Study Report	No	Nil
Geotechnical Study Report	No	Nil
Any Other Study Report	Yes	<a href="#">Geo_Physical_Survey_Report_Final.pdf</a>
Bulk Density Study Report	No	Nil

##### 4A.3.2: Insitu Mining

SI.No.	Year	Waste Quantity(t)	ROM Quantity(t)	Total Handling (t)	ROM Quantity Saleable Mineral (t)	ROM Quantity Mineral Reject (t)	OB Ratio to Ore (Waste Quantity /	Grade Range (%)
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							ROM Quantity )	
1	2023-2024	6500.00	74342.50	80843.00	52039.75	22302.75	0.09	40% to 52%
2	2024-2025	21000.00	72750.00	93750.00	50925.00	21825.00	0.29	40% to 52%
3	2025-2026	6000.00	72375.00	78375.00	50662.50	21712.50	0.08	40% to 52%
4	2026-2027	0.00	72000.00	72000.00	50400.00	21600.00	0.00	40% to 52%
5	2027-2028	7500.00	72030.00	79530.00	50421.00	21609.00	0.10	40% to 52%
	Total	41000.00	363497.50	404498.00	254448.25	109049.25		

#### 4A.3.3: Dump workings

SI.No.	Year	Dump ID	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Area (m2)	Avg Height of Dump (m)	Volume (m <sup>3</sup> )	Total Dump Quantity (t)	Proposed Dump Handling Quantity (t) (A)	Proposed Recovery of Saleable Mineral (t)(B)	Proposed Waste Quantity (t) (A-B)	Grade Range (%)	Justification
			From	To	From	To									
1	Nil	0	Nil	00:00:00.00	00:00:00.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	NA

#### 4A.3.4: Calculation Summary

Year	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	Total
(A) Total ROM quantity (t)	74343.00	72750.00	72375.00	72000.00	72030.00	363498.00
(B) Saleable ore from ROM (t)	52040.00	50925.00	50663.00	50400.00	50421.00	254449.00
(C) Proposed Dump Handling Quantity (t)	0.00	0.00	0.00	0.00	0.00	0.00
(D) Saleable Ore recovered from dump	0.00	0.00	0.00	0.00	0.00	0.00



workings (t)						
(E) Total Saleable Ore (t)(=B+D)	52040.00	50925.00	50663.00	50400.00	50421.00	254449.00
(F) Total Quantity Handled (t)(=A+C)	74343.00	72750.00	72375.00	72000.00	72030.00	363498.00

#### 4A.4: Machine Calculation

##### 4A.4.1: Machine Requirement Summary

Number of Average Working Days in One Year (A)	300
Number of Shifts per Day (B)	1
Material Handling Required per Day (t) ((D)=Largest of (Q1,Q5)/(A))	270
Material to be Handled per Shift (t) ((E)=(D)/(B))	270
Handling Required per Hour (t) ((F)=(E)/8 hours)	32.53
Effective Shift Time	8 hrs 30 mins

##### 4A.4.2: Shovel / Excavator Requirement

Effective Shift Time		8 hrs							30 mins					
SI.No.	Type	Bucket Capacity (m <sup>3</sup> )(A)	Bucket Fill Factor (B)	Swell Factor (C)	Tonnage Factor (t/m <sup>3</sup> ) (D)	Machine Utilization Factor (%) (U)	Efficiency (%) (E)	Cycle time (sec) (F)	(G) TPH =TPH (G) =((3600 x A x B x C x D x E x U) / F)	Total Hours (H) =Number of working days x Number of shifts/day x Effective shift hours	Yearly handling by one Excavator (t) (I)=(G x H)	Maximum handling of the material by this machine during the block period (t) (J)	Number of excavator machines required (K) = (J / I)	Standby excavator (L)
1	Hydraulic	1.20	1.0	0.5	2.50	0.90	0.90	35	124.97	2400	299928.00	50890.00	0.17	1

Excavator														
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#### 4A.4.3: Dumper Requirement

Effective Shift Time					8 hrs					30 mins				
SI.No.	Total Hour s=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requireme nt Summary) (A)	Capacity of Dumpers (t) (B)	Speed of the dumper (KMPH) (i)	Lead Distance (KM) (ii)	Time taken to cover distance in minutes(iii ) =(ii/i) x 60	Queuing, Loading Time at Shovel (min) (iv)	Queuing, Unloading Time during unloading (min) (v)	Total Time to complete one trip(vi) = (iii + iv + v )	No. of Trips / hr = (60 / vi)	Total trans portation per hour =( B X vii)	Yearly handling by one dumper (ix) = A x TPH	Maximum handling of the material by this machine during the block period (t) (x)	Number of dumpers will be (xi) =( x / ix)	Plus Standby dumper (xii)
1	2400	15.00	25.00	0.20	0.48	0.10	0.05	0.63	95	1428	3428640.0 0	15.00	0	0

#### 4A.4.4: Drill Machine Requirement

Effective Shift Time					8 hrs					30 mins				
SI.No.	Type of Drill	Depth of H ole(includi ng Sub- grade Drilling (m)	Spacing (m)	Burden (m)	Bulk Density of Waste (t/m <sup>3</sup> )	Bulk Density of Mineral (t/m <sup>3</sup> )	Yield per Hole (t)	Yield per Meter (t/m) = Yield per Hole (t)/Depth of Hole(in	Annual Target Known (t)	Drilling Re quirement per Day (m) = (Annual Target Known (t)	Drilling Re quirement per Shif t(m)	Rate of Drilling per Hours (m/hr) = Drilling Re quirement per Shif t(	Required No. of drills (m/c) = Required rate of drilling in meters per	Stand by Drill

								cluding Sub-grade Drilling (m))	/ Yield per Meter (t/m) ) / Number of Average Working Days in One Year (A)	m)/Effecti ve Shift Time	hr./ Actual rate of drilling in meters per hr of the machine deployed			
1	Hydraulic	6.00	2.00	1.00	2.86	2.50	30.00	5.00	50890.00	33.92	33.92	3.99	0.33	1

#### 4A.4.5: Machine Deployment Details

##### 4A.4.5.1: Excavator & Loading Equipment

SI.No.	Type	Make	Capacity (m <sup>3</sup> )	No. of Equipments
1	Hydraulic Excavator	Tata Hitachi	1.20	2

##### 4A.4.5.2: Dozers Details

SI.No.	Type	Make	Capacity (hp)	No. of Equipments
1	0	0	0.00	1

##### 4A.4.5.3: Drilling Details

SI.No.	Type	Make	Capacity (t)	Diameter of Hole(mm)
1	Jack Hammer	Atlas Copco	140.00	32.00

#### 4A.5 Blasting Requirement

##### 4A.5.1: Blasting & Explosive Requirement in Waste/Development

Sl.No.	Drill Pattern / Spacing of Holes (m)	Burden of Holes (m)	Number of Rows / Rings	Yield per Holes in Waste (m <sup>3</sup> )	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month in Development (kg)	Powder Factor in Development / Waste (t/kg)	Depth Of Hole
1	0.75	0.6	6	0.4	14	135	0.14	19	963	0.7	1

#### 4A.5.2: Blasting & Explosive Requirement in Mineral / Ore

Type of Explosive	Type of Explosives used / to be Used
Ammonium Nitrate Fuel Oil Mixture	Permitted Slurry Explosives (Small Diameter)

Sl.No.	Total ROM proposed to be handled in CU M/annum	Total ROM proposed to be handled in CUM/day	Spacing of Holes (m)	Burden of Holes (m)	Number of Rows	Yield per Holes in ROM Zone (m <sup>3</sup> )	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	No of Holes Required to be Blasted per Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month for ROM Zone Blasting (kg)	Powder Factor in Ore (t/kg)	Pop Shooting (no of Boulders)	Plaster Shooting (no of Boulders)	Use of Rockbreaker	Capacity	Secondary Blasting Requirements	Depth Of Hole
1	29737	99.12	2.0	1.0	2	12	6	8	8	0.84	6.72	168	6	0	0	1	1.20	No	0

#### 4A.6: Man Power Deployment

##### 4A.6.1: Managerial

Sl.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	1st Class	0	0	0	1	1
2	Geologist	0	0	0	1	1

**4A.6.2: Supervisory**

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Foreman	0	0	0	1	1
2	Mine-mate	0	0	0	1	1

**4A.6.3: Skilled Workers / Operators**

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Operator	0	0	0	2	2
2	Drill Operator	0	0	0	2	2

**4A.6.4: Semi-skilled Workers**

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	0	0	0	8	8

**4A.6.5: Unskilled Workers**

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	0	0	0	2	2

**4A.6.6: Others Specify**

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
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1	other	0	0	0	2	2
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**4A.6.7: No of Persons Engaged Per Day**

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	0	0	0	22	22

No of Shifts per Day ((A) = Machine Requirement Summary (B))	1
Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A))	22
Material to be Handled per Shift ((C) = Machine Requirement Summary (E))	1848

**4A.6.8: Supervision**

SI.No.	Particular	Qualification	Requirement / Proposed	In Position / Existing Strength	(Requirement / Proposed) - (In Position / Existing Strength) = (-) Shortage / (+) Excess	Remarks
1	Geologist	Post Graduate M Sc Geology	1	1	0	Post Graduate M Sc

**4A.7: Waste Management****4A.7.1: Existing Dump**

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m <sup>3</sup> )	Existing Dump Location
						From	To	From	To		
1	Nil	0	Mineral Reject	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00	NA

**4A.7.2: New Dump**

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m <sup>3</sup> )	New Dump Location
						From	To	From	To		
1	2023-2024	1	Mineral Reject	0.23	5.84	10:02:55.21	10:02:56.61	77:51:06.41	77:51:08.23	22303.00	South
2	2024-2025	1	Mineral Reject	0.23	9.35	10:02:56.66	10:02:58.34	77:51:08.41	77:51:08.79	21825.00	South
3	2025-2026	1	Mineral Reject	0.23	15.21	10:02:56.66	10:02:56.61	77:51:06.41	77:51:08.79	21713.00	South
4	2026-2027	1	Mineral Reject	0.23	22.48	10:02:56.66	10:02:56.61	77:51:06.41	77:51:08.79	21600.00	South
5	2027-2028	1	Mineral Reject	0.23	28.53	10:02:56.66	10:02:56.61	77:51:06.41	77:51:08.79	21609.00	South
6	2023-2024	2	Waste	0.18	2.15	10:02:56.66	10:02:58.34	77:51:08.41	77:51:08.79	6500.00	East
7	2024-2025	2	Waste	0.18	5.13	10:02:56.66	10:02:58.34	77:51:08.41	77:51:08.79	23775.00	East
8	2025-2026	2	Waste	0.18	9.42	10:02:56.66	10:02:58.34	77:51:08.41	77:51:08.79	6000.00	East
9	2027-2028	2	Waste	0.18	13.55	10:02:56.66	10:02:58.34	77:51:08.41	77:51:08.79	7500.00	East

**4A.7.3: Existing Stack**

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m <sup>3</sup> )	Existing Stack Location
						From	To	From	To		
1	Nil	0	Stack for mineral	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00	NA

**4A.7.4: New Stack**

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m <sup>3</sup> )	New Stack Location
						From	To	From	To		
1	Nil	0	Stack for	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00	NA

			mineral						
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**4A.8: Mineral Waste Handling To Utilize As Minor Mineral**

SI.No.	Year	Dump ID	Type of Dump	Proposed Area (ha)	Quantity Handled (t)	Quantity Recovered (t)	Name Of Minor Mineral	Alternative Waste Utilization (m <sup>3</sup> )
1	Nil	0	Waste	0.00	0.00	0.00	NA	0.00

**4A.9: Use of Minerals**

SI.No.	Proposed Use Of Mineral	Name Of Mineral	Relevant Use Of Mineral	Physical Specifications	Chemical Specifications
1	Direct Selling	LIMESTONE	The mined out material from the mine is cement grade like limestone it is proposed to sale to the nearby Cement factories by public carriers on hire basis	Good	LOI: 41.05%, CaO : 52.04%, SiO <sub>2</sub> : 4.07%, MgO : 0.73%, Fe <sub>2</sub> O <sub>3</sub> : 0.14%, Al <sub>2</sub> O <sub>3</sub> :0.51

\* Choose among these:

1. Captive use in own industry
2. Direct Selling
3. Selling Post-Beneficiation /Up-gradation

\*Select more than one, if applicable



# Chapter 4 B : Mining Operations UG : NA

Approved

## Chapter 5: Sustainable Mining

### 5.1: Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017

The lessee will take all possible precautions to reduce impact of mining, Afforestation will be carried out within the safety area and mine premises, Mined out Land restoration as per the mine closure plan, The lessee will utilize CSR fund for development of school, drinking & agricultural development of village, provide employment for the local peoples to increase socio-economic development and encourage social cultural activities. The lessee will comply all the parameters for SDF implementations with due consideration.

