

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT &  
ENVIRONMENTAL MANAGEMENT PLAN REPORT**

**(Submitted for Public Hearing as per the provisions of  
EIA Notification 2006 & amendments thereof)**

**FOR  
OBTAINING  
Environmental Clearance  
Schedule Sl. No. 1 (a) (i): Mining Project  
(Category B1-Minor Mineral-Cluster-Non-Forest Land)  
Total Proposed Area – 4.97.0 (i.e. individual areas of 4.97.0 Ha);  
Cluster Extent: 7.34.5 Ha  
PROPOSED ROUGH STONE & GRAVEL QUARRY  
(1 PROPOSED)  
STUDY PERIOD – MARCH 2022 TO MAY 2022**

**Located at  
SURVEY NOS. 46  
KUTTAPALAYAM VILLAGE, KANGAYAM TALUK,  
TIRUPPUR DISTRICT, TAMIL NADU**

**Project Proponent: Lessee  
Tvl. R.P.P. Blue Metals,  
No.156, Mullamparappu,  
Nathagoundampalayam Post,  
Erode District,  
Tamil Nadu State – 638 115**

**CONSULTANT**



**ENVIRO RESOURCES**

**NABET Certificate No: NABET/EIA/1922/SA0133  
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November 2022**

## UNDERTAKING BY CLIENT

I P.Selvasundaram , Managing Partner and Authorized Signatory lessee for Tvl. R.P.P. Blue Metals of Kuttapalayam Village Rough Stone & Gravel Quarry at S.No. 46, Kangayam Taluk, Tiruppur District, Tamil Nadu having an area of 4.97.0 Ha. While cluster area is 7.34.5 Ha give this undertaking to the effect that the conditions laid down in Terms of Reference by SEIAA, Tamil Nadu vide Letter no. SEIAA-TN/F.No.8780/SEAC/ToR-1081/2021 dated 17.03.2022 for the proposed quarry.

The report has been complied with, and the data submitted and the information presented in the report are factually correct.

Date: 07/11/2022



P.Selvasundaram  
Managing Partner and Authorized Signatory  
Tvl. R.P.P. Blue Metals,  
No.156, Mullamparappu,  
Nathagoundampalayam Post,  
Erode District,  
Tamil Nadu State - 638 115

### Declaration by Expert

Declaration by Experts contributing to the EIA "Kuttapalayam Village Rough Stone & Gravel Quarry at S.F.No. 46, In Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu having an area of 4.97.0 Ha. While cluster area is 7.34.5 Ha. Project Proponent: Lessee Tvl. R.P.P. Blue Metals. Study Period March to May 2022.

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

EIA coordinator:

Name: **Dr. Milind P. Kundal**



Signature and Date: .....







Period of involvement: September 2021 to Till date





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Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1.	AP*	Timir Shah	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
2.	WP*	Pritam Kadam	September 2021 to July 2022 (Identification & Assessment of Impact, Suggestion Mitigation Measures).	
3.	SE*	Anil Shende	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
4.	EB*	Bhaskar Yengal	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
5.	HG*	Milind Kundal	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
6.	GEO*	Milind Kundal	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
7.	SC*	Bhaskar Yengal	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
8.	AQ*	Pritam Kadam	September 2021 to July 2022 (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
9.	NV*	Partho Mukherjee	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	Partho Sankar Mukherjee
10.	LU*	Milind Kundal	September 2021 to Till date (Identification & Assessment of Impact, Suggestion Mitigation Measures)	
11.	RH*	Santosh Gupta	September 2021 to July 2022 (Identification & Assessment of Impact, Suggestion Mitigation Measures)	

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

I, Timir Shah, hereby, confirm that the above-mentioned experts prepared the EIA "Kuttapalayam Village Rough Stone & Gravel Quarry at 46, Kangayam Taluk, Tiruppur District, Tamil Nadu has an area of 4.97.0 Ha. While cluster area is 7.34.5 Ha. Project Proponent: Lessee Tvl. R.P.P. Blue Metals. Study Period March to May 2022. I also confirm that the consultant organization shall be fully accountable for any mis-leading information mentioned in this statement.

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: Mr. Timir Shah

Designation: Head of ACO & MD

Name of the EIA consultant organization: Enviro Resources, Mumbai.

NABET Certificate No. & Issue Date: **NABET/EIA/1922/SA 0133.**

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## **ABBREVIATIONS**

AAQ	:	Ambient Air Quality
AAQM	:	Ambient Air Quality Monitoring
AAQS	:	Ambient Air Quality Standards
AIS & LUS	:	All India Soil and Land Use Survey
AMSL	:	Above Mean Sea Level
ANFO	:	Ammonium Nitrate - Fuel Oil
BH	:	Business Head
BHs	:	Bore Holes
BIS	:	Bureau of Indian Standards
bgl	:	Below Ground Level
CC	:	Calcium Carbonate
CFM	:	Cubic Feet per Minute
CWC	:	Central Water Commission
CPCB	:	Central Pollution Control Board
CSR	:	Corporate Social Responsibility
DGMS	:	Directorate General of Mines Safety
DMP	:	Disaster Management Plan
DMG	:	Department of Mines and Geology
DTH	:	Down the Hole
E	:	East
EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
EHS	:	Environmental, Health and Safety
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
ESE	:	East of South East
ENE	:	East of North East
EPA	:	Environmental Protection Act
ERDAS	:	Earth Resources Data Analysis System
EPO	:	Emergency planning officer
FPS	:	Fine Particulate Sampler
FCC	:	False Color Composite
Govt.	:	Government
GCP	:	Ground Control Points
GLC	:	Ground Level Concentration
GOI	:	Government of India
GPS	:	Global Positioning System
GSI	:	Geological Survey of India
GWEC	:	Ground Water Estimation Committee
Ha	:	Hectare

HIV	:	Human Immunodeficiency Virus
IBM	:	Indian Bureau of Mines
IMD	:	India Meteorological Department
IS	:	Indian Standards
ISO	:	International Organization of Standardization
IUCN	:	International Union for Conservation of Nature
KLD	:	Kilo Litre Per Day
LOI	:	Letter of Intent
LU/LC	:	Land Use / Land Cover
mRL	:	Metre Reduced Level
MC	:	Magnesium Carbonate
ML	:	Mining Lease
MoEF	:	Ministry of Environment & Forests
MSL	:	Mean Sea Level
MT	:	Million Tonnes
MTPA	:	Metric Tonnes Per Annum
MW	:	Mega Watt
N	:	North
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education & Training
NATMO	:	National Atlas & Thematic Mapping Organization
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NE	:	North East
NH	:	National Highway
NNE	:	North of North East
NGO	:	Non-Governmental Organization
NNW	:	North of North West
NRSA	:	National Remote Sensing Agency
NRSC	:	National Remote Sensing Centre
NW	:	North West
OB	:	Over Burden
OBC	:	Other Backward Classes
OHS	:	Occupational Health and Safety
OSHA	:	Occupational Safety and Health Administration
PFR	:	Pre-Feasibility Report
pH	:	Potential of Hydrogen
PHCS	:	Public Health Centers
PM	:	Particulate Matter
PPE	:	Personal Protective Equipment
PPV	:	Peak Particle Velocity
QCI	:	Quality Council of India

RSPM	:	Respirable Suspended Particulate Matter
SC	:	Scheduled Caste
SE	:	South East
SEIAA	:	State Environmental Impact Assessment Authority
SH	:	State Highway
SHE	:	Safety, Health & Environment
SI	:	Sustainability initiatives
SIA	:	Social Impact Assessment
SOI	:	Survey of India
SPCB	:	State Pollution Control Board
SPM	:	Suspended Particulate Matter
SSW	:	South of South West
ST	:	Scheduled Tribe
SW	:	South West
TC	:	Total Carbonate
TDS	:	Total Dissolved Solids
ToR	:	Terms of Reference
TPD	:	Tonnes Per Day
UNFC	:	United Nations Framework Classification
USDA	:	United States Department of Agriculture
USEPA	:	United States Environmental Protection Agency
VT	:	Vocational Training
RF	:	Reserved Forest
PF	:	Protected Forest
W	:	West
WNW	:	West of North West
WSW	:	West of South West
$\mu\text{g}/\text{m}^3$	:	Micro gram per meter cube
$\mu\text{m}$	:	Micro Meter
cu. m	:	Cubic meter
dB	:	Decibel
gm/sec	:	Gram per second
gm/cc	:	Gram per cubic metre
hr/day	:	Hour per day
kg	:	Kilogram
Kg/hr	:	Kilogram per hour
Kg/ha	:	Kilogram per hectare
km	:	Kilometre
m	:	Metre
mg/l	:	Miligram per Litre
mm	:	Milimetre
Sq.km	:	Square Kilometre



TMT. P. RAJESWARI, I.F.S.,  
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY – TAMIL NADU

3rd Floor, Panagal Maaligai,  
No.1 Jeenis Road, Saidapet,  
Chennai-15.

Phone No.044-24359973

Fax No. 044-24359975

**TERMS OF REFERENCE (ToR)**

**Lr.No.SEIAA-TN/F.No.8780/SEAC/ToR-1091/2021 Dated:17.03.2022**

To

TvLR.P.P.Blue Metals  
No.156, Mullamparappa  
Nathagoundampalayam Post  
Erode District-638115.

Sir / Madam,


**Sub:** SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough stone & gravel quarry lease over an extent of 4.97.0 Ha at S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu by Tvl. R.P.P. Blue Metals - under project category – “B1” and Schedule S.No. 1(a) – ToR issued along with Public Hearing- preparation of EIA report – Regarding.

- Ref:** 1. Online proposal No SIA/TN/MIN/67364/2021, dated: 07.09.2021  
2. Your application seeking Terms of Reference submitted on: 09.09.2021  
3. Minutes of the 248<sup>th</sup> meeting of SEAC held on 24.02.2022  
4. Minutes of the 492<sup>nd</sup> meeting of SEIAA held on 16.03.2022.

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

The proponent, TvLR.P.P.Blue Metals has submitted application seeking ToR for B1 category project in Form-1, for the Proposed Rough stone & gravel quarry lease over an extent of 4.97.0 Ha at S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu and has furnished Pre-feasibility report.

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

The proposal was placed in 248th SEAC meeting held on 24.02.2022. 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, Tvl. R.P.P. Blue Metals has applied for Terms for Reference for the proposed Rough stone & gravel quarry lease over an extent of 4.97.0 Ha at S.F.No.46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. The Production for the five years states that total quantity should not exceed 3,94,606 m<sup>3</sup> of rough stone & 52,191 m<sup>3</sup> of gravel with a ultimate depth of mining is 47m below ground level.

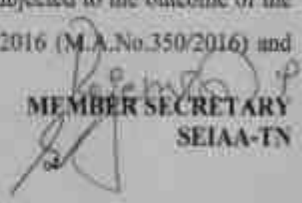
Based on the presentation made by the proponent and the documents furnished, SEAC decided to **recommend the proposal for the grant of Terms of Reference (TOR) with Public Hearing** for the total Production for the period of five years states that total quantity should not exceed 3,94,606 m<sup>3</sup> of rough stone & 52,191 m<sup>3</sup> of gravel with a ultimate depth of mining is 47m below ground level. Subject to the following TORs, 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:

1. The Project proponent (PP) shall furnish the details of fencing in the existing quarries operated by the same PP as per mine closure plan.
2. The Proponent shall carry out the cumulative & comprehensive environmental impact assessment study due to mining operations carried out in the quarry cluster specifically with reference to the environment in terms of air pollution, water pollution, & health impacts; and accordingly the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
3. The Proponent shall carry out the Socio Economic Impact Assessment study in the vicinity of the villages located in the proposed quarry.
4. 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,
  - a) What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
  - b) Quantity of minerals mined out.
  - c) Highest production achieved in any one year

  
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- d) Detail of approved depth of mining.
  - e) Actual depth of the mining achieved earlier.
  - f) Name of the person already mined in that leases area.
  - g) If EC and CTO already obtained, the copy of the same shall be submitted.
  - h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
5. 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).
  6. 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.
  7. The Project Proponent shall provide the details of geological 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 proposed mitigation measures for the same.
  8. 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.
  9. The Project Proponent shall conduct the 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) 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.
  10. 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.
  11. The recommendation for the issue of "Terms of Reference" is subjected to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of 2016 (M.A.No.350/2016) and

  
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O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and 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) and 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)


12. The purpose of Green belt around the project is to capture the fugitive dust emissions, carbon sequestration and to attenuate the noise generated, in addition to reduce the visual impacts. 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.
13. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted in proper spacing 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.
14. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
15. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.
16. 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.
17. 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.
18. 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 Reference besides attracting the penal provisions as given in the Environment (Protection) Act, 1986.