(Total 200 characters)

Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace	Not Applicable
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### 5.2: CSR INITIATIVES

#### 5.2.1: 2023-2024

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.1.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.1.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.1.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0

**5.2.1.4: Efforts Made towards Providing Transport to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
10	10

**5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
10	10

**5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
10	10

**5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives**

Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.1.9: Communication Facilities Provided to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.1.11: Adoption of ODF**

Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	1	10

**5.2.1.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
1	0

**5.2.1.13: Efforts for green energy**

Total energy consumption (KWh)	Green energy consumption (% of total)
0.00	0.00

**5.2.1.14: Water & recycled use**

Total water consumption (KLD)	Water recycled (% of total)
0.00	0.00

**5.2.2: 2024-2025**

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.2.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00

<b>5.2.2.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00

<b>5.2.2.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0

<b>5.2.2.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10

**5.2.2.5: Efforts Made towards Providing Healthcare to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
Nil	Nil

**5.2.2.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
10	10

**5.2.2.7: Efforts Made towards Skill Development Programs to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.2.8: Efforts Made to Promote Education & Knowledge Based Initiatives**

Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.2.9: Communication Facilities Provided to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.2.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.2.11: Adoption of ODF**

Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	0	0

**5.2.2.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
1	1

<b>5.2.2.13: Efforts for green energy</b>	
Total energy consumption (KWh)	Green energy consumption (% of total)
0.00	0.00

<b>5.2.2.14: Water &amp; recycled use</b>	
Total water consumption (KLD)	Water recycled (% of total)
0.00	0.00

**5.2.3: 2025-2026**

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.3.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00

<b>5.2.3.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00

<b>5.2.3.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0

<b>5.2.3.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10

<b>5.2.3.5: Efforts Made towards Providing Healthcare to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10

<b>5.2.3.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
5	5	
<b>5.2.3.7: Efforts Made towards Skill Development Programs to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
5	5	
<b>5.2.3.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>		
Number of Beneficiaries	Number of Beneficiaries	
5	5	
<b>5.2.3.9: Communication Facilities Provided to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
0	0	
<b>5.2.3.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
2	2	
<b>5.2.3.11: Adoption of ODF</b>		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	0	0
<b>5.2.3.12: Awareness Program among Mine Workers for Swatchata</b>		
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held	
1	1	
<b>5.2.3.13: Efforts for green energy</b>		
Total energy consumption (KWh)	Green energy consumption (% of total)	
0.00	0.00	

<b>5.2.3.14: Water &amp; recycled use</b>	
Total water consumption (KLD)	Water recycled (% of total)
0.00	0.00

**5.2.4: 2026-2027**

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.4.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.4.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.4.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0
<b>5.2.4.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10
<b>5.2.4.5: Efforts Made towards Providing Healthcare to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10
<b>5.2.4.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
5	5



<b>5.2.4.7: Efforts Made towards Skill Development Programs to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
5	5	
<b>5.2.4.8: Efforts Made to Promote Education &amp; Knowledge Based Initiatives</b>		
Number of Beneficiaries	Number of Beneficiaries	
5	5	
<b>5.2.4.9: Communication Facilities Provided to Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
0	0	
<b>5.2.4.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities</b>		
Number of Beneficiaries	Number of Beneficiaries	
2	2	
<b>5.2.4.11: Adoption of ODF</b>		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	0	0
<b>5.2.4.12: Awareness Program among Mine Workers for Swatchata</b>		
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held	
1	1	
<b>5.2.4.13: Efforts for green energy</b>		
Total energy consumption (KWh)	Green energy consumption (% of total)	
0.00	0.00	
<b>5.2.4.14: Water &amp; recycled use</b>		
Total water consumption (KLD)	Water recycled (% of total)	
0.00	0.00	

**5.2.5: 2027-2028**

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
<b>5.2.5.1: Area to be Developed for Recreation</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.5.2: Area for Water Storage &amp; Recharge Facility</b>	
Area (Ha)	Area (Ha)
0.00	0.00
<b>5.2.5.3: Efforts Made towards Housing for Local Communities</b>	
Number of Houses	Number of Houses
0	0
<b>5.2.5.4: Efforts Made towards Providing Transport to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10
<b>5.2.5.5: Efforts Made towards Providing Healthcare to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
10	10
<b>5.2.5.6: Efforts Made towards Providing Hygiene &amp; Sanitation to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
5	5
<b>5.2.5.7: Efforts Made towards Skill Development Programs to Local Communities</b>	
Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.5.8: Efforts Made to Promote Education & Knowledge Based Initiatives**

Number of Beneficiaries	Number of Beneficiaries
5	5

**5.2.5.9: Communication Facilities Provided to Local Communities**

Number of Beneficiaries	Number of Beneficiaries
0	0

**5.2.5.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities**

Number of Beneficiaries	Number of Beneficiaries
2	2

**5.2.5.11: Adoption of ODF**

Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	0	0

**5.2.5.12: Awareness Program among Mine Workers for Swatchata**

Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
1	1

**5.2.5.13: Efforts for green energy**

Total energy consumption (KWh)	Green energy consumption (% of total)
0.00	0.00

**5.2.5.14: Water & recycled use**

Total water consumption (KLD)	Water recycled (% of total)
0.00	0.00

**5.3: Rehabilitation & Resettlement of Affected Persons**

Particular	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
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Proposed Number of Project Affected Persons(PAP)	0	0	0	0	0
Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood	0	0	0	0	0
Proposed Number of Person for Skill Training	0	0	0	0	0
Proposed Number of Person Likely to get Direct Employment	0	0	0	0	0
Proposed Number of Person Likely to get Indirect Employment	0	0	0	0	0
Proposed Project Affected Families Skilled and Absorbed	0	0	0	0	0
Proposed Number of Project Affected Families	0	0	0	0	0

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## Chapter 6: Progressive Mine Closure Plan

### 6.1: Status of Land

Total Area Degraded				Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated		
Total area under excavation in the lease		Area under Dumps(in hect)	Area under utility services(in hect)	Area under Stack yards(in hect)	Mined out Area Reclaimed but not rehabilitated(in hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabilized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)
Area under mining operation	Mined Out area in the lease								
0.05	0.05	0.00	0.01	0.00	0.00	0.00	0.00	2.40	

### 6.2: Progressive Reclamation and Rehabilitation Plan

#### 6.2.1: Backfilling

Quantity of Waste / Fill Material Available at Site (m <sup>3</sup> )	0.00
Availability of Top Soil for Spreading (m <sup>3</sup> )	0.00
Proposed Spread Area (m <sup>2</sup> )	0.00

#### 6.2.1.1: Year Wise Proposal

SI.No	Year	Pit ID	Area (m <sup>2</sup> )	Top RL	Bottom RL	Estimated Expenditure (₹ INR)
1	2023-2024	0	0.00	0	0	0.00
2	2024-2025	0	0.00	0	0	0.00
3	2025-2026	0	0.00	0	0	0.00

4	2026-2027	0	0.00	0	0	0.00
5	2027-2028	0	0.00	0	0	0.00

**6.2.2: Water Reservoir**

Average Rainfall of The Area (mm)	849.00
Proposed Area under Water Storage	0

**6.2.2.1: Preparations For Ground Water Recharging**

<b>6.2.2.1.1: Drilling Holes</b>	
Year	Proposed no of Holes to be Drilled
2023-2024	0.00
2024-2025	0.00
2025-2026	0.00
2026-2027	0.00
2027-2028	0.00

<b>6.2.2.1.2:Preparation of Course Gravel Bed</b>	
Year	Proposed Area of Bed (LxW)
2023-2024	0.00
2024-2025	0.00
2025-2026	0.00
2026-2027	0.00
2027-2028	0.00

Please specify, if others

As the Mineral will not be completely mined during the plan period, the water storage during the plan period is not envisaged. However at the end of the mine life, the pit will be covered into a water storage reservoir which will help in recharge of groundwater

**6.2.2.2: Protective measures (Please specify running meter)**

<b>6.2.2.2.1: Fencing</b>					
Year	Proposed Fencing Length (m)	Latitude(dd:mm:ss.ss)		Longitude(dd:mm:ss.ss)	
		From	To	From	To
2023-2024	200	10:02:58.85	77:51:10.35	10:03:02.38	77:51:04.84
2024-2025	180	10:03:02.38	77:51:04.84	10:02:59.02	77:51:02.38
2025-2026	180	10:02:59.02	77:51:02.38	10:02:56.37	77:51:07.64
2026-2027	200	10:02:56.37	77:51:07.64	10:02:54.58	77:51:07.82
2027-2028	200	10:02:54.58	77:51:07.82	10:02:58.85	77:51:10.35

<b>6.2.2.2.2: Retaining Wall</b>					
Year	Proposed Wall Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
2023-2024	25	10:02:57.44	77:51:08.46	00:00:00.00	00:00:00.00
2024-2025	45	10:02:56.72	77:51:08.09	10:02:55.55	77:51:07.21
2025-2026	23	10:02:55.55	77:51:07.21	10:02:54.83	77:51:07.55
2026-2027	47	10:02:54.83	77:51:07.55	10:02:55.98	77:51:08.60
2027-2028	Nil	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00

<b>6.2.2.2.3: Garland Drains</b>					
Year	Proposed Bund Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
2023-2024	200	10:02:58.85	77:51:10.35	10:03:02.38	77:51:04.84
2024-2025	180	10:03:02.38	77:51:04.84	10:02:59.02	77:51:02.38
2025-2026	180	10:02:59.02	77:51:02.38	10:02:56.37	77:51:07.64
2026-2027	200	10:02:56.37	77:51:07.64	10:02:54.58	77:51:07.82

2027-2028	200	10:02:54.58	77:51:07.82	10:02:58.85	77:51:10.35
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### 6.2.3: Green Belt Development

#### 6.2.3.1: Cumulative work done (upto end of previous block of five years)

SI.No	Total Expenditure Incurred up to Last Year (INR)	Area Covered (Ha)	Number of Plants	Survival Rate (%)
1	20000.00	1.00	30	80.00

#### 6.2.3.2: Year Wise Proposal

SI.No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (₹ INR)
1	2023-2024	NorthEast	0.12	30	80	20000
2	2024-2025	NorthWest	0.12	30	80	20000
3	2025-2026	West	0.12	30	80	20000
4	2026-2027	SothWest	0.12	30	80	20000
5	2027-2028	South	0.12	30	80	20000

### 6.2.4: Use of Shallow Pits

#### 6.2.4.1: Cumulative Work Done (upto end of previous block of five years)

SI.No	Pit ID	Work Done	Area covered (m <sup>2</sup> )	Total Expenditure Incurred (up to last five year block) (₹ INR)
1	0	0	0.00	0.00



**6.2.4.2: Year Wise Proposal**

Sl.No	Year	Pit ID	Total Area(Ha)	Area Proposed for Crops (Ha)	Suitable Crops	Area Proposed for Grass (Ha)	Total Proposed Expenditure (₹ INR)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remarks
								From	To	From	To	
1	Nil	0	0.00	0.00	0	0.00	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0

**6.2.5: Pisciculture**

<b>6.2.5.1: Total Expenditure incurred as on Date (INR)</b>	0
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**6.2.5.2: Cumulative work done as on Date**

Sl.No	Pit ID	Area (m <sup>2</sup> )	Expenditure (₹ INR)
1	0	0.00	0.00

**6.2.5.3: Year Wise Proposal**

Sl.No	Year	Pit ID	Area (m <sup>2</sup> )	Estimated Expenditure (₹ INR)
1	Nil	0	0.00	0.00

<b>6.2.5.4: Source of Water for Pisciculture</b>	NA
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<b>6.2.5.5: Whether the quality of water has been assessed &amp; found to be suitable for Pisciculture</b>	Yes
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**6.2.6: Recreational Facility**

<b>6.2.6.1: Total Expenditure Incurred (up to last five year block) (INR)</b>	0.00
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**6.2.6.2: Cumulative work done as on Date**

SI.No	Pit ID	Area (m <sup>2</sup> )	Expenditure (₹ INR)
1	0	0.00	0.00

**6.2.6.3: Year Wise Proposal**

SI.No	Year	Type of Recreational Facility	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Estimated Expenditure (INR)
				From	To	From	To	
1	2023-2024	0	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00
2	2024-2025	0	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00
3	2025-2026	0	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00
4	2026-2027	0	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00
5	2027-2028	0	0.00	00:00:00.00	00:00:00.00	00:00:00.00	00:00:00.00	0.00

**6.2.7: Dump Area Stabilization & Development**

SI.No	Year	Dump ID	No of Terraces	Average Height of Terraces (m)	Length of Toe Wall (m)	Length of Garland Drain (m)	Area Stabilized (Ha)	Method of Stabilization	Estimated Expenditure (₹ INR)	No of Check Dams
1	2023-2024	1	1	2.15	30.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
2	2023-2024	2	1	1.68	40.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom	2500.00	1

								and proper terracing & Slopping and garland drain with silt trap near the retaining wall		
3	2024-2025	1	1	3.00	30.00	30.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
4	2024-2025	2	1	5.00	40.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
5	2025-2026	1	1	8.50	30.00	30.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the	2500.00	1

								retaining wall		
6	2025-2026	2	1	12.50	40.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
7	2026-2027	1	1	11.07	30.00	30.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
8	2026-2027	2	1	17.23	40.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1
9	2027-2028	1	1	13.56	30.00	30.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper	2500.00	1

								terracing & Slopping and garland drain with silt trap near the retaining wall		
10	2027-2028	2	1	28.53	40.00	40.00	0.05	Afforestation on the dump, retaining wall on the bottom and proper terracing & Slopping and garland drain with silt trap near the retaining wall	2500.00	1

#### 6.2.8: Other Form of Reclaiming the Area

##### 6.2.8.1: Cumulative work done as on Date

Sl.No	Total Expenditure incurred as on Date (INR)	Work Done
1	0.00	0

##### 6.2.8.2: Year Wise Proposal

Sl.No	Year	Work Proposals	Estimated Expenditure (INR)
1	2023-2024	0	0.00
2	2024-2025	0	0.00
3	2025-2026	0	0.00
4	2026-2027	0	0.00
5	2027-2028	0	0.00

**6.2.9: TopSoil Management****6.2.9.1: Cummulative Work Done as on Date**

SI.No	Top Soil Generated (m <sup>3</sup> )	Top Soil Utilized (m <sup>3</sup> )	Topsoil Stored (m <sup>3</sup> )	Total expenditure incurred as on date (₹)
1	0.00	0.00	0.00	0.00

**6.2.9.2: Year Wise Proposal**

SI.No	Year	Topsoil Generated (m <sup>3</sup> ) (A)	Topsoil Utilized (m <sup>3</sup> ) (B)	Topsoil Stored (m <sup>3</sup> ) (A-B)	Estimated Expenditure (INR)
1	2023-2024	12885.00	0.00	12885.00	5000.00
2	2024-2025	2775.00	0.00	2775.00	5000.00
3	2025-2026	10200.00	0.00	10200.00	5000.00
4	2026-2027	0.00	0.00	0.00	0.00
5	2027-2028	0.00	0.00	0.00	0.00

**6.2.10: Tailings Dam Management**

SI.No	Year	Yearly generation of Tailing (m <sup>3</sup> ) (A)	Total capacity of Tailing Pond (m <sup>3</sup> )	Measures Proposed for Periodic Desilting	Yearly Utilization of Tailing (m <sup>3</sup> ) (B)	Disposal of Tailing to Tailing Pond (m <sup>3</sup> ) (A-B)	Tailing Dam Design	Structural Stability Studies
1	2023-2024	0.00	0.00	0	0.00	0.00	Nil	<a href="#">NOT.pdf</a>
2	2024-2025	0.00	0.00	0	0.00	0.00	Nil	<a href="#">NOT.pdf</a>
3	2025-2026	0.00	0.00	0	0.00	0.00	Nil	<a href="#">NOT.pdf</a>
4	2026-2027	0.00	0.00	0	0.00	0.00	Nil	<a href="#">NOT.pdf</a>
5	2027-2028	0.00	0.00	0	0.00	0.00	Nil	<a href="#">NOT.pdf</a>