  
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**Appendix****List of Native Trees for Planting**

1. *Aegle marmelos* - Vilvam
2. *Adenanthera pavonina* - Marjadi
3. *Albizia lebbek* - Vaagai
4. *Albizia amara* - Usil
5. *Bauhinia purpurea* - Mantharai
6. *Bauhinia racemosa* - Anthi
7. *Bauhinia tomentosa* - Iryvathi
8. *Buchanania ailanthes* - Kattuna
9. *Borassus flabellifer* - Pannai
10. *Butea monosperma* - Murukka maram
11. *Bobax ceiba* - Ilavu, Sevvilavu
12. *Calophyllum inophyllum* - Pannai
13. *Cassia fistula* - Sarakondrai
14. *Cassia roxburghii* - Sengondrai
15. *Chloroxylon swietenia* - Purasa maram
16. *Cochlospermum religiosum* - Kongu, Manjal Ilavu
17. *Cordia dichotoma* - Mookuchali maram
18. *Cretoa adamsenii* - Mavalingum
19. *Dillenia indica* - Uva, Uzha
20. *Dillenia pentagyna* - Siru Uva, Sitruzha
21. *Diospyros ebenum* - Karungali
22. *Diospyros chloroxylon* - Vaganai
23. *Ficus amplissima* - Kal Itchi
24. *Hibiscus tiliaceus* - Aattru poovarasu
25. *Hardwickia binata* - Aacha
26. *Holoptelia integrifolia* - Aayili
27. *Lanea coromandelica* - Odhiam
28. *Lagerstroemia speciosa* - Poo Marudhu
29. *Lepisanthus tetraphylla* - Neikottai maram
30. *Limonia acidissima* - Vila maram

31. *Litsea glutinosa* -Pisin pattai
32. *Madhuca longifolia* - Illupai
33. *Mankara hexandra* - Ulakkai Paalai
34. *Mimusops elengi* - Magizha maran
35. *Mitragyna parvifolia* - Kadamba
36. *Morinda pubescens* - Nura
37. *Morinda citrifolia* - Veilai Nura
38. *Phoenix sylvestre* - Eachai
39. *Pongamia pinnata* - Pungam
40. *Premna mollissima* - Marnai
41. *Premna serratifolia* - Narumunai
42. *Premna tomentosa* - Purangai Naari, Pudanga Naari
43. *Prosopis cinerea* - Vanni maran
44. *Pterocarpus marsupium* - Vengai
45. *Pterospermum canescens* - Vennangu, Tada
46. *Pterospermum xylocarpum* - Polavu
47. *Puthranjiva roxburghii* - Puthrangivi
48. *Salvadora persica* - Ugai Maran
49. *Sapindus emarginatus* - Manipungu, Soupu kai
50. *Saraca asoca* - Asoca
51. *Strobilus asper* - Piraya maran
52. *Strychnos nuxvomica* - Yetti
53. *Strychnos potatorum* - Therthang Kottai
54. *Syzygium cumini* - Naval
55. *Terminalia bellerica* - Thandri
56. *Terminalia arjuna* - Ven marulhu
57. *Toona cilinte* - Sandhana vembu
58. *Thespesia populnea* - Puvarasu
59. *Walsura trifoliata* - valsura
60. *Wrightia tinctoria* - Vep

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

The subject was placed in the 492<sup>nd</sup> Authority meeting held on 16.03.2022. 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 condition in addition to the following conditions:

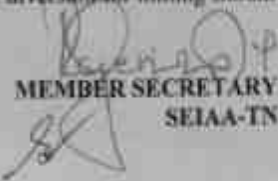
1. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.
2. The Environmental Impact Assessment shall 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.
3. 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.
4. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
5. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
6. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
7. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
8. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
9. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
10. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.
11. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

  
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12. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.
13. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.
14. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.
15. 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.
16. 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/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

  
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- 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, 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.

  
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- 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 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

  
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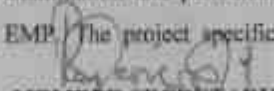


Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of 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.
- 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.

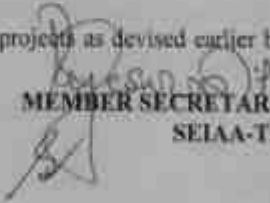
  
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- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological 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 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

  
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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:-
  - 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

  
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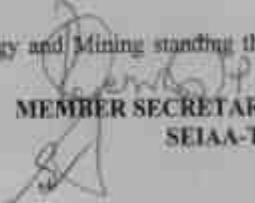
the Ministry shall also be filled and submitted.

- 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))
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 submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that

  
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- 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 its acquisition, nearby (in 2-3 km.) water body, population, within 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.
  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 institutions/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.

  
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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 & EC 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 (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.

  
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- 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.

  
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**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. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> Floor, Cathedral Garden Road, Nungambakkam, Chennai -34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003.
6. The District Collector, Tiruppur District.
7. Stock File.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

### TOR COMPLIANCE

The point wise ToR compliances issued by SEIAA, Tamil Nadu for Proposed Rough stone and Gravel Quarry of an area is 4.97.0 Ha, while total cluster area is in Survey No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu. Details of ToR issued by SEIAA is as follows.

LESSEE	PROPOSAL NO	TOR LETTER
Tvl. R.P.P. Blue Metals	SIA/TN/MIN/67364/2021	SEIAA-TN/F.No.8780/SEAC/ToR-1081/2021

### TERMS OF REFERENCE (ToR) for Tvl. R.P.P. Blue Metals

S.No.	Condition	Compliance
1.	The Project proponent (PP) shall furnish the details of fencing in the existing quarries operated by the same PP as per mine closure plan.	The fencing has been provided all around the boundary of the project site and the photos has been attached as <b>Annexure X, Page No. 347.</b>
2.	The Proponent shall carry out the cumulative & comprehensive impact study due to mining operations carried out in the quarry cluster specifically with reference to the 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.	The anticipated impacts due to mining operations carried out in the quarry cluster and its mitigation measures have been discussed in Chapter 4 of Draft EIA Report.
3.	The Proponent shall carry out the Socio Economic Impact Assessment study in the vicinity of the villages located in the proposed quarry.	The socio-economic study has been discussed in <b>Chapter 3, Section 3.14, Page no. 103.</b>
4.	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, a) What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	It is an existing quarry, and it is a patta land. Previously the applied area for quarrying lease as 1. Rc. No. 273/Mines/2013 Dated 21.09.2016 - Lease Period: 21.09.2016 to 20.09.2021 - 5 Years



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
	<p>b) Quantity of minerals mined out.  c) Highest production achieved in any one year  d) Detail of approved depth of mining.  e) Actual depth of the mining achieved earlier.  f) Name of the person already mined in that leases area.  g) If EC and CTO already obtained, the copy of the same shall be submitted.  h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.</p>	<p>Operated by P.Selvasundaram over an extent of 4.97.0 Ha EC Obtained - Lr.No.SEIAA-TN/F.No.4385/1(a)/ EC.No.2884/2015 dated: 15.02.2016.</p> <p>The pit dimension letter is given as <b>Annexure II, Page No. 222</b></p>
5.	<p>All corner coordinates of the mine lease area, superimposed on 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).</p>	<p>All maps have been provided in <b>Chapter 1 and Chapter 2</b> of Draft EIA report.</p> <p>Topo map – Pg No. 27  Geomorphology – Pg No. 43  Geology – Pg No. 41  Lithology – Pg No. 44</p>
6.	<p>The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees &amp; safety distance between the adjacent quarries &amp; water bodies nearby provided as per the approved mining plan.</p>	<p>It is an existing quarry, The fencing has been provided all around the boundary of the project site and the photos has been attached as <b>Annexure X, Page No. 347</b></p>
7.	<p>The Project Proponent shall provide the details of geological 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.</p>	<p>The geological reserves, mineable reserves and Year wise production details has been discussed in <b>Chapter 2, Section 2.13, page No.46</b></p> <p>The anticipated impacts due to mining operations carried out in the quarry cluster and its mitigation measures have been discussed in Chapter 4 of Draft EIA Report.</p>

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
8.	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 man power details has been discussed in <b>Chapter 2, Section 2.4.3, Page No. 38</b>
9.	The Project Proponent shall conduct the 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) 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.	The hydro-geological study has been conducted and attached in <b>Chapter 3, Section 3.12.4, Pg No. 83</b>
10.	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 for the environmental and ecological parameters about surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study have been incorporated in Chapter 3.
11.	The recommendation for the issue of "Terms of Reference" is subjected to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and 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) and O.A.No.405/2016 and O.A.No.520 of 2016	Noted.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
	(M.A.No.981/2016, M.A.No.982/2016 & M.A.No.384/2017).	
12.	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.	Around 1000 trees will be planted around the site. The list of trees to be planted are given below:  Neem, Pungam, Poovarasu, Naval, etc.
13.	Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted in proper espacement as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall carmark 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.	The green belt plan is enclosed along with mining plates in <b>Annexure VII, Page No. 233</b>
14.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A Disaster management Plan has been discussed in <b>Chapter 7, Section 7.3, Pg No. 154</b>
15.	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.	A Risk Assessment and management Plan has been discussed in <b>Chapter 7, Section 7.2, Pg No. 152</b>
16.	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	The socio-economic study has been discussed in <b>Chapter 3, section 3.14, Page no. 103.</b>

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
	dimensions may be given with time frames for implementation.	
17.	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/TNPCCB.	It is an existing quarry. Previously the applied area for quarrying lease as 1. Rc. No. 273/Mines/2013 Dated 21.09.2016 - Lease Period: 21.09.2016 to 20.09.2021 - 5 Years Operated by P.Selvasundaram over an extent of 4.97.0 Ha EC Obtained - Lr.No.SEIAA-TN/F.No.4385/ 1(a)/ EC.No.2884/2015 dated: 15.02.2016.
18.	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 Reference besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted.
<b>Additional details by SEIAA</b>		
1.	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.	Noted and public hearing details will be included along with final EIA report.
2.	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.	Noted and will be complied in Final EIA report.
3.	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.	The biodiversity environment has been studied and discussed in <b>Chapter 3, Section 3.13, Pg No. 94.</b>

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
4.	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	It is a Rough Stone and Gravel Quarry with a Mineable depth of 47m only and hence, no need of mitigation and restoration / reclamation of the applied lease area.  The ultimate pit will be used to store water. The quarry will be fences and green belt will be developed around the boundary of the project site.
5.	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	The Noyyal River is located within 10m in Northern direction. The quarry will be carried out leaving 50m from the boundary of the river, hence there won't be any impact on fish habitats and the food WEB/ food chain.
6.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The soil samples have been collected surrounding the project site and physical, chemical components and microbial components study has been carried out and the results are tabulated in <b>Chapter 3, Section 3.9, Page No. 67</b>
7.	The Environmental Impact Assessment should study impact on biodiversity, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The biological environment impacts, and its mitigation measures has been given in <b>Chapter 4, Section 4.10, Page No.139</b>
8.	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	There are no existing trees in the project site and surrounding the project site. Only thorny shrubs were present.
9.	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The water environment impacts, and its mitigation measures has

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

S.No.	Condition	Compliance
		been given in <b>Chapter 4, Section 4.5, Page No. 130.</b>
10.	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	The EMP with budget for green belt development and mine closure plan including disaster management plan has been given in Chapter 10.
11.	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Noted and will be complied in Final EIA report.
12.	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	We will obtain letter from District forest officer indicating the nearest reserve forest and submit along final EIA report.  There is no protected areas, National Parks, Corridors and Wildlife pathways near project site.
13.	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	Impact of biological Environment is provided in <b>Chapter 4, Section 4.10, Page 139</b>
14.	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	Noted and will be complied in Final EIA report.
15.	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.	The Noyyal River is located within 10m in Northern direction. The quarry will be carried out leaving 50m from the boundary of the river, Hence there won't be much impact on aquatic plant and animals. There is no caves, heritage sites and archaeological sites near the project site.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
16.	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.	There will not be any plastic and microplastic pollution due to mining activity. Also, we ensure that we won't use any single use plastics in the project site.
<b>STANDARD TOR</b>		
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.	Previously the applied area for quarrying lease as 1. Rc. No. 273/Mines/2013 Dated 21.09.2016 - Lease Period: 21.09.2016 to 20.09.2021 - 5 Years Operated by P. Selvasundaram over an extent of 4.97.0 Ha EC Obtained - Lr.No.SEIAA-TN/F.No.4385/1(a)/ EC.No.2884/2015 dated: 15.02.2016. EC Letter attached as <b>Annexure II , Page No. 207</b>
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the Quarry should be given.	The copy of LOI i.e. Precise Area Communication Letter dated 28.07.2021 in the name of Lessee is attached as <b>Annexure I. Page No. 203</b>
3.	All documents including approved Quarry plan, EIA and Public Hearing should be compatible with one another in terms of the Quarry lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee	Noted & agreed.
4.	All corner coordinates of the Quarry 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).	Details of coordinates of all corner of proposed mining lease area have been incorporated in mining plan and Chapter 1 of EIA/ EMP Report.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
5.	Information should be provided in Survey of India Toposheet 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.	Topo map as attached in <b>Chapter-1, Pg No. 27.</b>
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.	The applied area is inspected by the VAO, Revenue Inspector of Mines, Deputy Director and confirmed the land is suitable for Rough stone quarrying operation with the land use policy of the state VAO Copy attached as <b>Annexure V, page No. 229</b>
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.	The proponent has framed its Environmental Policy and is Provided as <b>Annexure VIII. Page No. 305</b>
8.	Issues relating to Quarry 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.	It is an open cast mining project. Blasting details are incorporated in <b>Chapter-2, Section 2.17.1, Page No. 51</b>



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
9.	The study area will comprise of 10 km zone around the Quarry lease from lease periphery and the data contained in the EIA such as waste generation etc should be for the life of the Quarry / lease period.	The study area comprise of 10 km zone around the Quarry lease from lease periphery as mentioned and the data contained in the EIA such as waste generation etc. are for the life of the Quarry. in <b>Chapter 2.</b>
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 Quarry 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.	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 is given in <b>Chapter 3, Section 3.2, From Page No. 61</b> There is no wildlife sanctuary and national park, migratory routes of fauna in the study area
11.	Details of the land for any Over Burden Dumps outside the Quarry lease, such as extent of land area, distance from Quarry lease, its land use. R&R issues, if any, should be given.	There is no proposal for use of land outside the Quarry lease area for OB dumps, etc. There are no R&R issues involved in the project.
12.	A 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.	No forest land involved in the project.