**6.2.11: Land Use of Lease Area at the Expiry of Lease Period**

Total Area Degraded				Non Degraded area	Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated			
Mined Out area in the lease	Area under Dumps(in hect)	Area under the Tailing Dam	Area under utility services(in hect)	Area undisturbed/virgin	Mined out Area Reclaimed but not rehabilitated(in hect)	Mined out Area fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabilized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)	Rehabilitated Area under utility services(in hect)	Rehabilitated Area under Tailing dam (in hect)
1.8820	0.41	0.00	0.01	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Approved

### Chapter 7: Financial Assurance/ Performance Surety (AREA PUT TO USE)

**2023-2024**

Consolidated View of Financial Assurance

Sl.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	0.05	0.27	0.32
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	0.00	0.41	0.41
4	Mineral Storage	0.00	0.00	0.00
5	Infrastructure (Workshop, Administrative Building etc.)	0.01	0.00	0.01
6	Roads	0.02	0.01	0.03
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.00	0.00
	Total	0.08	0.69	0.77

**2024-2025**

Consolidated View of Financial Assurance



SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	0.32	0.43	0.75
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	0.41	0.00	0.41
4	Mineral Storage	0.00	0.00	0.00
5	Infrastructure (Workshop, Administrative Building etc.)	0.01	0.00	0.01
6	Roads	0.03	0.00	0.03
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.00	0.00
	Total	0.77	0.43	1.20

**2025-2026**

## Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	0.75	0.40	1.15
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	0.41	0.00	0.41
4	Mineral Storage	0.00	0.00	0.00
5	Infrastructure (Workshop, Administrative Building etc.)	0.01	0.00	0.01

6	Roads	0.03	0.00	0.03
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.00	0.00
	Total	1.20	0.40	1.60

**2026-2027**

## Consolidated View of Financial Assurance

Sl.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	1.15	0.25	1.40
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	0.41	0.00	0.41
4	Mineral Storage	0.00	0.00	0.00
5	Infrastructure (Workshop, Administrative Building etc.)	0.01	0.00	0.01
6	Roads	0.03	0.00	0.03
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.00	0.00
	Total	1.60	0.25	1.85

2027-2028

## Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	1.40	0.20	1.60
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	0.41	0.00	0.41
4	Mineral Storage	0.00	0.00	0.00
5	Infrastructure (Workshop, Administrative Building etc.)	0.01	0.00	0.01
6	Roads	0.03	0.00	0.03
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.00	0.00
	Total	1.85	0.20	2.05
	Grand Total			2.05

Financial Assurance

## Financial Assurance

## Category A Mining Lease

Total Area Proposed to be put to use in	Amount of Bank Gurantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Gurantee as attachment
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hect(Year 1 to 5)			
2.05	10.25	01/02/2028	<u>Bank Guarentee Rs 1025000.pdf</u>

**Category B Mining Lease**

SI.No	Total Area Proposed to be put to use in hect(Year 1 to 5)	Amount of Bank Gurantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Gurantee as attachment
1	Nil	Nil	Nil	Nil

Approved

## Chapter 8: Review of Previous Proposals (Not applicable for fresh grant)

### 8.1: General

#### 8.1.1: Lease Area Utilization

Sl. No.	Type of land use (in ha)	Area at the beginning of the proposal period	Area proposed under activity	Actual Area utilized in the proposal period	Deviation	Reasons for deviation
1	Mining	0.05	0.24	0.05	0	Since no mining Carried out during last plan period, No deviation from the proposal
2	Mineral storage	0.00	0.00	0.00	0	Since no mining Carried out during last plan period, No deviation from the proposal
3	Mineral Beneficiation plant	0.00	0.00	0.00	0	0
4	Township	0.00	0.00	0.00	0	0
5	Tailing Pond	0.00	0.00	0.00	0	0
6	Railways	0.00	0.00	0.00	0	0
7	Roads	0.02	0.03	0.02	0	Since no mining Carried out during last plan period, No deviation from the proposal
8	Infrastructure (Workshop, administrative building etc.)	0.01	0.01	0.01	0	Since no mining Carried out during last plan period, No deviation from the proposal

9	OB/waste dump	0.00	0.36	0.00	0	Since no mining Carried out during last plan period, No deviation from the proposal
10	Top soil preservation	0.00	0.59	0.00	0	Since no mining Carried out during last plan period, No deviation from the proposal
11	Others	0.00	0.59	0.59	0	0
12	Total area put to use	0.08	1.82	0.75	0	Since no mining Carried out during last plan period, No deviation from the proposal
13	Excavated area reclaimed	0.00	0.00	0.00	0	0
14	Waste dump area reclaimed	0.00	0.00	0.00	0	0
15	Undisturbed Area	2.99	1.25	2.32	0	Since no mining Carried out during last plan period, No deviation from the proposal
	Total	3.07	3.07	3.07	0	

### 8.1.2: SDF and CSR Expenditures

Activity	Proposals		Achievement	Deviation	Reasons for deviation
Total expenditure incurred for implementation of SDF at mine level including - Environment Protection - CSR & other welfare activities in peripheral area (Explanation: Expenditure is not over and above the statutory levies imposed by the Government; However, THIS	10% of Royalty (a)	Total Expenditure for SDF implementation (b)			

EXCLUDES CONTRIBUTION TO DMF & NMET and is over and above the statutory levies imposed by the Government.)					
CSR (Corporate Social Responsibility) spending at the mine level in Proposal Period (as per Companies Act, 2013 or otherwise)	25000.00	0.00	25000.00	Nil	Mines is not in operation due to absence of EC

## 8.2: Technical Details

### 8.2.1: Exploration

Particulars	Proposals			Achievement			Deviation			Reasons for deviation
	Boreholes	Pits	Trenchs	Boreholes	Pits	Trenchs	Boreholes	Pits	Trenchs	
Number of Boreholes/ Pits/ Trenches	7	0	0	3	Nil	Nil	-4	Nil	Nil	Mines is not in operation due to absence of EC
Boreholes Meterage (If Boreholes selected in first row) (m)	140			90			-50			Mines is not in operation due to absence of EC
Grid	50			50			0			NA
G Axis upgradation during Proposal Period as per guidelines of MEMC Rule 2015)	0			0			0			0
Area converted under G1 from	3.07			3.07			0			NA

G2/G3			
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**8.2.2: Mine Development (Opencast/ Underground/ Both/ Dump Mining)**

Particulars	Proposals	Actual	Deviation	Reasons for deviation
8.2.2.1: Generation of Ore/Waste While Development				
Ore	3123	0	-10410	Mines is not in operation due to absence of EC
Waste	22050	0	-22050	Mines is not in operation due to absence of EC
Generated Waste while ROM recovery	7287	0	-7287	Mines is not in operation due to absence of EC
Dumping Site (For Surface)	0.36	0	-0.36	Mines is not in operation due to absence of EC
Removal of waste/ over burden in cubic meters	8820	0	Nil	Mines is not in operation due to absence of EC
8.2.2.2: Excavation				
Lateral extent	0.24	0.05	0.19	Mines is not in operation due to absence of EC
Vertical extent	0	0	0	NA

**8.2.3: Mining operation: Dump Mining**

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Handling of Material	0	0	0	0
Waste Generated post recovery	0	0	0	0
Dumping site for waste	0	0	00	0

**8.2.4: Zero Waste Mining**

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Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Alternative use / Disposal of Waste Generated (excluding top soil)	0.00	0.00	0.00	0

**8.2.5: Backfilling**

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Site (Co-ordinates)	0	0	0	NA
Area	0	0	0	NA
Depth	0	0	0	NA
Volume Backfilled (CuM)	0	0	0	NA
Backfilled Area available for Reclamation and Rehabilitation	0	0	0	NA
Backfilled Area Reclaimed and Rehabilitated	0	0	0	NA
Balance Backfilled Area	0	0	0	NA

**8.2.6: Production of Mineral(s)**

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
8.2.6.1: ROM				
Opencast	3123.0000	0.0000	Nil	Mines is not in operation due to absence of EC
8.2.6.2: Cleaned Ore				
Opencast	0.0000	0.0000	0.0000	NA
Dump Mining	0.0000	0.0000	0.0000	NA
Recovery from Mineral Rejects or Tailings	0.0000	0.0000	0.0000	NA
Total	0.0000	0.0000	0.0000	NA

**8.2.7: Handling of Mineral Rejects/ Sub-Grade**

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Generation of mineral rejects				
Opencast	7287	0	Nil	NA
Dump Mining	0	0	0	NA
Other recovery	0	0	0	NA
Stacking of mineral rejects/ sub-grade mineral (Dump Id)	0	0	0	NA
Blending of mineral reject / sub-grade	0	0	0	NA

**8.2.8: Environment Compliances**

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
<b>8.2.8.1: Top soil</b>				
Generation	7287	0	Nil	Mines is not in operation due to absence of EC
Utilization	0	0	0	NA
Stacking (Dump Id)	0	0	0	NA
Reclamation	0	0	0	NA
Rehabilitation	0	0	0	NA
<b>8.2.8.2: Afforestation (Dumps/Benches/Backfilled Area etc.)</b>				
2018 - 2019	30	0	-30	Mines is not in operation due to absence of EC
2019 - 2020	30	0	-30	Mines is not in operation due to absence of EC

2020 - 2021	30	0	-30	Mines is not in operation due to absence of EC
2021 - 2022	30	0	-30	Mines is not in operation due to absence of EC
2022 - 2023	30	0	-30	Mines is not in operation due to absence of EC
<b>8.2.8.3: Afforestation (Green Belt)</b>				
2018 - 2019	30	10	-20	Mines is not in operation due to absence of EC
2019 - 2020	30	10	-20	Mines is not in operation due to absence of EC
2020 - 2021	30	10	-20	Mines is not in operation due to absence of EC
2021 - 2022	30	10	-20	Mines is not in operation due to absence of EC
2022 - 2023	30	10	-20	Mines is not in operation due to absence of EC
Construction of check dams	0	0	0	NA
Construction of Garland Drain (in meter)	0	0	0	NA
Construction of Retaining Walls (in meter)	0	0	0	NA
<b>8.2.8.4: Tailings</b>				
Generation	0	0	0	NA
Utilization	0	0	0	NA
Disposal	0	0	0	NA

### 8.3: Socio-Economic Review

#### 8.3.1: Rehabilitation & Resettlement for Project Affected People

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
No. of Project Affected People (PAP)	0.0000	0.0000	0.0000	NA
%age of PAP for whom alternate arrangements made for sustained livelihood	0.0000	0.0000	0.0000	NA
% of project affected families given employment	0.0000	0.0000	0.0000	0
% of project affected families who have been skilled by the lessee and absorbed (% of total employment given to affected families)	0.0000	0.0000	0.0000	NA

**8.3.2 : Grievance Redressal**

Grievances Received	2018 - 2019	2019 - 2020	2020 - 2021	2021 - 2022	2022 - 2023
	Nil	Nil	Nil	Nil	Nil
Grievances Redressed	Nil	Nil	Nil	Nil	Nil

**8.3.3: Welfare and socio-economic development programs for local communities**

Particulars	2018 - 2019	2019 - 2020	2020 - 2021	2021 - 2022	2022 - 2023
<b>8.3.3.1 Support for Drinking Water &amp; Agriculture</b>					
No. of Water Storage Tanks constructed	0	0	0	0	0
Drinking Water Facilities provided (Bore wells/ Pumps etc.)	1	0	0	0	0
Irrigation Support provided (Canals/ Pumps etc.)	0	0	0	0	0
No. of Water tanks De-silted	1	0	0	0	0

Water Treatment facilities provided (A/NA)	0	0	0	0	0
Amount of Water treated (in kL) (if selected A in above)	0	0	0	0	0
<b>8.3.3.2 Support to Health &amp; Medical Services</b>					
No. of persons identified from Occupational health diseases	2	0	0	0	0
No. of Health Camps/ Medicine Camps Organized	0	0	0	0	0
<b>8.3.3.3 Support to Skill development &amp; Education</b>					
Vocational Training Provided/ Support Provided					
No. of employees undergone Vocational training	0	0	0	0	0
No. of other persons undergone Vocational training	0	0	0	0	0
Number of Literacy & Education Camps held/ Supported	0	0	0	0	0
<b>8.3.3.4 Support to Transportation Services &amp; Infrastructure</b>					
Expenditure on Transportation Services & Infrastructure	1	0	0	0	0
Road development (m) in the peripheral area (not lease area)	0	0	0	0	0
No. of Public transport support provided (Ambulance/Buses/ School Vans etc)	0	0	0	0	0
<b>8.3.3.5 Swatchata Programs: Creating/providing sanitation and healthy condition in and around the mine area</b>					
Adoption of ODF within mining lease area					
No. of Toilets built in the Lease Area	2	0	0	0	0
Adoption of ODF in nearby villages					

No. Of Toilets built in the villages	0	0	0	0	0
Provision for greenage recreational facility (Within Lease Area/ Outside)					
Recreational Area Type (Picnic Spot/ tracks/Park Etc)	0	0	0	0	0
Area covered (For within Lease Area only)	0	0	0	0	0
Awareness program among Mine workers for Swatchata					
No. of Swatchchta Programmes held	0	0	0	0	0

Approved

# Chapter 9 : Impact Assessment (NA)

Approved

## Chapter 10: Annexures

### 1. Upload Document

#### 1.1 Upload Document

Sl.No.	Title	Is Upload	Document (only pdf allowed)
1	Letter of Intent /Letter of lease grant	Nil	<a href="#">Government_Order.pdf</a>
2	Copy of lease deed executed	Nil	<a href="#">Lease_deed_thiraviam.pdf</a>
3	Copy of Declaration of Owner/Nominated Owner in case of Company/partnership firm	Nil	<a href="#">NOT.pdf</a>
4	ID & Address Proof of Owner/ Nominated Owner	Nil	<a href="#">Thiraviyam_pan_card.pdf</a>
5	Copy of Environment and Forest Clearance, Consent to Establish, Consent to Operate	Nil	<a href="#">NOT.pdf</a>
6	Copy of Registration of Company (RoC)/Partnership firm (Registration) & Deed	Nil	<a href="#">Thiraviam_minnarals_certificate.pdf</a>
7	Consent letter for Qualified Person	Nil	<a href="#">QP_Certificate_(2).pdf</a>
8	Experience & Qualification Details of Qualified Person	Nil	<a href="#">QP_SURESH.pdf</a>
9	Certificate from QP	Nil	<a href="#">QP_Certificate_(2).pdf</a>
10	Copy of Bank Guarantee	Nil	<a href="#">Bank_Guarentee_Rs_1025000.pdf</a>
11	Copy of Performance Surety	Nil	<a href="#">NOT.pdf</a>
12	Copy of MDPA (as applicable)	Nil	<a href="#">NOT.pdf</a>
13	Exploration details	Nil	<a href="#">Log_Sheet_thiraviyam.pdf</a>
14	Copy of feasibility Report	Nil	<a href="#">Feasibility_Report.pdf</a>
15	Copy of Study reports conducted as per Para	Nil	<a href="#">Geo_Physical_Survey_Report_Final.pdf</a>



	4.3.1		
16	Chemical and Mineralogical analysis report	Nil	<u>Chemical analysis Thiraviam.pdf</u>
17	Any other Report or Certification as required in the submitted Document.	Nil	<u>Additional files-State govt letter-Penalty receipt-Proposed bore holes.pdf</u>
18	Copy of Scale relaxation approval granted(if applicable)	No	Nil
19	Mineral processing flowsheet with stage wise recovery	Nil	<u>NOT.pdf</u>
20	Any Other	Yes	<u>Consent_from_applicant.pdf</u>

Approved

## Chapter 11: Plates (OC)

### 1. Upload Document

#### 1.1 Upload Document

S.N.	Title	Is Upload	Document
1	Lease sketch plan;	Nil	<u>MINE LEASE PLAN.pdf</u>
2	Surface Plan (.KMZ format)(Georeferenced); A statutory plan as per MCDR, 2017. The Plan should be submitted showing different color codes for:(1) Active Pits & Excavation area(2) Excavated area reclaimed & rehabilitated (3)Active dumps (4) Stabilized & rehabilitated dump area , (5) Green belt (6) Mineral Stacks (7) Utilities such as plant, buildings etc (8) Lease boundary along with other details.)	Nil	<u>Surface_Plan.kmz</u>
3	Surface Geological Plan of the lease (.KMZ format)(Georeferenced); The Plan should be submitted showing different color codes for : (1) Lithological/Geological Occurance (2) Area under G1,G2,G3 & G4 (3) Active pits & Excavation area (4) Dump Area (5) Mineral Stacks (6) Lease boundary along with other details.)	Nil	<u>Geological Plan.kmz</u>
4	Surface Geological sections (in Pdf format); Geological sections with different color coding depicting all the features shown in Surface Geological Plan. )	Nil	<u>CROSS SECTIONS OF GEOLOGICAL PLAN.pdf</u>
5	Five year Production and Development plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for: (1) Active Pit and Excavation area ,	Nil	<u>Production 2026-2028.kmz</u>

	(2) Year wise excavation proposal for year I to V (3) Active dump and yearwise dump proposal for year I to V (4) Year wise Dump working proposal for year I to V (6) Lease boundary (with reference to chapter 4) along with other details.)		
6	Five year Production and Development sections (in pdf format); Year wise excavation and dumping proposals with different color coding depicting all the features as shown in the Five year Production and development plan.)	Nil	<u>CROSS SECTION OF YEARWISE DEVELOPMENT AND PRODUCTION PLAN.pdf</u>
7	Progressive Mine Closure Plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for : (1) Yearwise excavated area Reclaimed & rehabilitated for year I to V (2) Year wise dump area to be stabilized and dump area to be rehabilitated for year I to V (3) Year wise Green area proposed from year I to V.(4) Any other reclamation and rehabilitation measures proposed.(5) Lease boundary ( with reference to chapter 6) along with other details.)	Nil	<u>Financial_Assurance_Plan.kmz</u>
8	Progressive mine Closure sections (in pdf format); Year wise Progressive mine closure sections showing all the yearwise reclamation, rehabilitation proposals as depicted in the Progressive mine closure plan.)	Nil	<u>11- CROSS SECTIONS OF ULTIMATE PIT LIMIT.pdf</u>
9	Conceptual Plan (.KMZ format)(Georeferenced); The Plan should depict the status of lease area as envisaged at the end of life of Mine showing all the details. Status of land use shall be depicted by different color coding.)	Nil	<u>Conceptual Mining Plan.kmz</u>
10	Conceptual Sections (pdf) format;	Nil	<u>11- CROSS SECTIONS OF ULTIMATE PIT LIMIT.pdf</u>
11	Geo referenced Cadastral Plan; Duly certified by the State Government)	Nil	Nil

12	Financial Assurance Plan (KMZ);	Nil	<u>Financial_Assurance_Plan.kmz</u>
13	Environmental Plan (.KMZ format)(Georeferenced); As per MCDR, 2017 indicating all the details.)	Nil	<u>Environment_Plan.kmz</u>
14	Any other plan/section as deemed necessary by approving authority;	Yes	<u>All_Plates_Thiraviam.pdf</u>
15	Five Year Production and Development sections (in pdf format);	Yes	<u>CROSS_SECTION_OF_YEARWISE_DEVELOPMENT_AND_PRODUCTION_PLAN.pdf</u>
16	LEVEL WISE SLICE PLAN; LEVEL WISE SLICE PLAN (PDF FORMAT IN VISIBLE SCALE))	No	Nil

Approved

# Chapter 11 : Plates(UG) : NA

Approved

Esigned by: RO  
Date: 30/08/2023 03:32:13 PM

## Department of Geology and Mining

Roc. No. 1123/2015 – Mines

Department of Geology and Mining,  
Collectorate,  
Madurai.

Dated. 06.12.2017

**Memo**

Sub: Mines and Minerals - Madurai District – Lime Stone mining lease granted to Tmt. B. Thiraviam in S.F. No. 132/1 & 132/3 of Panamooppanpatti Village, Usilampatti Taluk – over an extent of 3.07.0 Hectares - Reg

Ref: 1. G.O 3(D) No.124 Industries (MMD2) Department dated 31.07.1997

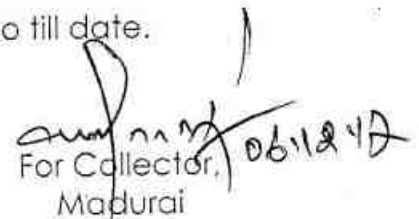
2. Tmt.B.Thiraviam, Usilampatti representation dated 25.10.2017. Received in this office on 25.10.2017

\*\*\*\*\*

A mining lease has been granted to Tmt. B. Thiraviam for mining Limestone in S.F. No. 132/1 & 132/3 over an extent of 3.07.0 hecets of Panamooppanpatti village Usilampatti taluk, Madurai District.

In the reference 2<sup>nd</sup> cited above, Tmt. B. Thiraviam has requested to inform the issueance of last date of transport permit in respect of the above said Mine.

In this connection it is informed that, on verification of this office record it is revealed that, on request of the lessee Tmt. B. Thiraviam, the transport permit has been issued on 08.06.2015 to Tmt. B. Thiraviam for the transportation of 10 Metric Ton of Limestone mined from S.F. No. 132/1 & 132/3 over an extent of 3.07.0 hecets of Panamooppanpatti village Usilampatti taluk, Madurai District. Further it is informed that, the lessee has not applied for transport permit for transport limestone from 09.06.2015 to till date.

  
For Collector, Madurai

To,  
Tmt. B. Thiraviam,  
W/o. Bose,  
15/22A, Kavandampatti Road,  
Usilampatti, Madurai District.

  
06/12/17

## POPULATION BREAKUP &amp; LITERACY LEVEL IN THE BUFFER ZONE

Sl.No	No. of Villages	Name of village	Rural / urban	HOUSE HOLDS	POPULATION			POPULATION BELOW 6 AGE GROUP			SCHEDULE CASTE			SCHEDULE TRIBE			LITRERATES			ILLITRERATES		
					TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F. MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE
<b>0-2 km, Usilampatti Sub-District, Madurai District</b>																						
1	1	Kalluthu	Rural	1236	4605	2416	2189	494	281	213	249	128	121	0	0	0	3109	1818	1291	1496	598	898
2	2	Panamooanpatti	Rural	517	1950	984	966	222	108	114	77	34	43	0	0	0	1110	656	454	840	328	512
3	3	Eravarpatti	Rural	657	2459	1228	1231	288	154	134	56	21	35	0	0	0	1263	737	526	1196	491	705
		<b>Total (A)</b>		<b>2410</b>	<b>9014</b>	<b>4628</b>	<b>4386</b>	<b>1004</b>	<b>543</b>	<b>461</b>	<b>382</b>	<b>183</b>	<b>199</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5482</b>	<b>3211</b>	<b>2271</b>	<b>3532</b>	<b>1417</b>	<b>2115</b>
<b>2-5 km, Usilampatti Sub-District, Madurai District</b>																						
4	1	Sakkarappanaickanur	Rural	619	2507	1273	1234	259	126	133	149	79	70	0	0	0	1551	917	634	956	356	600
5	2	Thimmanatham	Rural	1311	4893	2557	2336	416	233	183	424	218	206	0	0	0	2964	1750	1214	1929	807	1122
6	3	Pappapatti	Rural	356	1359	748	611	117	66	51	407	213	194	0	0	0	963	617	346	396	131	265
<b>Vadipatti Sub-District, Madurai District</b>																						
7	1	Kovilkuruvithurai	Rural	364	1379	734	645	120	68	52	0	0	0	0	0	0	826	500	326	553	234	319
<b>Nilakkottai Sub-District, Dindigul District</b>																						
8	1	Sithargalnatham	Rural	1604	6372	3299	3073	647	321	326	1005	515	490	0	0	0	4136	2372	1764	2236	927	1309
9	2	Vilampatti	Rural	683	2589	1309	1280	265	137	128	543	264	279	0	0	0	1720	945	775	869	364	505
		<b>Total (B)</b>		<b>4937</b>	<b>19099</b>	<b>9920</b>	<b>9179</b>	<b>1824</b>	<b>951</b>	<b>873</b>	<b>2528</b>	<b>1289</b>	<b>1239</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12160</b>	<b>7101</b>	<b>5059</b>	<b>6939</b>	<b>2819</b>	<b>4120</b>
<b>5-10 km, Vadipatti Sub-District, Madurai District</b>																						
10	1	Katchiakatti	Rural	3350	13141	6552	6589	1319	669	650	5165	2533	2632	42	18	24	8223	4591	3632	4918	1961	2957
11	2	Karupatti	Rural	885	3399	1712	1687	361	184	177	1893	950	943	1	1	0	2419	1316	1103	980	396	584
12	3	Ayankurivithurai	Rural	448	1726	924	802	173	105	68	444	224	220	0	0	0	1151	670	481	575	254	321
13	4	Mannadimangalam	Rural	1838	7259	3662	3597	826	440	386	1780	884	896	840	425	415	4868	2664	2204	2391	998	1393
14	5	Irumbadi	Rural	1576	5845	2951	2894	567	292	275	742	368	374	4	2	2	3975	2214	1761	1870	737	1133
15	6	Mullipallam	Rural	2173	7903	3972	3931	803	416	387	1314	655	659	0	0	0	5606	3105	2501	2297	867	1430
<b>Usilampatti Sub-District, Madurai District</b>																						
16	1	Uthappanaickanur	Rural	1729	6879	3522	3357	775	400	375	493	244	249	0	0	0	4085	2339	1746	2794	1183	1611
17	2	Poduvarpatti	Rural	384	1244	615	629	132	70	62	263	130	133	0	0	0	695	402	293	549	213	336
18	3	Ayyanarkulam	Rural	837	2732	1392	1340	211	116	95	125	63	62	0	0	0	1632	987	645	1100	405	695
19	4	Vikkiramangalam	Rural	2129	7440	3840	3600	688	370	318	770	387	383	9	5	4	4964	2906	2058	2476	934	1542
20	5	Mudalaikulam	Rural	1427	5134	2624	2510	528	281	247	820	407	413	0	0	0	3016	1784	1232	2118	840	1278
21	6	Kodikulam	Rural	682	2380	1203	1177	227	109	118	236	121	115	0	0	0	1534	878	656	846	325	521
22	7	Vinnakudi	Rural	247	858	429	429	92	45	47	450	221	229	0	0	0	488	297	191	370	132	238
23	8	Kuruvakudi	Rural	553	1977	987	990	181	96	85	510	257	253	0	0	0	1301	700	601	676	287	389
24	9	Sadaichipatti	Rural	269	1059	546	513	135	73	62	209	109	100	0	0	0	621	353	268	438	193	245
25	10	Pudupatti (Anaiyur)	Rural	373	1375	695	680	114	57	57	336	174	162	0	0	0	803	481	322	572	214	358
26	11	Sirupatti	Rural	180	663	321	342	63	24	39	16	6	10	0	0	0	388	225	163	275	96	179
27	12	Keeripatti	Rural	465	1626	838	788	151	79	72	388	199	189	0	0	0	1090	639	451	536	199	337
28	13	Nadupatti	Rural	959	3506	1766	1740	354	188	166	312	157	155	0	0	0	2128	1234	894	1378	532	846
29	14	Meikkilarpatti	Rural	650	2407	1247	1160	288	156	132	370	185	185	0	0	0	1491	884	607	916	363	553
30	15	Boodipuram	Rural	573	2181	1112	1069	212	121	91	527	259	268	0	0	0	1396	829	567	785	283	502
31	16	Krishnapuram	Rural	77	262	137	125	17	9	8	0	0	0	0	0	0	172	108	64	90	29	61
32	17	Kattakaruppanpatti	Rural	295	1030	505	525	84	40	44	79	37	42	0	0	0	652	378	274	378	127	251
<b>Nilakkottai Sub-District, Dindigul District</b>																						
33	1	Kombaipatti	Rural	2210	8406	4223	4183	815	406	409	2174	1097	1077	1	1	0	5106	2898	2208	3300	1325	1975
34	2	Kullalagundu	Rural	1828	7200	3560	3640	810	366	444	3294	1624	1670	0	0	0	4773	2684	2089	2427	876	1551
35	3	Pallapatti	Rural	1959	7633	3853	3780	852	421	431	2139	1073	1066	0	0	0	4843	2777	2066	2790	1076	1714
36	4	Ethilodu	Rural	2496	9580	4815	4765	1019	514	505	2967	1461	1506	0	0	0	5962	3426	2536	3618	1389	2229
37	5	Koovanuthu	Rural	594	2419	1200	1219	319	166	153	1117	565	552	0	0	0	1459	818	641	960	382	578
38	6	Musuvanuthu	Rural	852	3545	1821	1724	398	213	185	918	474	444	0	0	0	2123	1217	906	1422	604	818
39	7	Bodiagoundanpatti	Rural	214	732	372	360	82	40	42	7	4	3	0	0	0	516	297	219	216	75	141
40	8	Sivagnanapuram	Rural	434	1721	888	833	167	86	81	928	474	454	0	0	0	1095	635	460	626	253	373
41	9	Sekkapatti	Rural	640	2463	1295	1168	209	104	105	63	51	12	0	0	0	1857	1075	782	606	220	386
42	10	Nadakottai	Rural	739	2682	1390	1292	312	180	132	613	318	295	0	0	0	1838	1059	779	844	331	513
43	11	Kullichettipatti	Rural	368	1380	694	686	125	63	62	498	245	253	0	0	0	1015	545	470	365	149	216