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**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
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 since no forest land involved within Quarry lease area.
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 since no forest land involved in Quarry lease area.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No wildlife sanctuary, national park or biosphere reserve within 10 m radius of Quarry lease area.
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.	Impact On Biological Environment is given in <b>Chapter 3, Section 3.13, From Page No. 94</b>
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 Quarry 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.	Not Applicable since no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed) within 10 km radius.
18.	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the Quarry 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,	Details biological study (flora & fauna) within 10 km radius of the project site have been incorporated in <b>Chapter 3, Section 3.13, From Page No. 94</b> of EIA/ EMP Report.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
	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 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.	There is no critically polluted area within 10 km radius of the mining area. Also, the project does not come under the 'Aravali Range'.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the Quarry 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).	The project does not fall under CRZ.
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	There is no Rehabilitation and resettlement is involved. Land classified as Patta land

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
	whether the village(s) located in the Quarry 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 (Pre 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 Quarry lease in the pre-dominant downwind direction. The Mineralogical composition of PM10, particularly for free silica, should be given.	Baseline environmental monitoring was conducted in the core zone and buffer zone during <b>March 2022 to May 2022</b> . Site specific meteorological data was also collected during the study period. The monitoring location details and the monitoring results are discussed in <b>Chapter 3</b> .
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.	Air quality modeling was carried out for the rough stone mining project using AERMOD as incorporated in <b>Chapter-4, Section 4.3, Page No. 118, While maximum incremental due to Mining values are Shown in Table 4.2, Page No. 121</b>

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
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.	Water requirement for the project and source are given in detail in <b>Table no.2.2 in Chapter 2, Page No. 38</b>
25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable Water will be taken from nearby villages
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. 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.	Proposed water conservation measures including rainwater harvesting measures are discussed in <b>Chapter 4</b>
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.	Impact of the project on the surface and ground water environment and necessary control measures are discussed in <b>Chapter 4,</b>
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.	The mining activities will not intersect ground water during life of Quarry as per plan period and Conceptual Plan as discussed in <b>Chapter 4, Section 4.5, Page No. 130</b>
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.	There is no seasonal stream or nallah flowing through the mining area.

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**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
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.	Highest elevation: 207 AMSL Depth: 62 to 67m m Below Ground Water Level
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.	Progressive green belt development plan is prepared and attached mining plate no. IV
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 such as State Government) should be covered Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Impact on local transport infrastructure due to the project has been assessed. There shall not be much impact on local transport. Traffic density from the proposed mining activity has been incorporated in <b>Chapter-4 section No.4.9, Page No. 137</b> EIA/EMP report.
33.	Details of the onsite shelter and facilities to be provided to the Quarry workers should be included in the EIA Report.	Details of onsite facilities to be provided to the Quarry workers are given in <b>Chapter 2</b> .

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>
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.	Conceptual Plan and Section of the Quarry lease area is given in Chapter 2
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 anticipated occupational health impacts and proposed preventive measures are discussed in <b>Section 4.8 in Chapter 4, Page No. 134</b>
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.	The public health implications due to the project are discussed in <b>Section 4.8.3 in Chapter 4, Page No. 137</b>
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.	CSR Activities as per Need based assessment which will be done as per comments during public hearing.
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.	Environmental Management Plan for the project is discussed in detail in <b>Chapter 9</b> .
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.	The draft EIA/EMP report is submitted for public hearing. Issues raised in the public hearing along with time bound action plan will be incorporated in the final EIA/EMP report.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

<b>S.No.</b>	<b>Condition</b>	<b>Compliance</b>						
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.	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.	<table border="1"> <tr> <td>Project cost</td> <td>Rs. 76,55,000/-</td> </tr> <tr> <td>EMP cost</td> <td>Rs. 1,22,50,605/-</td> </tr> <tr> <td>CER Cost</td> <td>Rs.5,00,000/-</td> </tr> </table>	Project cost	Rs. 76,55,000/-	EMP cost	Rs. 1,22,50,605/-	CER Cost	Rs.5,00,000/-
Project cost	Rs. 76,55,000/-							
EMP cost	Rs. 1,22,50,605/-							
CER Cost	Rs.5,00,000/-							
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster Management Plan is included in <b>Section 7.3 of Chapter 7, Page No. 154</b>						
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.	The Project benefits are clearly spelt out in <b>Chapter 8.</b>						
44.	Besides the above, the below mentioned general points are also to be followed:-  <ol style="list-style-type: none"> <li>1. Executive Summary of the EIA/EMP Report</li> <li>2. All documents to be properly referenced with index and continuous page numbering.</li> <li>3. Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.</li> <li>4. Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&amp;CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.</li> <li>5. Where the documents provided are in a language other than English, an English translation should be provided.</li> <li>6. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.</li> <li>7. While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by</li> </ol>	All general are followed while preparing EIA/EMP.						



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

**ToR Compliance**

S.No.	Condition	Compliance
	<p>MoEF&amp;CC vide O.M. No. J-11013/41/2006-1 A.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.</p> <p>8. 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&amp;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.</p> <p>9. As per the circular no. J-11011/61S/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.</p> <p>10. 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 Quarry pit and external dumps, if any, clearly showing the land features of the adjoining area.</p>	

## **1. INTRODUCTION**

### **1.1 INTRODUCTION**

Environmental Impact Assessment (EIA) is the basic management tool to ensure the sustainable development with proposed project implementation. In the process of EIA anticipated environmental impacts due to proposed project identified including social and economic impacts, prior to decision making for the project implementation. EIA is the decision-making tool, which guides the decision maker to take appropriate decisions for proposed project. EIA study systematically examines both beneficial and adverse impact due to proposed project to ensure that anticipated impacts can be mitigating during operational phase of the project with resilience to climate.

### **1.2 HISTORY OF THE PROJECT**

Lessee Tvl. R.P.P. Blue Metals has applied for TOR to prepare EIA report for grant of Environmental Clearance for proposed Roughstone and Gravel Quarry having an area of 4.97.0 Ha located in Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.

As the total cluster comes to 7.34.5 Ha (1 Existing + 1 Proposed) as the cluster area more than 5 Ha but less than 100 Ha project falls in B Category. The project falls in B1 category vide OM No F. NO. L-11011/175/2018-IA-II (M) dated 12<sup>th</sup> December 2018 as per order dated 4<sup>th</sup> September 2018 and 13<sup>th</sup> September 2018 passed by Ho'ble NGT, New Delhi in O.A. NO. 173 of 2018 and O.A. NO. 186 of 2016.

Details of LOI and ToR of the Quarry are given in **Table 1.1** below.

**TABLE 1-1 LOI & TOR DETAILS**

<b>Name of Lessee</b>	<b>LOI Letter No.</b>	<b>LOI Letter Date</b>	<b>Period of lease</b>
Tvl. R.P.P. Blue Metals	Rc. No.1605/Mines/2020	28.07.2021	5 years
	<b>ToR Letter No.</b>	<b>Letter Date</b>	-
	SEIAA-TN/F.No.8780/SEAC/ToR-1091/2021	17.03.2022	-

### **1.3 PURPOSE OF THE REPORT**

The purpose of the EIA process is to inform decision-makers and the public of the environmental consequences of implementing a proposed project. The EIA document itself is a technical tool that identifies, predicts and analyses impacts on the physical environment, as well as social, cultural, and health impacts.

The purpose of this report is to assess the environment impact, suggest the environmental mitigation measures and to assess the technical feasibility, economic viability and sustainable development of the Rough stone and Gravel Quarry over a cluster area of 4.97.0 Ha located

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Lessee Tvl. R.P.P. Blue Metals**

## **Chapter 1: Introduction**

at Survey Nos. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

The Mined stone will be used for the setting up of the basic infrastructure facilities, roads, housing, ports, railways, irrigation, etc. It will generate employment and the overall development of the state while contributing to the state and central income. The proposed product from the Quarry will be utilized for private and government projects in and around the surrounding districts in Tamil Nadu. The abundance of rough stone & gravel and its growing demand in the state has prompted the entrepreneur for the mining quarry in this area.

The EIA/EMP has been prepared in accordance with the Standard ToR. Further to assess the impact on environment, it is necessary to ascertain present status of environment prevailing at the project site and identification and Assessment of impact on the environment. Keeping these points and statutory requirement in view, this Environment Impact Assessment Report (EIA) and Environmental Management Plan (EMP) has been prepared. Environmental Study has been carried out within 10 km radius of proposed Quarry lease area for one season monitoring data from March TO May 2022.

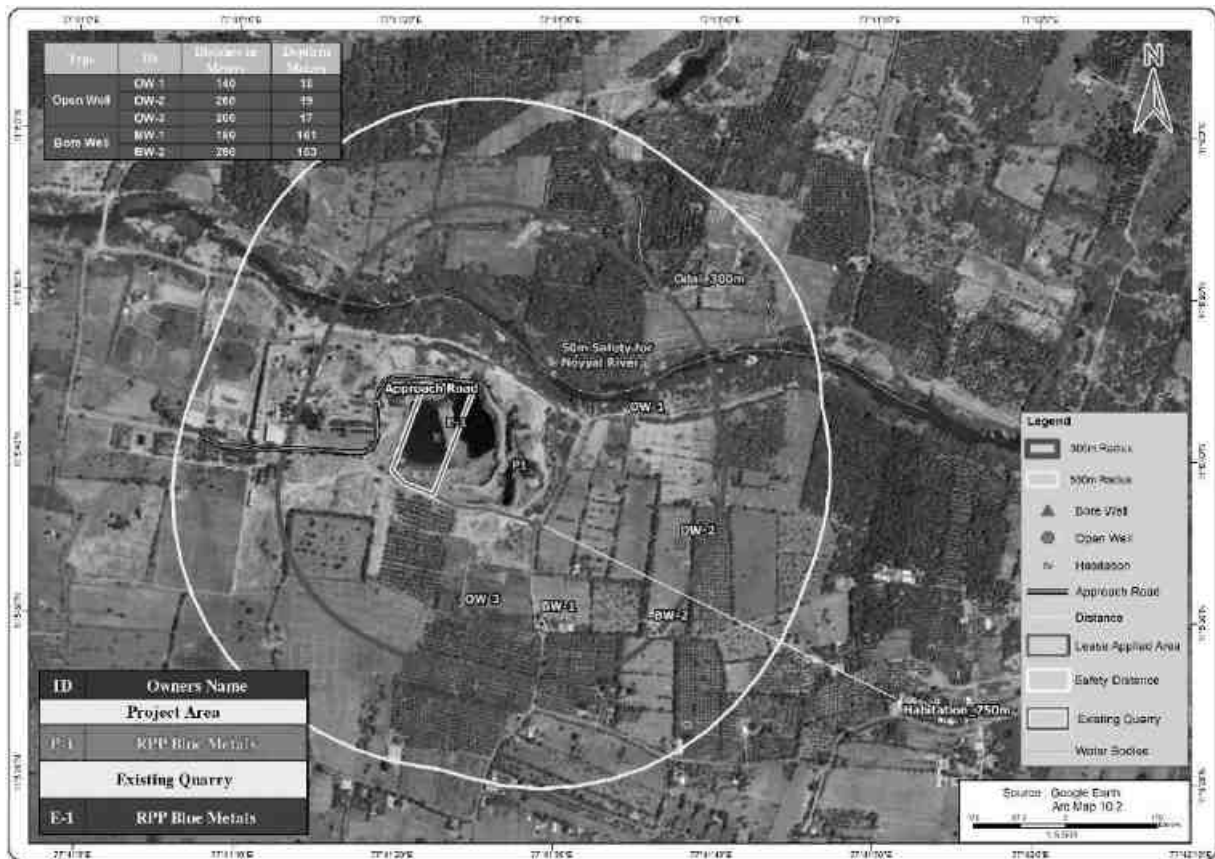
The application for TOR was submitted to prepare EIA report for grant of Environmental Clearance (Form-1, PFR and Approved Quarry Plan) for this proposed Quarry was considered as per the provisions of EIA Notification dated 14<sup>th</sup> September 2006. The proposals were considered by the State Expert Appraisal SEAC. The proposal was recommended for TOR by SEAC, Tamil Nadu. The proposal was considered by SEIAA, Tamil Nadu in its meeting and granted Terms of Reference (ToR) to prepare the Environmental Impact Assessment and Environmental Management Plan. The cluster details are provided in **Table 1.2**.