Sl.No	No. of Villages	Name of village	Rural / urban	HOUSE HOLDS	POPULATION			POPULATION BELOW 6 AGE GROUP			SCHEDULE CASTE			SCHEDULE TRIBE			LITRERATES			ILLITRERATES		
					TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F. MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE
44	12	Pillaiyarnatham	Rural	1698	6712	3422	3290	725	374	351	1898	970	928	1	0	1	4498	2536	1962	2214	886	1328
45	13	Mattapparai	Rural	1131	4360	2210	2150	489	254	235	1466	730	736	4	3	1	2872	1625	1247	1488	585	903
46	14	Kolladipatti	Rural	373	1311	632	679	114	54	60	474	230	244	0	0	0	921	492	429	390	140	250
47	15	Ramarajapuram	Rural	1307	4985	2521	2464	508	261	247	983	494	489	0	0	0	3355	1894	1461	1630	627	1003
48	16	Viralimayanpatti	Rural	685	2795	1475	1320	287	149	138	980	497	483	0	0	0	1934	1123	811	861	352	509
49	17	Viruveedu	Rural	1677	6459	3332	3127	733	388	345	897	473	424	4	1	3	4122	2345	1777	2337	987	1350
		<b>Total (C)</b>		<b>41304</b>	<b>156409</b>	<b>79255</b>	<b>77154</b>	<b>16265</b>	<b>8379</b>	<b>7886</b>	<b>38658</b>	<b>19350</b>	<b>19308</b>	<b>906</b>	<b>456</b>	<b>450</b>	<b>100987</b>	<b>57430</b>	<b>43557</b>	<b>55422</b>	<b>21825</b>	<b>33597</b>
		<b>Grand Total (A+B+C)</b>		<b>48651</b>	<b>184522</b>	<b>93803</b>	<b>90719</b>	<b>19093</b>	<b>9873</b>	<b>9220</b>	<b>41568</b>	<b>20822</b>	<b>20746</b>	<b>906</b>	<b>456</b>	<b>450</b>	<b>118629</b>	<b>67742</b>	<b>50887</b>	<b>65893</b>	<b>26061</b>	<b>39832</b>

\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011



**OCCUPATIONAL STRUCTURE IN THE BUFFER ZONE**

Sl.No	No. of Villages	Name of village	Rural / urban	MAIN WORKERS		CULTIVATORS		AGRI LABOURS		HOUSE HOLD		OTHERS		MARGINAL WORKERS		NON WORKERS	
				MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE
<b>0-2 km, Usilampatti Sub-District, Madurai District</b>																	
1	1	Kalluthu	Rural	1088	731	233	164	684	516	18	9	153	42	427	508	901	950
2	2	Panamoopanpatti	Rural	541	433	274	197	216	209	1	3	50	24	49	61	394	472
3	3	Eravarpatti	Rural	718	546	216	112	455	403	3	0	44	31	23	199	487	486
<b>Total (A)</b>				<b>2347</b>	<b>1710</b>	<b>723</b>	<b>473</b>	<b>1355</b>	<b>1128</b>	<b>22</b>	<b>12</b>	<b>247</b>	<b>97</b>	<b>499</b>	<b>768</b>	<b>1782</b>	<b>1908</b>
<b>2-5 km, Usilampatti Sub-District, Madurai District</b>																	
4	1	Sakkarappanaickanur	Rural	588	521	75	57	385	405	15	7	113	52	207	225	478	488
5	2	Thimmanatham	Rural	1365	1310	716	683	504	542	62	45	83	40	276	311	916	715
6	3	Pappapatti	Rural	322	316	149	150	89	95	2	9	82	62	72	100	354	195
<b>Vadipatti Sub-District, Madurai District</b>																	
7	1	Kovilkuruvithurai	Rural	401	251	3	4	324	228	12	4	62	15	53	140	280	254
<b>Nilakkottai Sub-District, Dindigul District</b>																	
8	1	Sithargalnatham	Rural	1505	890	349	172	696	515	24	35	436	168	580	700	1214	1483
9	2	Vilampatti	Rural	280	101	38	23	34	12	13	8	195	58	561	537	468	642
<b>Total (B)</b>				<b>4461</b>	<b>3389</b>	<b>1330</b>	<b>1089</b>	<b>2032</b>	<b>1797</b>	<b>128</b>	<b>108</b>	<b>971</b>	<b>395</b>	<b>1749</b>	<b>2013</b>	<b>3710</b>	<b>3777</b>
<b>5-10 km, Vadipatti Sub-District, Madurai District</b>																	
10	1	Katchiakatti	Rural	3951	3193	312	126	2227	2331	39	77	1373	659	115	128	2486	3268
11	2	Karupatti	Rural	957	576	118	27	574	495	7	7	258	47	32	35	723	1076
12	3	Ayankurivithurai	Rural	391	183	32	9	233	139	3	3	123	32	154	186	379	433
13	4	Mannadimangalam	Rural	1842	1156	196	40	1179	948	35	30	432	138	442	363	1378	2078
14	5	Irumbadi	Rural	1865	818	60	10	957	540	34	27	814	241	46	98	1040	1978
15	6	Mullipallam	Rural	2023	1362	234	115	952	910	22	30	815	307	326	228	1623	2341
<b>Usilampatti Sub-District, Madurai District</b>																	
16	1	Uthappanaickanur	Rural	1811	1233	530	83	825	1012	45	33	411	105	353	406	1358	1718
17	2	Poduvarpatti	Rural	370	428	84	44	218	357	2	3	66	24	50	54	195	147
18	3	Ayyanarkulam	Rural	713	654	319	321	240	284	6	9	148	40	213	211	466	475
19	4	Vikkiramangalam	Rural	1958	1465	275	138	922	1104	27	20	734	203	319	457	1563	1678
20	5	Mudalaikulam	Rural	1542	1400	316	296	883	985	34	30	309	89	147	229	935	881
21	6	Kodikulam	Rural	611	540	56	46	448	458	15	11	92	25	62	73	530	564
22	7	Vinnakudi	Rural	239	237	16	15	204	213	0	1	19	8	8	15	182	177
23	8	Kuruvakudi	Rural	269	116	31	8	146	67	15	5	77	36	187	306	531	568
24	9	Sadaichipatti	Rural	351	280	33	23	221	212	29	16	68	29	6	12	189	221
25	10	Pudupatti(Anaiyur)	Rural	379	365	120	37	214	303	11	3	34	22	99	113	217	202
26	11	Sirupatti	Rural	38	30	11	11	25	18	1	0	1	1	198	212	85	100
27	12	Keeripatti	Rural	455	480	141	155	146	219	4	1	164	105	36	47	347	261
28	13	Nadupatti	Rural	865	697	231	185	346	413	26	37	262	62	206	370	695	673
29	14	Meikkilarpatti	Rural	537	370	101	99	128	203	14	4	294	64	49	50	661	740
30	15	Boodipuram	Rural	452	433	40	24	388	391	1	0	23	18	243	276	417	360
31	16	Krishnapuram	Rural	67	58	54	47	2	4	1	4	10	3	8	30	62	37
32	17	Kattakaruppanpatti	Rural	312	303	103	7	153	289	0	1	56	6	8	10	185	212
<b>Nilakkottai Sub-District, Dindigul District</b>																	
33	1	Kombaipatti	Rural	1999	1342	244	132	1225	1058	43	36	487	116	596	747	1628	2094
34	2	Kullalagundu	Rural	1716	1002	141	69	886	740	26	23	663	170	462	583	1382	2055
35	3	Pallapatti	Rural	2058	1257	195	91	895	818	28	35	940	313	230	339	1565	2184
36	4	Ethilodu	Rural	2539	1910	567	339	1453	1369	33	37	486	165	407	516	1869	2339
37	5	Koovanuthu	Rural	638	475	102	86	356	319	4	5	176	65	121	162	441	582
38	6	Musuvanuthu	Rural	1051	896	223	168	596	649	22	18	210	61	78	79	692	749
39	7	Bodiagoundanpatti	Rural	197	26	30	3	117	19	0	1	50	3	35	167	140	167
40	8	Sivagnanapuram	Rural	394	322	36	32	309	256	2	3	47	31	162	145	332	366
41	9	Sekkapatti	Rural	537	94	56	14	314	50	3	2	164	28	143	489	615	585
42	10	Nadakottai	Rural	730	504	131	47	459	422	11	8	129	27	136	259	524	529

Sl.No	No. of Villages	Name of village	Rural / urban	MAIN WORKERS		CULTIVATORS		AGRI LABOURS		HOUSE HOLD		OTHERS		MARGINAL WORKERS		NON WORKERS	
				MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE
43	11	Kulichettipatti	Rural	441	351	48	27	292	275	4	5	97	44	22	50	231	285
44	12	Pillaiyarnatham	Rural	1586	637	252	112	508	353	91	33	735	139	446	562	1390	2091
45	13	Mattapparai	Rural	592	313	65	39	144	171	11	7	372	96	747	748	871	1089
46	14	Kolladipatti	Rural	223	149	20	14	121	96	9	3	73	36	155	138	254	392
47	15	Ramarajapuram	Rural	997	637	112	44	569	506	22	13	294	74	643	602	881	1225
48	16	Viralimayanpatti	Rural	918	842	542	224	341	599	0	0	35	19	8	5	549	473
49	17	Viruveedu	Rural	1946	1519	411	324	1168	1083	29	24	338	88	113	113	1273	1495
		<b>Total (C)</b>		<b>40560</b>	<b>28653</b>	<b>6588</b>	<b>3631</b>	<b>21384</b>	<b>20678</b>	<b>709</b>	<b>605</b>	<b>11879</b>	<b>3739</b>	<b>7811</b>	<b>9613</b>	<b>30884</b>	<b>38888</b>
		<b>Grand Total (A+B+C)</b>		<b>47368</b>	<b>33752</b>	<b>8641</b>	<b>5193</b>	<b>24771</b>	<b>23603</b>	<b>859</b>	<b>725</b>	<b>13097</b>	<b>4231</b>	<b>10059</b>	<b>12394</b>	<b>36376</b>	<b>44573</b>

\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011

**EDUCATIONAL FACILITIES IN THE STUDY AREA**

Sl.No	No. of Villages	Name of village	Educational Facilities (A(1)/NA(2))	Govt Pre - Primary School (Nursery/LKG/UKG) (Numbers)	Govt Primary School (Numbers)	Govt Middle School (Numbers)	Govt Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Govt Medicine College (Numbers)	Govt Management Institute (Numbers)	Govt Polytechnic (Numbers)	Govt Vocational Training School/ITI (Numbers)	Government Non Formal Training Centre (Numbers)	Government School For Disabled (Numbers)
<b>0-2 km,Usilampatti Sub-District, Madurai District</b>																
1	1	Kalluthu	1	6	6	2	1	0	0	0	0	0	0	0	1	0
2	2	Panamooanpatti	1	2	3	1	0	0	0	0	0	0	0	0	1	0
3	3	Eravarpatti	1	2	4	0	0	0	0	0	0	0	0	0	1	0
		<b>Total (A)</b>		<b>10</b>	<b>13</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>2-5 km,Usilampatti Sub-District, Madurai District</b>																
4	1	Sakkarappanaickanur	1	2	4	1	0	0	0	0	0	0	0	0	1	0
5	2	Thimmanatham	1	8	4	1	1	0	0	0	0	0	0	0	1	0
6	3	Pappapatti	1	2	2	1	1	1	0	0	0	0	0	0	1	0
<b>Vadipatti Sub-District, Madurai District</b>																
7	1	Kovilkuruvithurai	1	1	1	0	0	0	0	0	0	0	0	0	1	0
<b>Nilakkottai Sub-District, Dindigul District</b>																
8	1	Sithargalnatham	1	8	5	1	0	0	0	0	0	0	0	0	1	0
9	2	Vilampatti	1	2	3	1	1	0	0	0	0	0	0	0	1	0
		<b>Total (B)</b>		<b>23</b>	<b>19</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>
<b>5-10 km,Vadipatti Sub-District, Madurai District</b>																
10	1	Katchiakatti	1	12	10	3	0	0	0	0	0	0	0	0	1	0
11	2	Karupatti	1	4	4	1	1	0	0	0	0	0	0	0	1	0
12	3	Ayankurivithurai	1	2	0	0	0	0	0	0	0	0	0	0	0	0
13	4	Mannadimangalam	1	6	4	1	1	1	0	0	0	0	0	0	1	0
14	5	Irumbadi	1	4	1	1	1	0	0	0	0	0	0	0	1	0
15	6	Mullipallam	1	6	4	2	2	0	0	0	0	0	0	0	1	0
<b>Usilampatti Sub-District, Madurai District</b>																
16	1	Uthappanaickanur	1	9	10	4	1	1	0	0	0	0	0	0	1	0
17	2	Poduvarpatti	1	4	4	0	0	0	0	0	0	0	0	0	1	0
18	3	Ayyanarkulam	1	6	4	1	0	0	0	0	0	0	0	0	1	0
19	4	Vikkiramangalam	1	2	8	1	1	1	0	0	0	0	0	0	1	0
20	5	Mudalaikulam	1	8	6	1	0	0	0	0	0	0	0	0	1	0
21	6	Kodikulam	1	1	4	0	0	0	0	0	0	0	0	0	1	0
22	7	Vinnakudi	1	2	2	0	0	0	0	0	0	0	0	0	1	0
23	8	Kuruvakudi	1	2	2	2	0	0	0	0	0	0	0	0	1	0
24	9	Sadaichipatti	1	1	1	0	0	0	0	0	0	0	0	0	1	0
25	10	Pudupatti(Anaiyur)	1	1	2	1	0	0	0	0	0	0	0	0	1	0
26	11	Sirupatti	1	1	1	0	0	0	0	0	0	0	0	0	1	0
27	12	Keeripatti	1	2	2	1	0	0	0	0	0	0	0	0	1	0
28	13	Nadupatti	1	7	2	3	1	1	0	0	0	0	0	0	1	0
29	14	Meikkilarpatti	1	2	1	1	0	0	0	0	0	0	0	0	1	0
30	15	Boodipuram	1	3	2	0	0	0	0	0	0	0	0	0	1	0
31	16	Krishnapuram	1	1	1	0	0	0	0	0	0	0	0	0	1	0
32	17	Kattakaruppanpatti	1	1	2	1	0	0	0	0	0	0	0	0	1	0
<b>Nilakkottai Sub-District, Dindigul District</b>																
33	1	Kombaipatti	1	7	6	1	1	0	0	0	0	0	0	0	0	0
34	2	Kullalagundu	1	7	3	1	0	0	0	0	0	0	0	0	1	0
35	3	Pallapatti	1	5	2	1	1	1	0	0	0	0	0	0	0	0
36	4	Ethilodu	1	8	4	2	1	1	0	0	0	0	0	0	1	0
37	5	Koovanuthu	1	2	2	0	0	0	0	0	0	0	0	0	0	0
38	6	Musuvanuthu	1	3	3	1	0	0	0	0	0	0	0	0	0	0
39	7	Bodiagoundanpatti	1	1	1	0	0	0	0	0	0	0	0	0	0	0
40	8	Sivagnanapuram	1	2	2	0	0	0	0	0	0	0	0	0	0	0
41	9	Sekkapatti	1	2	2	1	1	0	0	0	0	0	0	0	1	0