**TABLE 1-2 LIST OF QUARRIES WITHIN THE CLUSTER**

<b>S.No</b>	<b>Name of the lessee</b>	<b>S. F. Nos</b>	<b>Extent Area (Ha)</b>	<b>Period of lease</b>
Existing				
1.	Tvl. R.P.P. Blue Metals	49	2.37.5	28.09.2018 to 27.09.2023
Proposed				
1.	Tvl. R.P.P. Blue Metals	46	4.97.0	-
<b>Total Extent</b>			<b>7.34.5</b>	



**FIGURE 1.1: GOOGLE MAP OF PROJECT SITE ALONG WITH BOUNDATY PILLAR ON WGS 94 DATUM**



**FIGURE 1.2 CLUSTER IMAGE**

The applications for TOR were submitted in order to prepare EIA report for grant of Environmental Clearance (Form-1, PFR and Approved Quarry Plan) for all Rough stone and Gravel Mines was considered vide Application no. SIA/TN/MIN/67364/2021 by SEAC, as per the provisions of EIA Notification dated 14<sup>th</sup> September 2006. Rough stone and Gravel Mines were considered by the State Expert Appraisal SEAC. The proposal was recommended for TOR by SEAC, Tamil Nadu.

Previously the applied area was under 1 spell of quarrying lease as below -

Rc. No. D.273/Mines/2013 Dated 21.09.2016 - Lease Period: 21.09.2016 to 20.09.2021 – 5 Year - Operated by P.Selvasundaram over an extent of 4.97.0 Ha EC Obtained for the Lease Granted - Lr.No.SEIAA-TN/F.No.4385/1(a)/EC No.2884/2015 dated: 15.02.2016. EC Letter is attached as **Annexure II**.

This Environmental Impact Assessment (EIA) report is prepared for obtaining Environmental Clearance (EC) from the State Environmental Impact Assessment Authority, Tamil Nadu for open cast Rough stone and Gravel Quarry.

M/s. Enviro Resources, Mumbai has been allocated work to undertake Environmental Impact Assessment (EIA) studies as per the Terms of Reference (ToR) for assessing the impacts due to Minor Quarry cluster project in the districts of Karur. To assess the activities on various environmental parameters and prepare an Environment Management Plan for mitigating the adverse impacts of the project. The public hearing will be conducted in line with the EIA Notification dated 14<sup>th</sup> September 2006 and its amendments and as prescribed in ToR. The final report will be upgraded after public hearing incorporating concerns of public raised at the time of public hearing.

## **1.4 IDENTIFICATION OF PROJECT & PROJECT PROPONENT**

### **A. Project Proposal**

**Table 1-3 PROJECT DETAILS**

Proposed Project	Rough Stone & Gravel Quarry – 4.97.0 Ha
Location of the Project	Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.

### **B. Screening Category**

As per EIA Notification dated 14<sup>th</sup> September 2006 & subsequent amendments on 1<sup>st</sup> December 2009 and 4<sup>th</sup> April 2011; the proposed mining project falls under Activity(1a), namely Mining of Minerals. Such activities are further divided into category “A” and “B”. The said project is for mining Rough stone and Gravel cluster area 4.97.0 Ha such projects are listed as category “B” under the said notification, this project is categorized as ‘B’ category project as the total cluster area is 7.34.5 Ha. This project comes into B Category due to Cluster situation. As per latest amended EIA Notification, dated 14.08.2018 lease area upto

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100 Ha now falls under B category. The project falls in B1 category vide OM No F. NO. L-11011/175/2018-IA-II (M) dated 12<sup>th</sup> December 2018 as per order dated 4<sup>th</sup> September 2018 and 13<sup>th</sup> September 2018 passed by Ho'ble NGT, New Delhi in O.A. NO. 173 of 2018 and O.A. NO. 186 of 2016.

### C. Mining Lease Status

Lessee has obtained Letter of Intent by District Collector, Tiruppur District vide letter no. Rc. No.1605/Mines/2020 dated 28.07.2021 for Rough stone and Gravel stone Quarry for a lease area of 4.97.0 Ha located at Survey No. 46 in Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu for 5 years.

### D. Status of approval of Mining Plan

Mining Plan for the proposed project has been approved for plan period 5 years by District Geologist, Geology and Mining, Karur, Tamil Nadu. Copy of approval letter is enclosed as **Annexure IV**.

**Table 1-4 MINING PLAN DETAILS**

Name of Lessee	S.F. Nos.	Approved Quarry Plan Letter No.
Tvl. R.P.P. Blue Metals	46	R.c.No. 1605/2020/Mines dated 03.08.2021

## 1.5 INTRODUCTION OF PROJECT PROPONENT

Details of the lessee is given below.

**Table 1-5 PROJECT PROPONENT DETAILS**

<b>Lessee Name</b>	Tvl. R.P.P. Blue Metals
<b>Managing Partner Name</b>	P.Selvasundaram
<b>Address</b>	No.156, Mullamparappu, Nathagoundampalayam Post, Erode District, Tamil Nadu State – 638 115.
<b>Mobile No</b>	+91 73395 60777
<b>Email ID</b>	agm.accounts@rpp.selvam.com
<b>Site Address</b>	Survey No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.

## 1.6 BRIEF DESCRIPTION OF THE PROJECT

This is a case of proposed Rough stone and Gravel Quarry having total cluster area of 7.34.5 Ha) located in Survey No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu. The project proponent has applied for Environmental clearance as per EIA notification dated 14<sup>th</sup> September 2006 and its amendments. The cost of project **Rs. 85.35** lakhs. Details of Quarry is presented in **Table 1.6**.

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**Table 1-6 BRIEF DESCRIPTION OF THE PROJECT**

<b>Location of Project</b>	Survey No. 46, Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu	
<b>Topo sheet Number</b>	58 - E/12	
<b>Type of Mining</b>	Open Cast Mechanized Mining	
<b>Seismic Zone</b>	Seismically, this area is categorized under Zone-III as per IS-1893 (Part-1)-2002. Hence, seismically the site is medium Damage Risk Zone. With MSK scale of VII.	
<b>No of Working Days</b>	300days/ year	
<b>Quarry Area</b>	4.97.0 Ha	
<b>Quarry Location on WGS 1984 datum</b>	<b>Latitude</b>	<b>Longitude</b>
	11°05'36.42"N to 11°05'45.94"N	77°41'22.94"E to 77°41'30.84"E

**1.7 LOCATION OF THE PROJECT**

The cluster is in Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu. The nearest railway station is Ingur Railway station at 18.24 Km, NW Direction. The nearest SH-83A: Kangayam to Erode 2.57 Km, W from the project site The area is included in Survey of India Toposheet No. 58 E/12 on R.F. 1:50,000. The google image of project site **FIGURE 1.3**. The Boundary Pillar Co-ordinates are given in **Table 1.7**. The location map of the project site is presented in **FIGURE:1.4**. Topographical map of study area 10 km radius is shown in **FIGURE:1.5**. The environmental setting and the project details is presented in **Table-1.8**. Photographs of the Rough stone and Gravel Quarry are given in **FIGURE: 1.6**. 1 Km Radius google Image of lease area is shown in **FIGURE 1.7**. There is no critically polluted identified cluster by CPCB/MOEF in the vicinity of the project.

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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**FIGURE 1.3 GOOGLE IMAGE OF THE LEASE AREA**

**Table 1-7 BOUNDARY CO-ORDINATES OF LEASE AREA**

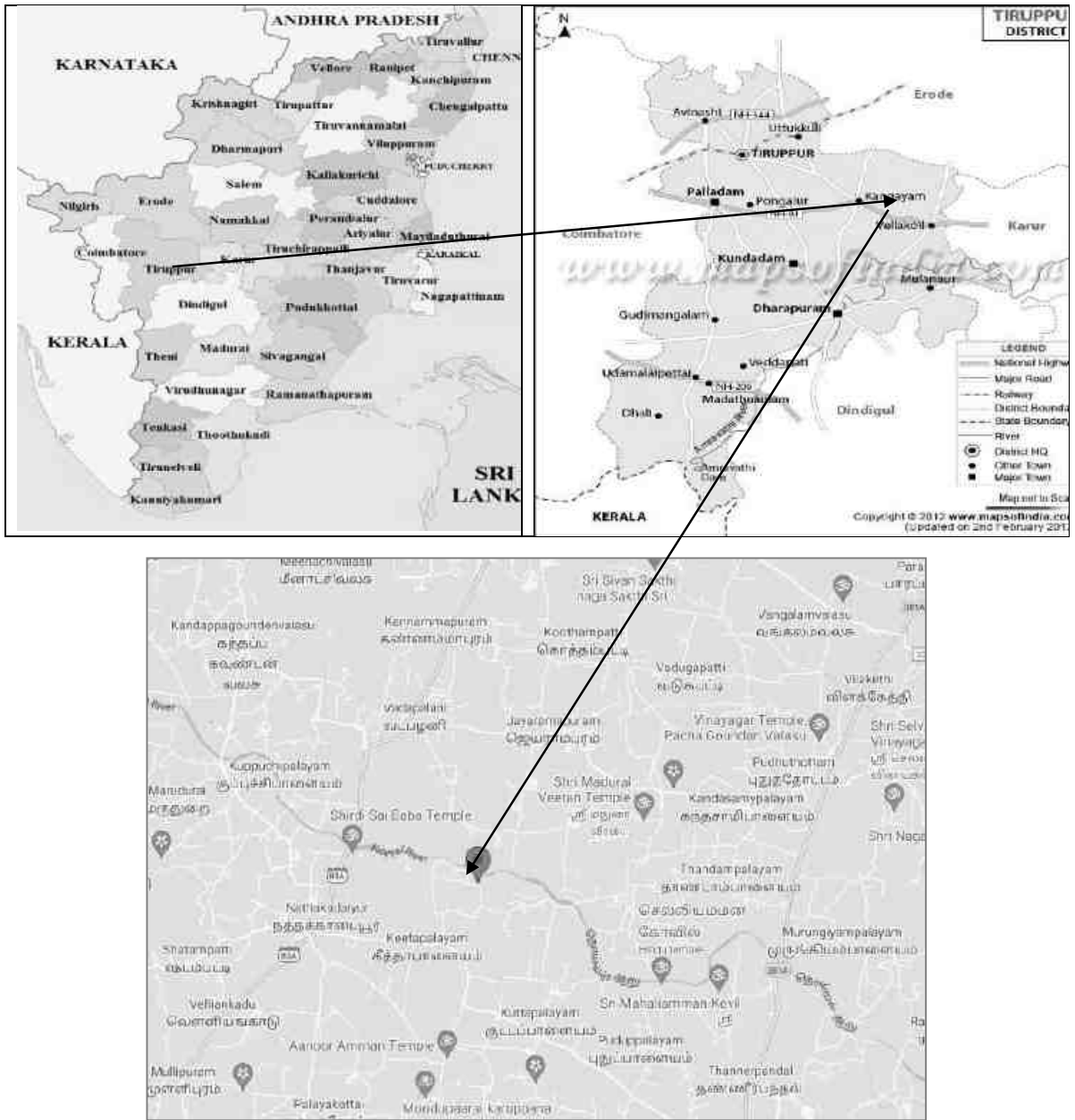
S. No.	Latitude	Longitude	S. No.	Latitude	Longitude
1.	11° 5'37.42"N	77°41'22.90"E	6.	11° 5'39.11"N	77°41'31.12"E
2.	11° 5'45.63"N	77°41'25.96"E	7.	11° 5'36.29"N	77°41'30.07"E
3.	11° 5'45.52"N	77°41'27.12"E	8.	11° 5'35.66"N	77°41'29.63"E
4.	11° 5'42.90"N	77°41'30.55"E	9.	11° 5'36.52"N	77°41'26.47"E
5.	11° 5'40.91"N	77°41'30.14"E	10.	11° 5'36.77"N	77°41'24.21"E