Sl.No	No. of Villages	Name of village	Educational Facilities (A(1)/NA(2) )	Govt Pre - Primary School (Nursery/LKG/UKG) (Numbers)	Govt Primary School (Numbers)	Govt Middle School (Numbers)	Govt Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Govt Medicine College (Numbers)	Govt Management Institute (Numbers)	Govt Polytechnic (Numbers)	Govt Vocational Training School/ITI (Numbers)	Government Non Formal Training Centre (Numbers)	Government School For Disabled (Numbers)
42	10	Nadakottai	1	2	4	0	0	0	0	0	0	0	0	0	1	0
43	11	Kulichettipatti	1	2	2	1	0	0	0	0	0	0	0	0	1	0
44	12	Pillaiyarnatham	1	6	6	2	1	1	0	0	0	0	0	0	1	0
45	13	Mattapparai	1	4	3	1	1	0	0	0	0	0	0	0	1	0
46	14	Kolladipatti	1	1	1	0	0	0	0	0	0	0	0	0	1	0
47	15	Ramarajapuram	1	4	2	1	0	0	0	0	0	0	0	0	1	0
48	16	Viralimayanpatti	1	3	5	0	0	0	0	0	0	0	0	0	1	0
49	17	Viruveedu	1	7	9	1	1	1	0	0	0	0	0	0	1	0
		<b>Total (C)</b>		<b>153</b>	<b>134</b>	<b>37</b>	<b>15</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>33</b>	<b>0</b>
		<b>Grand Total (A+B+C)</b>		<b>186</b>	<b>166</b>	<b>45</b>	<b>19</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>42</b>	<b>0</b>

\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011

**MEDICAL FACILITIES WITHIN THE STUDY AREA**

Sl.No	No. of Villages	Name of village	Medical Facilities (A(1)/NA(2))	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
<b>0-2 km,Usilampatti Sub-District, Madurai District</b>														
1	1	Kalluthu	1	0	0	2	0	0	0	0	0	0	0	0
2	2	Panamoopanpatti	2	0	0	0	0	0	0	0	0	0	0	0
3	3	Eravarpatti	2	0	0	0	0	0	0	0	0	0	0	0
		<b>Total (A)</b>		<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2-5 km,Usilampatti Sub-District, Madurai District</b>														
4	1	Sakkarappanaickanur	1	0	0	1	0	0	0	0	0	0	0	0
5	2	Thimmanatham	1	0	0	1	0	0	0	0	0	1	0	0
6	3	Pappapatti	1	0	0	1	0	0	0	0	0	1	0	0
<b>Vadipatti Sub-District, Madurai District</b>														
7	1	Kovilkuruvithurai	1	0	0	1	0	0	0	0	0	0	0	0
<b>Nilakkottai Sub-District, Dindigul District</b>														
8	1	Sithargalnatham	1	0	0	3	0	0	0	0	0	0	0	0
9	2	Vilampatti	1	0	0	2	0	0	0	0	0	1	0	0
		<b>Total (B)</b>		<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>
<b>5-10 km,Vadipatti Sub-District, Madurai District</b>														
10	1	Katchiakatti	1	1	1	2	1	1	0	0	1	1	0	1
11	2	Karupatti	1	0	0	1	0	0	0	0	0	0	0	0
12	3	Ayankurivithurai	2	0	0	0	0	0	0	0	0	0	0	0
13	4	Mannadimangalam	1	0	0	1	0	0	0	0	0	1	0	0
14	5	Irumbadi	1	0	0	1	0	0	0	0	0	0	0	0
15	6	Mullipallam	1	0	0	1	0	0	0	0	0	0	0	0
<b>Usilampatti Sub-District, Madurai District</b>														
16	1	Uthappanaickanur	1	0	1	1	1	1	0	0	1	1	0	1
17	2	Poduvarpatti	2	0	0	0	0	0	0	0	0	0	0	0
18	3	Ayyanarkulam	1	0	0	1	0	0	0	0	0	0	0	0
19	4	Vikkiramangalam	1	0	1	1	1	1	0	0	1	1	0	1
20	5	Mudalaikulam	1	0	0	1	0	0	0	0	0	0	0	0
21	6	Kodikulam	1	0	0	1	0	0	0	0	0	0	0	0
22	7	Vinnakudi	2	0	0	0	0	0	0	0	0	0	0	0
23	8	Kuruvakudi	1	0	1	1	1	1	0	0	1	0	0	1
24	9	Sadaichipatti	2	0	0	0	0	0	0	0	0	0	0	0
25	10	Pudupatti(Anaiyur)	2	0	0	0	0	0	0	0	0	0	0	0
26	11	Sirupatti	2	0	0	0	0	0	0	0	0	0	0	0
27	12	Keeripatti	2	0	0	0	0	0	0	0	0	0	0	0
28	13	Nadupatti	1	0	0	1	0	0	0	0	0	0	0	0
29	14	Meikkilarpatti	1	0	0	1	0	0	0	0	0	1	0	0
30	15	Boodipuram	1	0	0	1	0	0	0	0	0	0	0	0
31	16	Krishnapuram	2	0	0	0	0	0	0	0	0	0	0	0
32	17	Kattakaruppanpatti	2	0	0	0	0	0	0	0	0	0	0	0
<b>Nilakkottai Sub-District, Dindigul District</b>														
33	1	Kombaipatti	1	0	0	3	0	0	0	0	0	1	0	0
34	2	Kullalagundu	1	0	0	3	0	0	0	0	0	0	0	0
35	3	Pallapatti	1	0	0	1	0	0	0	0	0	1	0	0
36	4	Ethilodu	1	0	0	2	0	0	0	0	0	0	0	0
37	5	Koovanuthu	1	0	0	0	1	1	0	0	0	0	0	0
38	6	Musuvanuthu	1	0	0	1	0	0	0	0	0	0	0	0
39	7	Bodiagoundanpatti	2	0	0	0	0	0	0	0	0	0	0	0
40	8	Sivagnapuram	2	0	0	0	0	0	0	0	0	0	0	0

Sl.No	No. of Villages	Name of village	Medical Facilities (A(1)/NA(2))	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
41	9	Sekkapatti	2	0	0	0	0	0	0	0	0	0	0	0
42	10	Nadakottai	1	0	0	2	0	0	0	0	0	0	0	0
43	11	Kulichettipatti	1	0	0	1	1	0	0	0	0	1	0	0
44	12	Pillaiyarnatham	1	0	1	3	1	1	0	0	1	1	0	1
45	13	Mattapparai	1	0	1	1	1	1	0	0	1	0	0	1
46	14	Kolladipatti	1	0	0	1	0	0	0	0	0	0	0	0
47	15	Ramarajapuram	1	0	0	1	0	0	0	0	0	1	0	0
48	16	Viralimayanpatti	1	0	0	1	0	0	0	0	0	0	0	0
49	17	Viruveedu	1	1	1	1	1	1	0	0	1	1	0	1
		<b>Total (C)</b>		<b>2</b>	<b>7</b>	<b>36</b>	<b>9</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>11</b>	<b>0</b>	<b>7</b>
		<b>Grand Total (A+B+C)</b>		<b>2</b>	<b>7</b>	<b>47</b>	<b>9</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>14</b>	<b>0</b>	<b>7</b>

\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011

Note : A: Available, NA- Not Available

**INFRASTRUCTURAL FACILITIES IN THE STUDY AREA**

Sl. No	No. of Villages	Name of village	Tap Water-Treated	Covered Well	Hand Pump	Tube Wells/Bore hole	Spring	River/Canal	Tank/Pond/Lake	Post Office	Sub Post Office	Post And Telegraph Office	Telephone (landlines)	Mobile Phone Coverage	Public Bus Service	Railway Station	Commercial Bank	Cooperative Bank	Agricultural Credit Societies
<b>0-2 km, Usilampatti Sub-District, Madurai District</b>																			
1	1	Kalluthu	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	1	2
2	2	Panamooanpatti	1	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	1
3	3	Eravarpatti	1	1	2	1	2	1	1	2	1	2	1	1	1	2	2	2	2
<b>2-5 km, Usilampatti Sub-District, Madurai District</b>																			
4	1	Sakkarappanaickanur	1	2	1	1	2	1	2	2	1	2	1	1	1	2	2	1	1
5	2	Thimmanatham	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	1	2
6	3	Pappapatti	1	2	2	1	1	2	2	2	1	2	1	1	1	2	2	2	2
<b>Vadipatti Sub-District, Madurai District</b>																			
7	1	Kovilkuruvithurai	1	2	2	1	2	1	2	2	2	2	1	1	1	2	2	2	2
<b>Nilakkottai Sub-District, Dindigul District</b>																			
8	1	Sithargalnatham	1	2	2	1	2	2	2	1	2	1	1	1	1	2	2	2	2
9	2	Vilampatti	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2
<b>5-10 km, Vadipatti Sub-District, Madurai District</b>																			
10	1	Katchiakatti	1	1	1	1	2	1	2	2	1	2	1	1	1	2	2	1	1
11	2	Karupatti	1	2	1	1	1	2	2	1	1	1	1	1	2	2	2	1	1
12	3	Ayankurivithurai	1	1	1	2	1	2	2	2	1	2	1	1	1	2	2	2	2
13	4	Mannadimangalam	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	1	1
14	5	Irumbadi	1	1	1	1	2	2	2	2	1	2	1	1	1	1	1	1	1
15	6	Mullipallam	1	2	1	1	2	1	2	1	2	1	1	1	1	2	2	2	2
<b>Usilampatti Sub-District, Madurai District</b>																			
16	1	Uthappanaickanur	1	2	1	1	1	2	2	1	2	1	1	1	1	2	2	1	2
17	2	Poduvarpatti	1	2	1	1	2	2	2	2	2	2	1	1	1	2	2	2	2
18	3	Ayyanarkulam	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	1	2
19	4	Vikkiramangalam	1	1	1	1	2	2	2	2	1	2	1	1	2	2	2	1	1
20	5	Mudalaikulam	1	1	1	1	1	2	2	2	1	2	1	1	1	2	2	2	2
21	6	Kodikulam	1	1	2	2	2	2	1	2	1	2	1	1	1	2	2	2	1
22	7	Vinnakudi	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
23	8	Kuruvakudi	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	1	2
24	9	Sadaichipatti	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
25	10	Pudupatti (Anaiyur)	1	1	1	1	2	2	2	2	2	2	1	1	1	2	2	2	1
26	11	Sirupatti	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
27	12	Keeripatti	1	2	1	1	2	2	2	2	2	2	1	1	2	2	2	2	2
28	13	Nadupatti	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
29	14	Meikkilarpatti	1	1	1	1	2	2	2	2	1	2	1	1	2	2	2	2	2
30	15	Boodipuram	1	1	1	1	1	2	1	2	1	2	1	1	1	2	2	2	2
31	16	Krishnapuram	2	2	2	1	2	2	2	2	2	2	1	1	2	2	2	2	2
32	17	Kattakaruppanpatti	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
<b>Nilakkottai Sub-District, Dindigul District</b>																			
33	1	Kombaipatti	1	1	2	1	1	2	2	1	1	1	1	1	1	2	2	1	1
34	2	Kullalagundu	1	2	1	1	2	2	2	2	1	2	1	1	1	2	2	2	1
35	3	Pallapatti	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	1
36	4	Ethilodu	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	2	1
37	5	Koovanuthu	1	1	1	1	2	1	2	2	2	2	1	1	1	2	2	2	2
38	6	Musuvanuthu	1	2	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
39	7	Bodiagoundanpatti	1	2	2	1	2	2	2	2	2	2	2	1	1	2	2	2	2
40	8	Sivagnapuram	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	1	1

Sl. No	No. of Villages	Name of village	Tap Water-Treated	Covered Well	Hand Pump	Tube Wells/Bore hole	Spring	River/Canal	Tank/Pond/Lake	Post Office	Sub Post Office	Post And Telegraph Office	Telephone (landlines)	Mobile Phone Coverage	Public Bus Service	Railway Station	Commercial Bank	Cooperative Bank	Agricultural Credit Societies
41	9	Sekkapatti	1	1	1	1	2	2	2	2	2	2	1	1	1	2	2	2	2
42	10	Nadakottai	1	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
43	11	Kulichettipatti	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	2
44	12	Pillaiyarnatham	1	2	2	1	1	2	2	1	1	1	1	1	1	2	2	2	1
45	13	Mattapparai	1	2	1	1	1	2	2	2	2	2	1	1	1	2	2	2	2
46	14	Kolladipatti	2	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
47	15	Ramarajapuram	1	1	1	1	1	2	2	1	1	1	1	1	1	2	2	1	1
48	16	Viralimayanpatti	1	1	1	1	1	2	2	2	1	2	1	1	1	2	2	2	2
49	17	Viruveedu	1	1	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1

*\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011*

Note : A: Available, NA- Not Available

Status: A(1)/NA(2)





# CREATIVE ENGINEERS & CONSULTANTS

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DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