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**FIGURE 1.4 LOCATION MAP**

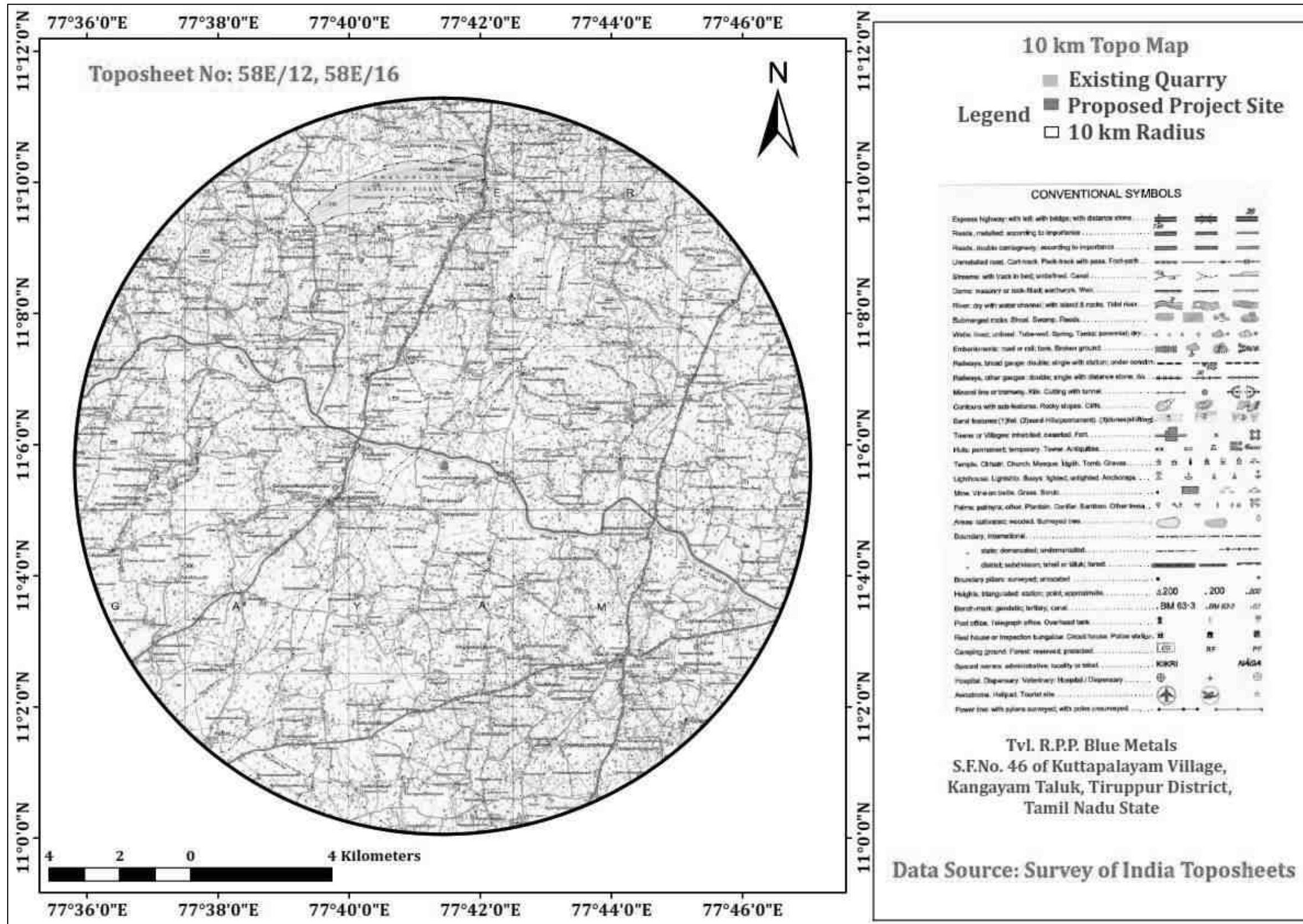


FIGURE 1.5 TOPOGRAPHICAL MAP OF STUDY AREA (10 KM RADIUS)



**FIGURE 1.6 PHOTOGRAPHS OF QUARRY**

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**FIGURE 1.7 1KM RADIUS GOOGLE IMAGE**

**Table 1-8 PROJECT DETAILS**

S. No.	Particulars	Details	
1	Type of Project	Rough Stone and Gravel Quarry	
2	Quarry area applied	4.97.0 Ha	
3	Project Location	Survey Nos. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.	
4	Quarry Location on WGS 1984 datum	<b>Latitude</b>	<b>Longitude</b>
		11°05'36.42"N to 11°05'45.94"N	77°41'22.94"E to 77°41'30.84"E
5	Topo sheet Number	58 E/12	
6	Geological Reserves	<b>Rough stone</b>	<b>Gravel</b>
		12,14,763 m <sup>3</sup>	74,047 m <sup>3</sup>
7		<b>Rough stone</b>	<b>Gravel</b>

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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S. No.	Particulars	Details	
	Mineable Reserves & Year-wise Production	3,94,606 m <sup>3</sup>	52,191 m <sup>3</sup>
8	Lease period	5 years	
9	Site elevation above Mean Sea Level	207m AMSL	
10	Land use at the proposed project site	Patta Land Land Cover: Barren Land which is not fit for vegetation/cultivation	
11	Site Topography	Sloping Towards Northeastern	
12	Ultimate depth of Mining	47m below ground level (2m Gravel + 45m Rough Stone) below ground level	
13	Existing Pit Dimension	108m (L) x 188m (W) x 27m (D)	
14	Ultimate Pit Dimension	197m (L) x 206m (W) x 47m (D) (BGL)	
15	Climatic Conditions	IMD Data, Tiruppur (1971-2000) <ul style="list-style-type: none"> <li>• Avg. Ambient air temp - 46.6° C to 20.6° C</li> <li>• Annual rainfall - 793 mm</li> </ul>	
16	Seismic zone	Seismically, this area is categorized under Zone-III as per IS-1893 (Part-1)-2002. Hence, seismically the site is High Damage Risk Zone. With MSK scale of VII.	
17	Nearest road	MDR 688 is present at a distance of 1.3 Km, South from Project Site	
18	Nearest State/National Highway	NH67 - Trichy - Coimbatore - 15.0km - S SH83A - Kangayam - Erode - 2.57 km-W	
19	Nearest Railway Station	Ingur Railway station at 18.24 Km, NW	
20	Nearest Air Port	Coimbatore Airport - 80.0km - W	
21	Nearest village/major town	Kangayam - 17.0km - SW	
22	Nearest Town, city, District Headquarters along with distance in kms.	Town: Kangayam - 17.0km - SW District: Tiruppur 38.24 Km, W Direction	

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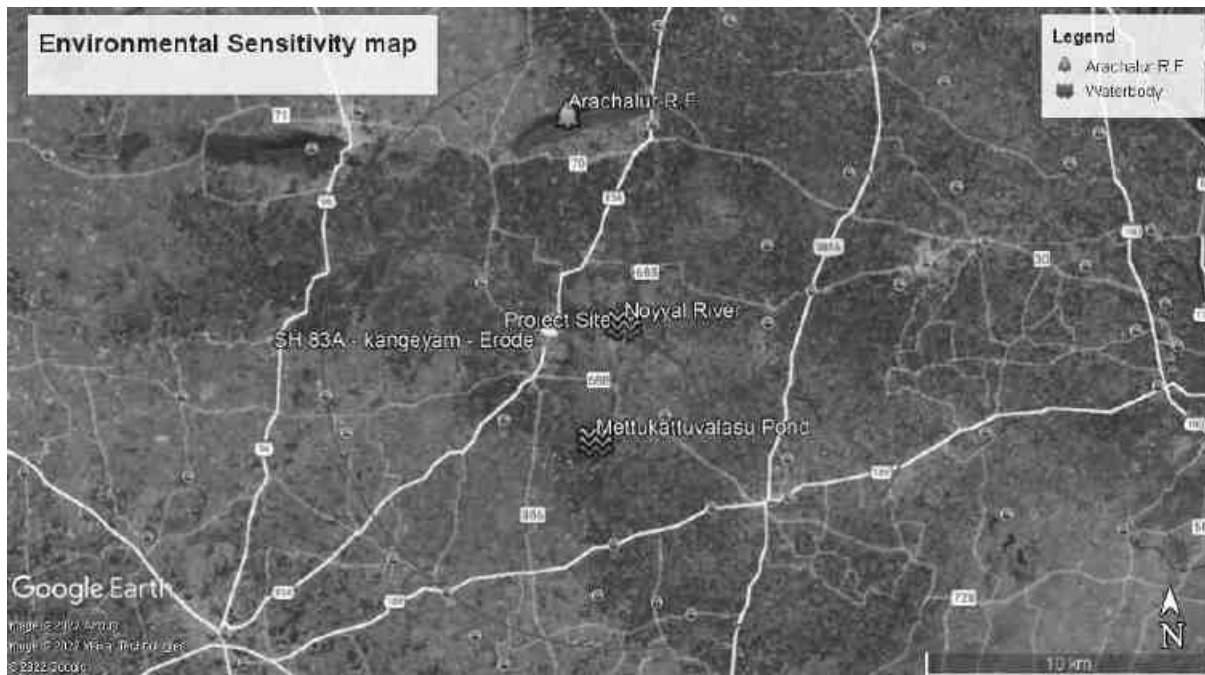
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S. No.	Particulars	Details		
23	Ecologically sensitive zone	No wildlife sanctuary, national park or biosphere reserve within 10m radius of Quarry lease area.		
24	Reserved/Protected forests	Arachalur R.F. – 7.56 km, NW		
25	Historical/tourist places	None within 10 Km radius of Quarry lease area		
26	Nearest Hill	Arachalur Malai – 7.56 km, NW		
27	Nearest water bodies	<b>Water bodies</b>	<b>Distance (Km)</b>	<b>Direction</b>
		<u>Noyyal River</u>	0.01	N
		Mettukattuvalasu Pond	4	SW
28	Nearest Hospital	Government Hospital - Nathakadaiyur: 3.24 Km, SW Direction		
29	Details of other quarries for a radius of 500m around the quarry site	<p>There are following quarries located within the radius of 500m from the proposed project site.</p> <p>Details:</p> <p>Abandoned quarry – Nil</p> <p>Existing quarry – 1 No. (2.37.5 Ha)</p> <p>Proposed quarry – 1No (4.97.0Ha)</p> <p>The total extent of the Existing and proposed quarry within the radius of 500m is <b>7.34.5 Ha</b>. The project falls under the cluster situation.</p>		
30	Man power	Total Employees proposed for the quarry operation is <b>36 Nos.</b>		
31	Water requirement & source	Total water requirement for <b>4.3 KLD</b> from water vendors & nearby Bore well.		
32	Overburden /Waste	The overburden in the form of Gravel formation		
33	Cost of the project	<b>The Project Cost:</b>		
		Project cost	=	Rs. 76,55,000/-
		EMP cost	=	Rs. 1,22,50,605/-
		CER Cost	=	Rs. 5,00,000/-

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**FIGURE 1.8 ENVIRONMENTAL SENSITIVITY MAP**

### 1.8 SUPPLY AND DEMAND DETAILS

There is a huge demand of Rough stone for State and National Road projects is under massive development for its widening and strengthening operation, apart from this many bridges and fly overs are also being under construction. And also, huge requirements of Rough stone for Public and Private sector projects to infrastructure development of the state; hence the project is significant to the state.

Railway lines in the country also under progress where huge Rough stone is required as Ballast. Other internal Panchayat Roads are also under progress, besides all these public works projects the Rough stone is widely used for domestic construction project like Hospital, School, Government Building and Housing construction. It is worth mentioning that the Rough stone of Tiruppur District.

### 1.9 SCOPE OF THE STUDY

The EIA study includes detailed characterization of various environmental components like Air, Noise, Water, Soil, Land and Socio-economics within 10 km radius around the study area and the SEAC, Tamilnadu committee suggested us to focus on baseline data which includes Hydrology study, Ground water study, Biodiversity assessment and land use cover within in the 10km radius around the mining lease area. The EIA is done based on collection of one season data (From March 2022 to May 2022)

### **1.10 DATA GENERATION**

The data has been generated by Enviro Tech Services, Ghaziabad (U.P) in accordance with the requirement of statutory agencies from March 2022 to May 2022. The monitoring and testing have been done as per the guidelines of MoEF&CC and the IS standards.

### **1.11 DATA COLLECTION**

The EIA study is being done for the Quarry Lease (core zone) and area within 10 km radius (buffer zone), both of which comprise the study area. The following data has been collected by Enviro Resources through field survey and other sources for preparing the EIA/EMP for the mining project.

- Details of wild fauna and flora within 10 km from the project site and information about forests, if any.
- Eco-sensitive places, sanctuaries, biosphere reserves within 10 km radius.
- Physical environment (Air, Water, Soil, & noise) baseline data.
- Religious places / historical monuments and tourist places within 10 km radius.
- Land use pattern within core zone and buffer zone (10 km radius around the core zone) based on Survey of India toposheet map and satellite image.
- Demography and Socio-economic based on last available Census data for entire study area.
- Relevant meteorological data, for previous decades from Indian Meteorological Department (IMD) and primary data.
- Study of present environmental protection and mitigation measures in nearby operating similar projects if any.
- Identification of water bodies, hills, roads etc. within 10 km radius.

### **1.12 GENERIC STRUCTURE OF ENVIRONMENTAL IMPACT ASSESSMENT DOCUMENT**

As per EIA notification of the MoEF dated 14th September 2006 as amended Dec 2009, the generic structure of the EIA document will be as under:

- Introduction
- Project Description
- Analysis of Alternatives (Technology and site)
- Description of the Environment
- Anticipated Environmental Impact & Mitigation Measures
- Environmental Monitoring Programme
- Additional Studies
- Project Benefits
- Environmental Cost Benefit Analysis
- Environmental Management Plan
- Summary & Conclusion



- Disclosure of Consultants engaged.