## AMBIENT AIR QUALITY

Project	:	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Near Mine Lease Area
Station Code	:	A1

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	05.12.23	39.9	18.4	4.9	7.2
2	06.12.23	42.7	19.6	4.9	8.1
3	16.12.23	48.3	22.2	6.1	9.5
4	17.12.23	45.1	20.7	5.4	8.7
5	19.12.23	41.5	19.1	4.7	7.8
6	20.12.23	47.1	21.7	5.9	9.3
7	30.12.23	43.5	20.1	5.2	8.3
8	31.12.23	45.5	20.9	5.5	8.9
9	02.01.24	39.1	17.9	4.7	7.1
10	03.01.24	41.9	19.3	4.8	7.8
11	13.01.24	43.1	19.8	5.1	8.2
12	14.01.24	47.5	21.9	6.1	9.4
13	16.01.24	40.7	18.7	5.1	7.5
14	17.01.24	44.3	20.4	5.4	8.5
15	27.01.24	49.1	22.6	6.2	9.6
16	28.01.24	46.3	21.3	5.7	9.1
17	30.01.24	41.1	18.9	5.2	7.6
18	31.01.24	45.9	21.1	5.6	8.9
19	10.02.24	39.5	18.2	4.8	7.2
20	11.02.24	42.3	19.5	4.9	7.9
21	13.02.24	40.3	18.5	5.0	7.4
22	14.02.24	44.7	20.6	5.3	8.6
23	24.02.24	43.9	20.2	5.3	8.4
24	25.02.24	46.7	21.5	5.8	9.2
	<b>MIN</b>	<b>39.1</b>	<b>17.9</b>	<b>4.7</b>	<b>7.1</b>
	<b>AVG</b>	<b>43.8</b>	<b>20.1</b>	<b>5.3</b>	<b>8.3</b>
	<b>MAX</b>	<b>49.1</b>	<b>22.6</b>	<b>6.2</b>	<b>9.6</b>

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

*Q. Pal*

Prepared by



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# CREATIVE ENGINEERS & CONSULTANTS

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DEPARTMENT OF INDUSTRIES AND COMMERCE REGISTERED COMPANY)

## AMBIENT AIR QUALITY

Project	:	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Thappathupatti village
Station Code	:	A2

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	05.12.23	43.3	19.9	5.8	8.4
2	06.12.23	44.5	20.5	6.2	9.1
3	16.12.23	41.7	19.2	5.6	7.6
4	17.12.23	42.3	19.5	5.8	7.9
5	19.12.23	44.1	20.3	6.1	8.8
6	20.12.23	45.5	20.9	6.7	9.5
7	30.12.23	42.1	19.4	5.8	7.8
8	31.12.23	42.5	19.6	5.9	8.1
9	02.01.24	41.3	19.0	5.4	7.4
10	03.01.24	43.1	19.8	5.7	8.3
11	13.01.24	45.9	21.1	6.9	9.7
12	14.01.24	44.7	20.6	6.3	9.1
13	16.01.24	42.9	19.7	5.7	8.2
14	17.01.24	44.3	20.4	6.1	8.9
15	27.01.24	43.9	20.2	5.9	8.7
16	28.01.24	45.1	20.7	6.5	9.3
17	30.01.24	44.9	20.7	6.4	9.2
18	31.01.24	45.3	20.8	6.6	9.4
19	10.02.24	41.5	19.1	5.5	7.5
20	11.02.24	43.7	20.1	5.9	8.6
21	13.02.24	41.9	19.3	5.7	7.7
22	14.02.24	42.7	19.6	5.9	8.1
23	24.02.24	43.5	20.0	5.8	8.5
24	25.02.24	45.7	21.0	6.8	9.6
	MIN	41.3	19.0	5.4	7.4
	AVG	43.6	20.1	6.0	8.6
	MAX	45.9	21.1	6.9	9.7

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## AMBIENT AIR QUALITY

Project	:	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Eravarpatti village
Station Code	:	A3

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	07.12.23	51.6	23.7	7.0	8.7
2	08.12.23	54.3	25.0	7.8	9.6
3	14.12.23	49.2	22.6	6.2	7.9
4	15.12.23	51.9	23.9	7.1	8.8
5	21.12.23	53.7	24.7	7.7	9.5
6	22.12.23	55.2	25.4	8.1	9.9
7	28.12.23	50.1	23.0	6.5	8.2
8	29.12.23	52.5	24.2	7.3	9.1
9	04.01.24	48.3	22.2	5.9	7.6
10	05.01.24	50.7	23.3	6.7	8.4
11	11.01.24	49.5	22.8	6.3	8
12	12.01.24	54.9	25.3	8.0	9.8
13	18.01.24	56.1	25.8	8.2	10.3
14	19.01.24	53.4	24.6	7.6	9.4
15	25.01.24	48.6	22.4	6.0	7.7
16	26.01.24	51.1	23.5	6.8	8.5
17	01.02.24	49.8	22.9	6.4	8.1
18	02.02.24	53.1	24.4	7.5	9.3
19	08.02.24	50.4	23.2	6.6	8.3
20	09.02.24	52.8	24.3	7.4	9.2
21	15.02.24	51.3	23.6	6.9	8.6
22	16.02.24	54.6	25.1	7.9	9.7
23	23.02.24	48.9	22.5	6.1	7.8
24	24.02.24	52.2	24.0	7.2	8.9
	<b>MIN</b>	<b>48.3</b>	<b>22.2</b>	<b>5.9</b>	<b>7.6</b>
	<b>AVG</b>	<b>51.8</b>	<b>23.8</b>	<b>7.0</b>	<b>8.8</b>
	<b>MAX</b>	<b>56.1</b>	<b>25.8</b>	<b>8.2</b>	<b>10.3</b>

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

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## AMBIENT AIR QUALITY

Project	:	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Pannamoppanpatti village
Station Code	:	A4

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	07.12.23	53.1	25.0	6.6	8.8
2	08.12.23	55.7	26.2	7.5	9.7
3	14.12.23	57.8	27.2	8.2	10.5
4	15.12.23	58.4	27.4	8.4	10.7
5	21.12.23	55.4	26.0	7.4	9.6
6	22.12.23	58.1	27.3	8.3	10.6
7	28.12.23	52.4	24.6	6.4	8.6
8	29.12.23	56.1	26.4	7.6	9.8
9	04.01.24	53.3	25.1	6.7	8.9
10	05.01.24	57.2	26.9	8.0	10.3
11	11.01.24	53.9	25.3	6.9	9.1
12	12.01.24	54.5	25.6	7.1	9.3
13	18.01.24	56.3	26.5	7.7	9.9
14	19.01.24	54.8	25.8	7.2	9.4
15	25.01.24	52.7	24.8	6.5	8.7
16	26.01.24	54.2	25.5	7.0	9.2
17	01.02.24	59.1	27.8	8.6	10.9
18	02.02.24	57.5	27.0	8.1	10.4
19	08.02.24	53.6	25.2	6.8	9
20	09.02.24	55.1	25.9	7.3	9.5
21	15.02.24	56.9	26.7	7.9	10.2
22	16.02.24	59.3	27.9	8.7	11.2
23	23.02.24	56.6	26.6	7.8	10.1
24	24.02.24	58.7	27.6	8.5	10.8
	<b>MIN</b>	<b>52.4</b>	<b>24.6</b>	<b>6.4</b>	<b>8.6</b>
	<b>AVG</b>	<b>55.9</b>	<b>26.3</b>	<b>7.6</b>	<b>9.8</b>
	<b>MAX</b>	<b>59.3</b>	<b>27.9</b>	<b>8.7</b>	<b>11.2</b>

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

*[Handwritten Signature]*

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## AMBIENT AIR QUALITY

Project	:	Panamooppampatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Perumalpatti Village
Station Code	:	A5

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	09.12.23	45.5	20.9	5.9	7.8
2	10.12.23	47.6	21.9	6.4	8.5
3	12.12.23	51.5	23.6	7.3	9.6
4	13.12.23	47.3	21.8	6.5	8.4
5	23.12.23	46.4	21.3	6.2	8.1
6	24.12.23	50.9	23.3	7.1	9.4
7	26.12.23	48.2	22.2	6.6	8.7
8	27.12.23	45.2	20.8	5.8	7.7
9	06.01.24	48.8	22.4	6.7	8.9
10	07.01.24	51.2	23.4	7.2	9.5
11	09.01.24	47.1	21.7	6.4	8.3
12	10.01.24	46.7	21.5	6.3	8.2
13	20.01.24	53.1	24.0	7.6	9.9
14	21.01.24	49.4	22.7	6.8	9.1
15	24.01.24	48.5	22.3	6.6	8.8
16	24.01.24	50.3	23.1	6.9	9.2
17	03.02.24	46.1	21.2	6.1	8.1
18	04.02.24	47.9	22.0	6.5	8.6
19	06.02.24	49.1	22.6	6.8	8.9
20	07.02.24	51.8	23.7	7.4	9.7
21	17.02.24	50.6	23.1	7.1	9.3
22	18.02.24	45.8	21.1	6.1	7.9
23	20.02.24	52.2	23.8	7.5	9.8
24	21.02.24	49.7	22.9	6.9	9.1
	<b>MIN</b>	<b>45.2</b>	<b>20.8</b>	<b>5.8</b>	<b>7.7</b>
	<b>AVG</b>	<b>48.8</b>	<b>22.4</b>	<b>6.7</b>	<b>8.8</b>
	<b>MAX</b>	<b>53.1</b>	<b>24.0</b>	<b>7.6</b>	<b>9.9</b>

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## AMBIENT AIR QUALITY

Project	:	Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam
Name of the Location	:	Kalluthu village
Station Code	:	A6

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	09.12.23	62.5	29.4	8.1	11.2
2	10.12.23	57.7	27.1	7.3	10.3
3	12.12.23	64.3	30.2	8.4	11.5
4	13.12.23	58.9	27.7	7.5	10.5
5	23.12.23	55.9	26.3	7.1	9.9
6	24.12.23	61.3	28.8	7.9	10.9
7	26.12.23	51.7	24.3	6.3	9.3
8	27.12.23	54.1	25.4	6.7	9.7
9	06.01.24	64.9	30.5	8.5	12.7
10	07.01.24	58.3	27.4	7.4	10.4
11	09.01.24	51.1	24.0	6.2	9.2
12	10.01.24	54.7	25.7	6.8	9.8
13	20.01.24	63.1	29.7	8.2	11.3
14	21.01.24	60.1	28.2	7.7	10.7
15	24.01.24	52.9	24.9	6.5	9.5
16	24.01.24	61.9	29.1	8.1	11.1
17	03.02.24	63.7	29.9	8.3	11.4
18	04.02.24	59.5	28.0	7.6	10.6
19	06.02.24	55.3	26.0	6.9	9.9
20	07.02.24	60.7	28.5	7.8	10.8
21	17.02.24	52.3	24.6	6.4	9.4
22	18.02.24	57.1	26.8	7.2	10.2
23	20.02.24	53.5	25.1	6.6	9.6
24	21.02.24	56.5	26.6	7.1	10.1
	<b>MIN</b>	<b>51.1</b>	<b>24.0</b>	<b>6.2</b>	<b>9.2</b>
	<b>AVG</b>	<b>58.0</b>	<b>27.3</b>	<b>7.4</b>	<b>10.4</b>
	<b>MAX</b>	<b>64.9</b>	<b>30.5</b>	<b>8.5</b>	<b>12.7</b>

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## WATER QUALITY DATA

<b>Project Name</b>	:	<b>Panamooppanpatti Limestone Mine of Tmt.B.Thiraviam</b>	
<b>Location Name</b>	:	<b>Location Code</b>	<b>Location Name</b>
		W1	Near Core Zone
		W2	Thappathupatti Village
		W3	Eravarpatti Village
		W4	Pannamoppanpatti Village
		W5	Perumalpatti Village
		W6	Kalluthu Village

S. No.	Parameter	Unit	W1	W 2	W 3	W 4	W 5	W6	*Permissible Limits
1	pH	-	7.32	7.45	7.22	7.06	7.55	7.29	6.5-8.5
2	Electrical Conductivity	µmhos/cm	910.8	992.9	562	656	1092	1418	-
3	Odor	-	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE
4	Turbidity	NTU	<1	<1	<1	<1	<1	<1	5.0
5	Total Hardness as CaCO <sub>3</sub>	mg/L	289	368	184	204	349	478	600
6	Calcium Hardness CaCO <sub>3</sub>	mg/L	184	264	100	120	153	270	-
7	Magnesium Hardness CaCO <sub>3</sub>	mg/L	105	104	84.3	84.0	196	208	-
8	Calcium Ca	mg/L	73.6	106	40	47.8	61.2	108.0	200
9	Magnesium Mg	mg/L	25.2	25.0	20.2	20.2	47.0	49.9	100
10	Alkalinity CaCO <sub>3</sub>	mg/L	220	242	187	204	257	438	600

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S. No.	Parameter	Unit	W1	W 2	W 3	W 4	W 5	W6	*Permissible Limits
11	Chloride Cl <sup>-</sup>	mg/L	186	216	98.6	13.7	57	210	1000
12	Sulphate SO <sub>4</sub> <sup>2-</sup>	mg/L	55.4	42.1	32.5	42.5	120	152	400
13	Iron Fe	mg/L	0.03	0.04	0.05	0.02	BDL (D.L - 0.01)	BDL(D.L - 0.01)	0.3
14	Nitrate NO <sub>3</sub>	mg/L	2.89	4.65	3.64	1.45	3.47	2.32	45
15	Fluoride F	mg/L	0.45	0.38	0.16	0.34	0.54	0.33	1.5
16	Total Dissolved Solids	mg/L	550	596	342	396	656	856	2000
17	Free Residual Chlorine Cl <sup>-</sup>	mg/L	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L - 0.2)	BDL (D.L-0.2)	1.0
18	Manganese Mn	mg/L	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL (D.L - 0.05)	BDL(D.L-0.05)	0.3

**Note:** \* The water quality of the collected ground water samples were found to be within the prescribed permissible limits of IS: 10500:2012 Norms for Drinking in the absence of an alternative source.