### 1.13 PREPARATION OF EIA/EMP

The EMP will include the following details:

- Present Environmental Setting.
- Identification, prediction and evaluation of anticipated environmental impact due to the proposed Quarry and related facilities.
- The environmental impacts would be anticipated in core and buffer zone.
- Sensitive Places/Historical Monuments.
- Measures to control the surface and ground water pollution due to various effluents to be discharged, if any.
- Measures to control air pollution due to proposed activities/operation.
- Green belt development plan and reclamation plan of Quarry.
- Measures to contain noise pollution & mitigate adverse impact on workers and habitat in core and buffer zone.
- Pronounce the improvement in socio-economic conditions & benefits the people will get on implementation of the project.
- Total and specific cost of control measures.
- Environmental monitoring, implementation organization and feedback mechanism to effect mid-course corrections.
- Identification of flora species which can be planted in and around the project.

The field studies for baseline environmental studies were conducted for a period of three months representing to determine Quarry existing levels of various environmental attributes as outlined in **Table 1.9**. The scope also includes all the conditions outlined in the ToR's prescribed.

**Table 1-9 ENVIRONMENTAL ATTRIBUTES AND FREQUENCY OF MONITORING**

S. No.	Attributes	Parameters	Frequency
1	Ambient Air Quality	PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , & Mineralogical composition of PM <sub>10</sub> , particularly for free silica	24 hourly samples, twice a week for three months at 8 locations.
2	Meteorology	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall	Continuous hourly recording (one season) at project site. Secondary data from the nearest IMD station.
3	Water quality	Physical and Chemical parameters.	Grab samples collected once during study period from 5

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S. No.	Attributes	Parameters	Frequency
			ground water and 3 surface water locations.
4	Soil Quality	Physical and Chemical parameters.	Grab samples collected once during study period from 8 locations.
5	Ecology	Existing terrestrial flora and fauna covering Core Zone & Buffer Zone (10-Km radius). Existing aquatic ecological status in Buffer Zone (10-Km radius).	Through field studies once during study period. Secondary data also collected.
6	Noise levels	Noise levels in dB (A) Day and Night.	Hourly Noise levels in and around the project area for 24 hours at each location once during study period at 7 locations.
7	Land use	Current land use scenario	Once during study period based on recent satellite imagery and ground-truthing at site.
8	Geology	Geological details	Once during study period. Data collected from secondary sources
9	Hydrogeology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas, etc.	Based on primary and secondary sources, once during study period.
10	Socio-Economic aspects	Socio-economic aspects like demography, population dynamics, infrastructure resources, health status, economic resources, etc.	From primary and secondary sources (like census abstracts of census of India 2011) once during the study period.

**1.14 TERMS OF REFERENCE**

The EIA/EMP report is prepared for Rough stone and Gravel cluster Quarry; which is classified as “**Category B**” by Ministry of Environment, Forest & Climate Change (MoEF & CC), New Delhi, as per the EIA notification dated on 14<sup>th</sup> September, 2006 and as the lease area is less than 100 Ha vide amended EIA Notification dated 14.08.2018. The project falls in B1 category vide OM No F. NO. L-11011/175/2018-IA-II (M) dated 12<sup>th</sup> December 2018

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as per order dated 4<sup>th</sup> September 2018 and 13<sup>th</sup> September 2018 passed by Ho'ble NGT, New Delhi in O.A. NO. 173 of 2018 and O.A. NO. 186 of 2016.

The draft report is prepared incorporating the Terms of Reference (ToR's) granted by SEIAA, Tamil Nadu to prepare the Environmental Impact Assessment and Environmental Management Plan vide its letter No. SEIAA-TN/F.No.8780/SEAC/ToR-1081/2021 dated 17.03.2022.

## 2. PROJECT DESCRIPTION

### 2.1 TYPE OF PROJECT

Lessee has applied for TOR to prepare EIA report for grant of Environmental Clearance for Rough stone and Gravel Quarry in an area of 4.97.0 Ha, located in Survey No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.

### 2.2 NEED FOR THE PROJECT

The basic objective of the project is to have effective utilization of Rough stone and Gravel stone as a building material in this region and state. The spur in infrastructure development and construction industry has enhanced the demand of Rough stone and Gravel stone in past few years. Building stone Quarry not only provides the building material but also employment and economic growth of the region that ultimately enhance the socio-economic status of the people of the region and the state. The mining activities shall provide socio-economic benefits to the local population with direct & indirect employment opportunities. The project also contributes to the regional and financial benefits in the form of Royalty, Cess, Taxes, DMF etc.

### 2.3 LOCATION

**Table 2-1 LOCATION DETAILS**

1	Survey No.	46	
2	Village	Kuttapalayam Village	
3	Taluka and District	Kangayam Taluk, Tiruppur District	
4	State	Tamil Nadu	
5	Toposheet No.	58 E/12	
6	Latitude & Longitude	<b>Latitude</b>	<b>Longitude</b>
		11°05'36.42"N to 11°05'45.94"N	77°41'22.94"E to 77°41'30.84"E

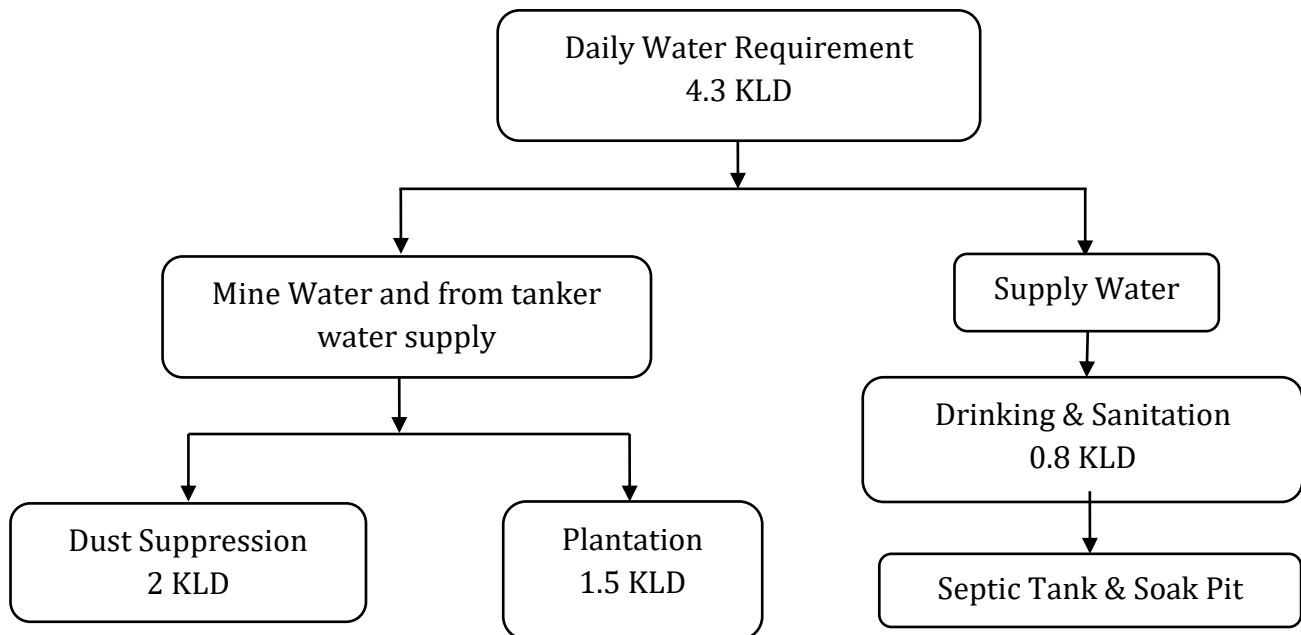
### 2.4 REQUIREMENTS FOR THE PROJECT

#### 2.4.1 Land Requirement

Lessee has obtained Letter of Intent by Deputy Director, Department of Geology and Mining, Tiruppur District for Rough stone and Gravel stone Quarry for a lease area 4.97.0 Ha located at Survey Nos. 46 in Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu. The LOI is provided for lease period of 5 years.

#### 2.4.2 Water Requirement

Total water requirement for the project will be 4.3 KLD, which will be met from Quarry pit water (when available) and by tankers from nearby bore wells. Water for drinking purposes will be supplied from nearby borewell. Details of water requirement in the project are presented in **Table 2.2**. Water balance diagram for the proposed Quarry is given in **Figure 2.1**



**FIGURE 2.1 WATER BALANCE DIAGRAM**

**Table 2-2 DAILY WATER REQUIREMENT (KLD)**

Purpose	Quantity	Sources
Drinking & Domestic Purpose	0.8KLD	From Existing bore wells and drinking water will be sourced from Approved Water vendors.
Dust suppression	2.0KLD	From Existing bore wells from nearby area
Green belt	1.5KLD	From Existing bore wells from nearby area
<b>Total</b>	<b>4.3 KLD</b>	

### 2.4.3 Man Power Requirement

The Quarry will provide employment for activities such as drilling, excavation, transportation etc. The list of proposed manpower for Rough stone and Gravel Quarry is shown in **Table-2.3**.

**Table 2-3 REQUIREMENT OF MANPOWER**

S.No	Particulars	Nos
1.	Mine Foreman	1
2.	Blaster/mate	1
3.	Excavator- Operator & Driver	6
4.	Jack hammer operator	16
<b>Semi- Skilled Labour</b>		
5.	Security	1
<b>Unskilled Labour</b>		
6.	Labour & Helper	5
7.	Cleaner	6
<b>Total</b>		<b>36</b>

*Source: Approved Mining Plan*

#### **2.4.4 Power Requirement**

Most of the Quarry machinery will be operated on diesel and thus, no major electrical power will be required for mining. The proposed Rough stone and Gravel Quarry does not require any power supply for the Mining operation. It is proposed to operate in day time only from 9 Am to 5 PM with 1 Hour lunch interval between 1PM to 2PM.

#### **2.4.5 Diesel Requirement**

**3,24,380** Liters of HSD will be used for the entire project life. Diesel will be brought from nearby diesel pumps. No power is required for the project. Lightings on the Night will be taken from nearby electric poles after obtaining permission from concerned authorities.

##### **1. For Gravel:**

Per hour Excavator will consume = 10 liters / hour  
 Per hour Excavator will excavate = 60m<sup>3</sup>of Gravel  
 Rough stone quantity = 52191/60 = 870hours  
 Diesel consume = 870 hours x 10 litres  
 Total diesel consumption = **8700** Liters of HSD will be utilized for Gravel

##### **2. For Rough stone:**

Per hour Excavator will consume = 16 liters / hour  
 Per hour Excavator will excavate = 20m<sup>3</sup>of Rough stone  
 Rough stone quantity = 394606/20 = 19730 hours  
 Diesel consume = 19730hours x 16 litres  
 Total diesel consumption = **3,15,680** Liters of HSD will be utilized for Gravel

**Total diesel consumption =8700 + 3,15,680**  
**=3,24,380 liters**

#### **2.4.6 Extent of Mechanization**

Since the deposit in this area is massive in nature, it is proposed to carry out opencast mining for this plan period. The lists of machines to be used in the Quarry are given in **Table 2.4**. Mostly hired equipment's are utilized.

**Table 2-4 LIST OF MACHINERY**

<b>S.No</b>	<b>Particulars</b>	<b>Nos</b>
1.	Jack hammer	8
2.	Compressor	2
3.	Excavator with Bucket and Rock Breaker	3
4.	Tippers	6

*Source: Approved Mining Plan*

**2.4.7 Lorry Load Calculation**

One lorry load = 6m<sup>3</sup> (approx.)  
 Total No of working days = 300 days per year  
 Total quantity to be removed in this five years plan period = 394606m<sup>3</sup>  
 Hence total lorry loads per day = 394606m<sup>3</sup> / 6m<sup>3</sup>  
 = 65768 Lorry loads  
 = 65768/ 5years  
 = 13154/ 300 days

**Rough stone = 44 Lorry loads per day**  
 Total quantity of gravel to be removed during three years = 52191 m<sup>3</sup> (Gravel)  
 Hence total lorry loads per day = 52191 m<sup>3</sup> / 6m<sup>3</sup>  
 = 8699 Lorry loads  
 = 8699/ 3  
 = 2900/ 300 days  
**Gravel load per day = 10 Lorry loads per day**

**2.5 PROJECT COST**

The estimated cost of the proposed Rough stone and Gravel quarry is proposed to be Rs. 76,55,000/-the split up is given below in Table.

**Table 2-5 ESTIMATION OF PROJECT COST**

Project cost	Rs. 76,55,000/-
EMP cost	Rs. 1,22,50,605/-
CER Cost	Rs.5,00,000/-

**2.6 MAINTENANCE REQUIREMENT**

Regularly maintenance will be carried out of all equipment’s at service centers located in nearby Town. The proposed method of mining operation will be Open Pit Quarry by using by drilling, blasting, loader and tipper/dumper combination. The machineries to be deployed are surface drilling, excavators, Water Tanker loading and transportation.

**2.7 GEOLOGY OF THE AREA**

**2.7.1 Regional Geology**

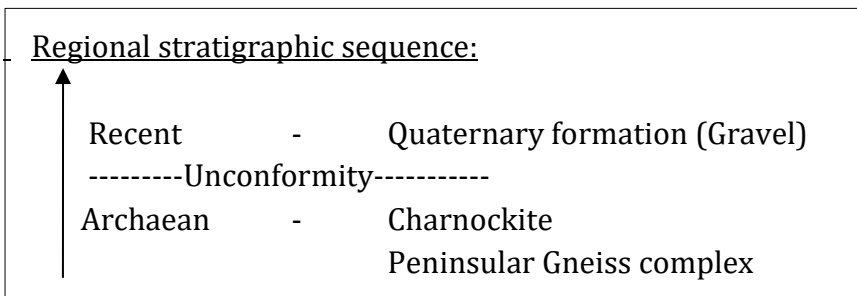
Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale the Charnockite body N30<sup>0</sup>E – S30<sup>0</sup>W with dipping towards SE60<sup>0</sup>.

The general geological sequences of the rocks in this area are given below:

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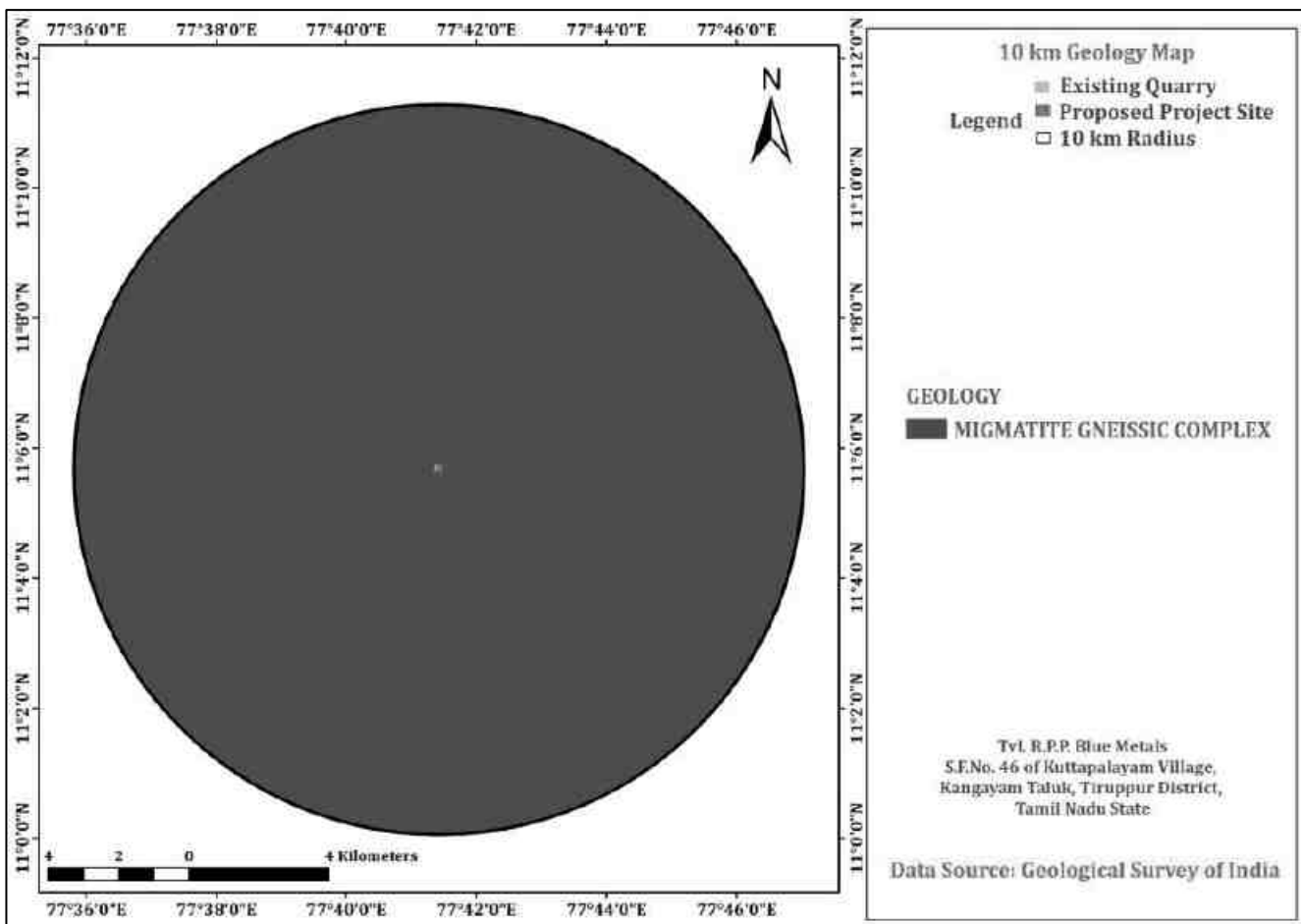
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The study area has presence of Quaternary formation of recent age which is underlain by chranokiites of Archaean age along with Peninsular Gneiss Complex.

**2.7.2 Local Geology**

The lease applied area is flat terrain. The gradient is gentle towards Southeastern and altitude of the area is 270m above from Mean sea level. The area is covered by 2m thickness of Gravel, 3m thickness of Weathered Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit. The Geological map is presented in **Figure 2.2**.



**FIGURE 2.2 GEOLOGICAL OF STUDY AREA**



## 2.8 HYDROGEOLOGY

The district is underlain by both porous and fissured formations. The important aquifer systems in the district are constituted by i) unconsolidated formations and ii) weathered and fractured crystalline rocks. The porous formations in the district are represented by alluvium and colluvium. The Colluvial formations are occurring in the western boarder of Tiruppur district. The porous formations in the district include sandstones and clays of Recent to sub recent and Tertiary age (Quaternary). The alluvial formations comprising mainly sands, clays and gravels are confined to major drainage courses in the district. The maximum thickness of alluvium is 35.0m whereas the average thickness is about 25.0m.

The area falls in one major river basins namely Thirumanimuthar River. River Thirumanimuthar originates from the Shevroy hills in Salem District, Tamilnadu State and flows in the south and south-eastern direction before it debouches into Gulf of Mannar. The river connecting of Cauvery River.

*(Source: District Groundwater Brochure, Tiruppur District, Tamil Nadu, CGWB 2013).*

**Table 2-6 RANGE OF AQUIFER PARAMETERS**

Name	Sp. Capacity (lpm/d)	Specific Yield (%)	T (m <sup>2</sup> /d)	K (m/day)	Yield of wells (lps)
Alluvium	2.08	7.2	98	19.7	2.5
Tertiary	78-173	1.4-3.5	46-134	16-33	2-3.3
Cretaceous	33-782	0.3-2.56	33-782	10-66	1.1-3.5
Crystalline	27-224	0.8-2.5	16-60	5-20	1-2

*Source: <http://nwm.gov.in/sites/default/files/Notes%20on%20Tiruppur%20District.pdf>*

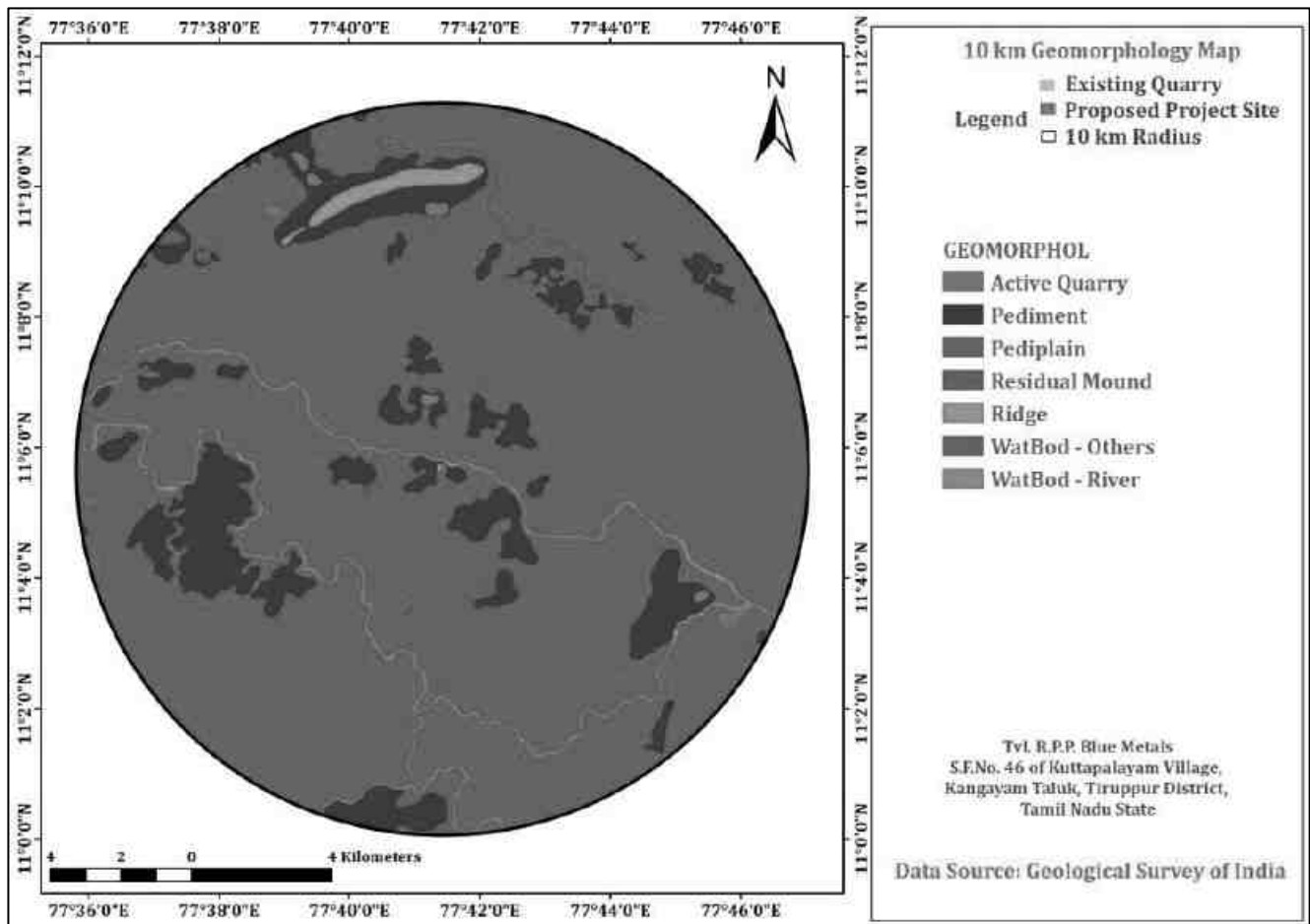
## 2.9 GEOMORPHOLOGY

The study area is part of residual hill with hillocks. Most of the area is covered with pediment and pediplain. The geomorphological map of 10km study area is shown in **Figure 2.3**.

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**FIGURE 2.3 GEOMORPHOLOGY OF STUDY AREA**

**2.10 LITHOLOGY**

The subsurface order of existence of different geological stratum in a particular locality is described with the term called as lithology. The study area consists of top soil, weathered and fresh stratum of gneiss, charnockite. The lithological details of the study area are known from the selected bore logs across the study area. The lithological details of different bore logs are given in **Table 2.7**, Lithology details.