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**LAND USE PATTERN OF THE STUDY AREA WITHIN 10 KM RADIUS AROUND THE PROPOSED PROJECT AREA**

Sl.No	No. of Villages	Name of village	Total Geographical Area (in Hectares)	Forest Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Uncultivable Land Area (in Hectares)	Permanent Pastures and Other Grazing Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Area (in Hectares)	Culturable Waste Land Area (in Hectares)	Fallows Land other than Current Fallows Area (in Hectares)	Current Fallows Area (in Hectares)	Total Unirrigated Land Area (in Hectares)	Area Irrigated by Source (in Hectares)
<b>0-2 km, Usilampatti Sub-District, Madurai District</b>													
1	1	Kalluthu	1228.08	140.41	95.82	187.83	0	0.1	35.19	270.66	119.1	113.74	265.23
2	2	Panamooanpatti	453.53	0	54.46	22.92	0	0	4.9	235.8	3.13	24.39	107.93
3	3	Eravarpatti	436.58	0	43.01	35.52	0	30.43	0	198.74	0	128.88	0
		<b>Total (A)</b>	<b>2118.19</b>	<b>140.41</b>	<b>193.29</b>	<b>246.27</b>	<b>0</b>	<b>30.53</b>	<b>40.09</b>	<b>705.2</b>	<b>122.23</b>	<b>267.01</b>	<b>373.16</b>
<b>2-5 km, Usilampatti Sub-District, Madurai District</b>													
4	1	Sakkarappanaickanur	460.26	0	43.2	7.6	0	21.54	7.27	204.27	0	171.16	5.22
5	2	Thimmanatham	1672.73	308.23	139.16	308.24	0	0.23	59.15	430.63	148.98	161.92	116.19
6	3	Pappapatti	459.77	0	72.05	2.06	0	0.23	13.36	83.53	0	199.04	89.5
<b>Vadipatti Sub-District, Madurai District</b>													
7	1	Kovilkuruvithurai	472.7	0	80.87	2.01	0	0.95	1.68	102.11	0	0.45	284.63
<b>Nilakkottai Sub-District, Dindigul District</b>													
8	1	Sithargalnatham	1539.04	0	602.64	62.22	0	0	1.51	0	392.74	451.94	27.99
9	2	Vilampatti	576	0	99.6	0.6	0	0	0	0	29.56	65.59	380.65
		<b>Total (B)</b>	<b>5180.5</b>	<b>308.23</b>	<b>1037.52</b>	<b>382.73</b>	<b>0</b>	<b>22.95</b>	<b>82.97</b>	<b>820.54</b>	<b>571.28</b>	<b>1050.1</b>	<b>904.18</b>
<b>5-10 km, Vadipatti Sub-District, Madurai District</b>													
10	1	Katchiakatti	2402.35	4.96	312.72	28.26	0	5.78	79.56	515.54	128.36	562.05	765.12
11	2	Karupatti	499.22	0	64.99	0.14	0	0.01	0	13.01	33.16	0.34	387.57
12	3	Ayankurivithurai	299.38	0	50.13	0	0	0	0.05	3.74	11.05	0.02	234.39
13	4	Mannadimangalam	930.35	0	188.14	0	0	0.35	8.75	9.14	95.41	0.06	628.5
14	5	Irumbadi	413.21	0	76.31	0	0	0	0.74	10.78	0	0.21	325.17
15	6	Mullipallam	880.48	0	200.97	0	0	0	29.74	0	139.11	42.02	468.64
<b>Usilampatti Sub-District, Madurai District</b>													
16	1	Uthappanaickanur	3376.1	1510	181.88	337.71	0	3.78	47.34	767.53	130.04	172.92	224.9
17	2	Poduvarpatti	797.93	0	129.5	79.07	0	0.12	5.34	74.58	0	142.94	366.38
18	3	Ayyanarkulam	599.22	0	78.8	0	2.76	0.11	3.72	80.54	0	12.66	420.63
19	4	Vikkiramangalam	1041.34	0	201.34	10.34	3.21	0	164.27	3.82	0	134.26	524.1
20	5	Mudalaikulam	1070.91	0	190.36	8.16	29.14	0	0	276.33	3.95	391.15	171.82
21	6	Kodikulam	621.23	0	169.64	0	0	0	0	26.08	0	20.02	405.49
22	7	Vinnakudi	397.35	0	93.61	0	0	0	0	7.91	0	0	295.83
23	8	Kuruvakudi	387.92	0	85.85	0	0	0	0.23	6.04	6.14	0	289.66
24	9	Sadaichipatti	295.81	0	50.1	0	0	0	4.95	0	44.76	23.11	172.89
25	10	Pudupatti (Anaiyur)	197.22	0	22.87	0	0	0	0.46	0	17.18	126.69	30.02
26	11	Sirupatti	284.93	0	40.06	0	0	0.21	1.25	0	44.04	168.75	30.62
27	12	Keeripatti	233.44	0	49.57	0	0	0.3	0	35.61	0	76.65	71.31
28	13	Nadupatti	972.61	0	81.32	1.8	0	2.54	39.93	293.94	9.5	173.69	369.89
29	14	Meikkilarpatti	360.99	0	38.42	0	0	1.45	0.18	40.99	126.95	126.95	26.05
30	15	Boodipuram	445.37	0	59.59	0	0	0	1.34	83.47	0	137.95	163.02
31	16	Krishnapuram	117.69	0	24.94	0	0	0	0	0	14.14	59.28	19.33
32	17	Kattakaruppanpatti	348.45	0	124.83	0	0	0	1.88	32.82	0	8.22	180.7
<b>Nilakkottai Sub-District, Dindigul District</b>													
33	1	Kombaipatti	1092.66	0	0	19.39	0	2.28	0	447.11	135.88	34	454
34	2	Kullalagundu	720.37	0	101.99	0	0	0	0.44	209.46	20.38	210.97	177.13
35	3	Pallapatti	1613.18	0	267.16	0	0	0	0	594.23	107.33	100.99	543.47
36	4	Ethilodu	1431.42	0	184.42	0	0	0	2.38	64.48	714.16	48.5	417.48
37	5	Koovanuthu	790.81	0	79.61	185.62	0	0	3.91	262.51	148.67	33.39	77.1
38	6	Musuvanuthu	1137.18	0	106.17	194.65	0	0	34.73	566.76	68.7	31.3	134.87
39	7	Bodiagoundanpatti	319.59	0	56.41	81.62	0	0	2.33	45.11	0	19.47	114.65
40	8	Sivagnanapuram	499.65	0	94.78	33.49	0	0	1.71	135.69	0	11.52	222.46
41	9	Sekkapatti	672.66	0	84.7	15.71	0	0	10.46	0	175.7	385.32	0.77
42	10	Nadakottai	859.59	0	89.84	1.83	0	0	24.66	0	254.71	448.55	40

43	11	Kulichettipatti	196.31	0	43.06	0	0	0	0.14	59.05	1.29	7.31	85.46
44	12	Pillaiyarnatham	753.74	0	124.25	0	0	0	0	162.14	46.5	122.16	298.69
45	13	Mattapparai	697.85	0	161.93	2.3	0	0	1.88	206.91	50	36.63	238.2
46	14	Kolladipatti	304.34	0	29.93	17.68	0	0	0	77.9	21.68	77.72	79.43
47	15	Ramarajapuram	415.19	0	100.3	9.49	0	0	1.46	100.69	1.74	12.44	189.07
48	16	Viralimayanpatti	722.45	0	56.19	80.65	0	0	12.61	0	262	300.73	10.27
49	17	Viruveedu	983.68	0	255.92	71.13	0	2.99	449.07	0	52.3	106.28	45.99
		<b>Total (C)</b>	<b>30184.17</b>	<b>1514.96</b>	<b>4352.6</b>	<b>1179.04</b>	<b>35.11</b>	<b>19.92</b>	<b>935.51</b>	<b>5213.91</b>	<b>2864.83</b>	<b>4367.22</b>	<b>9701.07</b>
		<b>Grand Total (A+B+C)</b>	<b>37482.86</b>	<b>1963.6</b>	<b>5583.41</b>	<b>1808.04</b>	<b>35.11</b>	<b>73.4</b>	<b>1058.57</b>	<b>6739.65</b>	<b>3558.34</b>	<b>5684.33</b>	<b>10978.41</b>

*\*Source: District Primary Census Abstract, Madurai & Dindigul District of Tamilnadu State-2011*

1. Tmt B.Thiraviam, No.9/1/22A, T.B.Road, Usilampatti Taluk, Madurai District  
Limestone Mines over an extent of 3.07.0 Hectares, S.F.No. 132/1 & 132/3(P),  
Panamooanpatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu.



**General View of the Proposed Area**

Dr. [Signature]  
13/11/2023  
காரைநாட்டில் அலுவலர்  
த. சக்கரப்பநாயகக்கனூர் குழு:  
உரிமையட்டி வட்டம்  
சுதந்திர மாவட்டம்

சான்று

மதுரை மாவட்டம், உசிலம்பட்டி வட்டம், திருமாதூர்  
உள்வட்டம், 03. பாணாடிப்பண்டட்டி கிராம திருவாத அலுவலர்  
அலுவலகம் சான்று

மதுரை மாவட்டம், உசிலம்பட்டி வட்டம், T.B. சாலை,  
நம்பர் 9/22A என்ற சுகவரியல் உசிக்கும் திரு. போஸ்  
என்பவர் மனைவி போ. திரையம் என்பவர், மதுரை  
மாவட்டம், உசிலம்பட்டி வட்டம், பாணா டிப்பண்டட்டி  
கிராமத்தில் உள்ள சர்வே எண் 132/1 மற்றும்  
132/3 தீர்வை ஏற்பட சர்க்கார் புள்ளித் தரிசு  
3.07.0 விவகாரம் பரப்பு நிலத்தில் சண்ணாம்புக்கல்  
விவட்டி எடுக்க அரசாங்கத்திடமிருந்து சீர்தகை அனுமதி  
கொரியுள்ளார். எனவே சுவாமி சீர்தகை உரிமம் எடுத்துள்ள  
நிலத்தைச் சற்றி சிமர் 300 கீட்டருக்கு அருகில் புராதனச்  
சின்னங்கள் மற்றும் அங்கீகரிக்கப்பட்ட கீட்டு ணைகள்  
ஏதும் இல்லை எனவும், இதனால் பொதுமக்களுக்கு  
எவ்வித தடைச்சல்களோ அல்லது பாதிப்புகளோ ஏற்படாது  
என உறுதிப்படுத்துகிறோம். மேலும் அனுமதி கொரிய  
புலத்திற்கு வண்டிகள் சென்றுவர வடக்கு கிழக்காக பாதுகா  
அமைந்துள்ளது.

திரு. ப. அனந்தன்  
13/04/2023  
கிராம நிர்வாக அலுவலர்  
சு. சக்கரப்பநாயககணுர் குழு  
உசிலம்பட்டி வட்டம்  
மதுரை மாவட்டம்

**DEPARTMENT OF GEOLOGY AND MINING**

From  
Thiru.T.Selvasekar, M.Sc.,  
Assistant Director (i/c),  
Dept. of Geology and Mining,  
Madurai

To  
Tmt.B.Thiraviyam,  
W/o.Bose,  
9/22A, T.B.Road,  
Usilampatti Taluk,  
Madurai - 625 032.

Rc.No.1123/2015-Mines, Dated.25.04.2023

Sir,

Sub: Mines and Minerals – Major Minerals – Limestone -  
Madurai District – Usilampatti Taluk –  
Panamooppampatti Village – Government  
Poramboke land - SF.Nos.132/1 & 132/3 (P) over  
an extent of 3.07.0 hectares –Tmt.B.Thiraviyam –  
500m radius requested - Reg.

Reg: Tmt.B.Thiraviyam Application dated.24.02.2023

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In the reference cited Thiru.B.Thiraviyam has requested for the details of quarries located within 500 meters radius from the limestone quarry situated over an extent of 3.07.0 hectares of Government Poramboke land SF.Nos.132/1 and 132/3 (P) in Panamooppampatti Village, Usilampatti Taluk.

In this regard, the following details are submitted:

**a. Existing quarries**

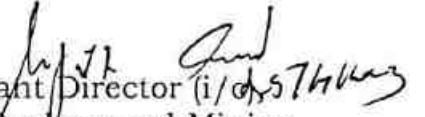
SI No	Name of the Owner	Village	S.F.No.	Extent (in hecets)	Collector's Proceedings No & date	Lease period
1.	Tmt.B.Thiraviyam, W/o.Bose, 9/22A, T.B.Road, Usilampatti Taluk, Madurai - 625 032.	Panamoop panpatti	132/1 and 132/3 (P)	3.07.0	G.O.3(D).No.124/1 industries (MMD2)Dept, Dt. 31.07.1997	02.02.199 8 - 01.02.201 8 (deemed extension)

b. Expired / Abandoned quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)	Collector's Proceedings No & date	Lease period
-NIL-						

c. Present proposed quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)
-NIL-				

  
Assistant Director (i/c) STHK  
Dept of Geology and Mining,  
Madurai

Copy to:

The Chairman,  
State Level Environment Impact,  
Assessment Authority, Tamil Nadu,  
3<sup>rd</sup> Floor, Panagal Maaligai, No.1 Jeenis Road, Saidapet,  
Chennai-15.



தமிழ்நாடு தமில்நாடு TAMILNADU

10.4.2024  
B. திருவியம்  
29.08.2024

V. முருகசாமின்  
USILAMPATTI DISTRICT  
ROC No: 4443/C1/2008(11)  
உசிலம்பட்டி, தமிழ்நாடு

DX 992794

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**AFFIDAVIT TO SEIAA, TAMIL NADU**

I, Tmt.B.Thiraviam, residing at No. 9/1/22A, T.B. Road, Usilampatti Taluk, Madurai District do hereby solemnly declare and sincerely affirm that, we have applied for getting environment clearance to SEIAA, Tamil Nadu for Panamooppampatti Limestone Mine located in Survey No. 132/1 and 132/3 (P) over an area of 3.07 Ha in Panamooppampatti Village, Usilampatti Taluk, Madurai District, Tamil Nadu. I hereby solemnly declare that:



10/04/2024

B. திருவியம்

1. I am the authorized signatory for this project.
2. The blasting operation in the proposed quarries will be carried by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine formeman, II/I Class mines manager appointed by the proponent.
3. I will abide the EMP for the entire life of Mine

Notary Sign & Seal

*B. Gnanasekar*  
Quarry Owner Sign



Solemnly affirmed and  
Signed in my Presence at  
Usilampatti on 10/04/24

*S. Kathiravan 10/04/24*  
**S. KATHIRAVAN** B.Com., B.L.,  
ADVOCATE & NOTARY  
Ent. No. Ms. 34 / 1998  
D. No. 23-1-16, Methi Nivas Illam  
USILAMPATTY TOWN,  
MADURAI District.  
Cell: 99656 50001