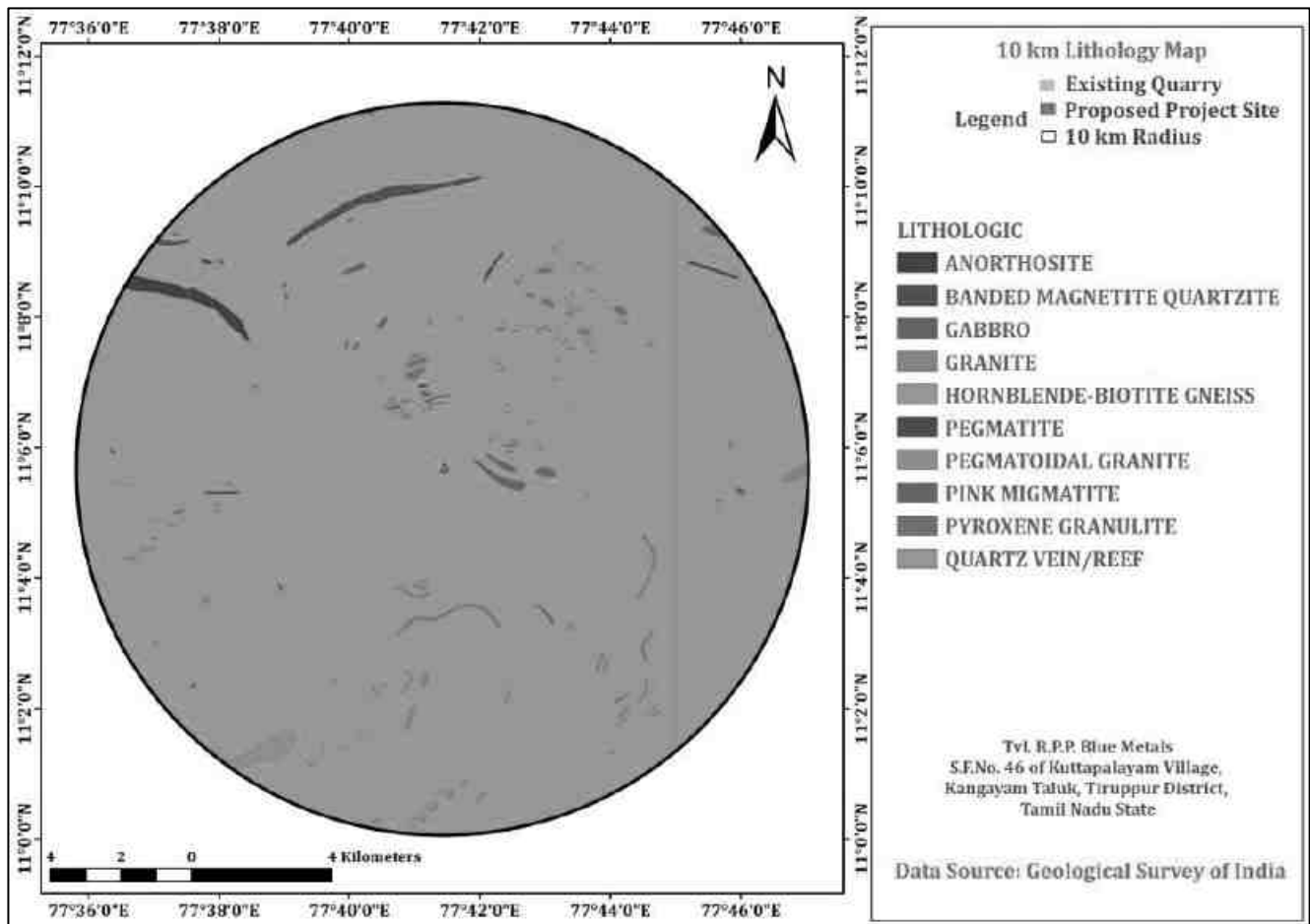
**TABLE 2-7 LITHOLOGY DETAILS**

GL- 2.0	Gravel
3.0 to 5.0	Weathered Gravel
2.0-45.0	Weathered Charnockite

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**FIGURE 2.4 LITHOLOGY OF STUDY AREA**

**2.11 PHYSIOGRAPHY AND DRAINAGE PATTERN**

This is a case of partly existing Quarry which will change in topography which will be there with formation of mining pits. Mining of Rough stone and Gravel by opencast method will change the existing topography within the Quarry lease area. The lease applied area is flat terrain. The gradient is gentle towards Southeastern and altitude of the area is 270m above from Mean sea level. The area is covered by 2m thickness of Gravel, 3m thickness of Weathered Gravel and followed by Massive Charnockite which is clearly inferred from the existing quarry pit. The Water level in the surrounding area is 67m in summer and at 63m in rainy season below general ground profile which is observed from the nearby bore wells.

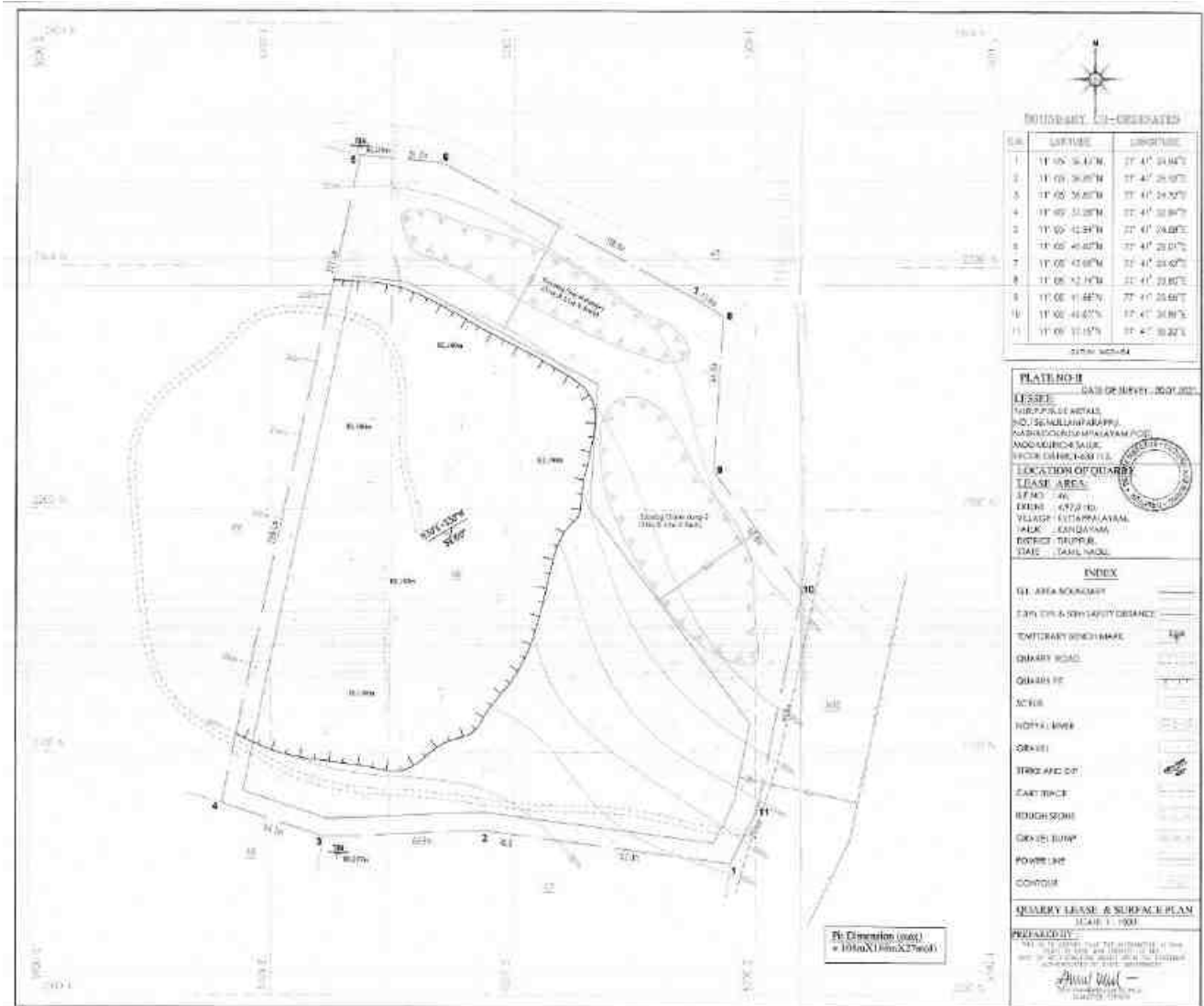
**2.12 DETAILS OF MINING**

The mine will be designed in such a way that the height of the bench is kept around 5m max and the width of benches will more than height, maintain a slope of 45° from the horizontal. Mining will be done with the help of drilling and blasting technique.

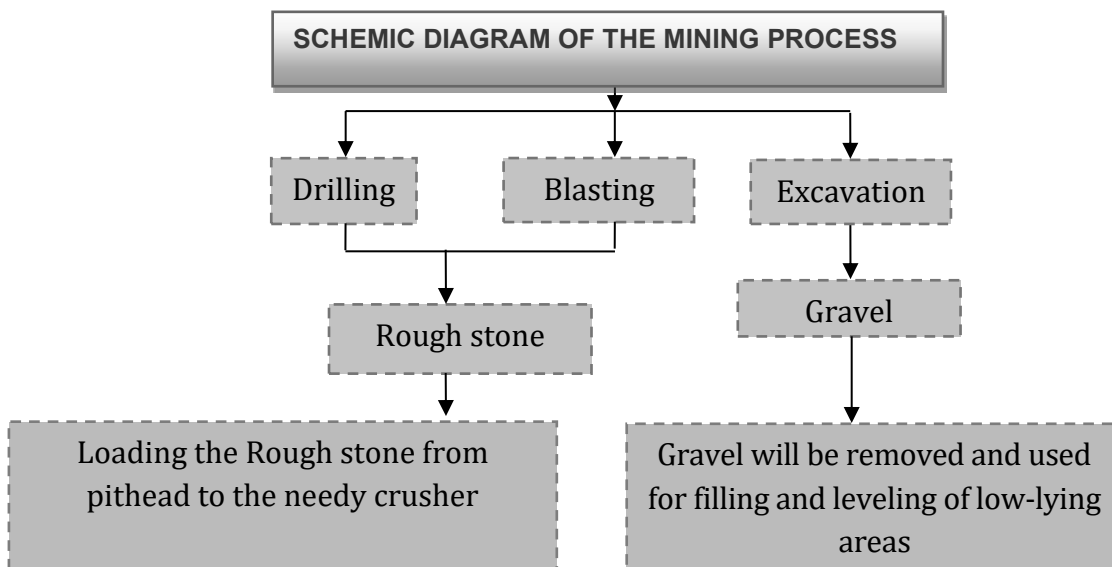
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**FIGURE 2.5 SURFACE PLAN OF MINE LEASE AREA**



## 2.13 RESERVE ESTIMATION & LIFE OF THE MINE

### 2.13.1 Reserve Estimation

The estimation of ore reserves is made by conventional parallel cross section method using geological cross section. The geological cross sections are prepared across the strike of the ore body. The area of individual litho units in each and every cross section is calculated separately. The volume between the cross section is arrived on the basis of the average area of parallel cross section i.e.  $((S1+S2)/2)$  and multiplying sectional interval. And tonnage is arrived at by multiplying by bulk density.

### 2.13.2 Geological Reserves

The geological cross sections are prepared across the strike of the ore body. The area of individual litho units in each and every cross section is calculated separately. Section wise sectional area is measured and multiplied by the influence to obtain the volume in m<sup>3</sup>. The volume is multiplied by 2.5MT/m<sup>3</sup> (bulk density) to calculate the resource of Rough stone and gravel in MT.

The total Geological resources are calculated after depletion of existing quarry pits. The total Geological reserves available in the mine lease area are given in **Table 2.8**.

**Table 2-8 SUMMARY OF AVAILABLE GEOLOGICAL RESERVE**

GEOLOGICAL RESOURCES						
Section	Bench	Length	Width	Depth	Geological Resources in	Gravel Formation
		in (m)	in (m)	in (m)	Rough stone (m3)	(ir.3)
Gravel Dump 1		131	21	5	-	13755
Gravel Dump 2		120	43	5	-	25800
XY-AB	i	55	50	2	-	5500
	iii	55	50	4.5	12375	-
	iv	55	50	5	13750	-
	v	55	50	5	13750	-
	vi	55	50	5	13750	-
	vii	88	168	5	73920	-
	viii	88	168	5	73920	-
	ix	88	168	5	73920	-
	X	88	168	5	73920	-
<b>Total</b>					<b>349305</b>	<b>45055</b>
XY-CD	i	36	27	2	-	1944
	ii	36	27	4	3888	-
	iii	36	27	5	4860	-
	iv	36	27	5	4860	-
	V	36	27	5	4860	-
	vi	36	27	5	48 60	-
	vii	171	125	5	106875	-
	viii	171	125	5	106875	-

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<b>GEOLOGICAL RESOURCES</b>						
		<b>Length</b>	<b>Width</b>	<b>Depth</b>	<b>Geological</b>	<b>Gravel</b>
	ix	171	125	5	106875	-
	x	171	125	5	106875	-
<b>Total</b>					<b>450828</b>	<b>1944</b>
X1Y1- CD	i	147	92	2	-	27048
	ii	45	66	3	8910	-
	iii	147	92	5	67620	-
	iv	147	92	5	67620	-
	V	147	92	5	67620	-
	vi	147	92	5	67620	-
	vii	147	92	5	67620	-
	viii	147	92	5	67620	-
	ix	147	92	5	67620	-
	X	147	92	5	67620	-
<b>Total</b>					<b>414630</b>	<b>27048</b>
<b>Grand Total</b>					<b>1214763</b>	<b>74047</b>

*Source: Approved Mining Plan*

Available Geological Resources of Gravel : 74,047 m<sup>3</sup>

Available Geological Resources of Rough stone : 12,14,763 m<sup>3</sup>

**2.13.3 Mineable Reserves**

Mineable reserve is getting restricted due to the formation of benches, leaving the statutory safety distance in the inner boundary, mineral lock up in the benches itself, ultimate depth of mining, bench slope adopted etc. So, the mineable reserve is estimated after reducing the Rough stone, weathered gravel and gravel blocked in the safety distance, benches and existing pit. The Rough stone, weathered gravel and gravel building stone reserves are given below.

**Table 2-9 SUMMARY OF MINEABLE RESERVE**

<b>MINEABLE RESERVES</b>						
<b>Section</b>	<b>Bench</b>	<b>Length in (m)</b>	<b>Width in (m)</b>	<b>Depth in (m)</b>	<b>Mineable Reserves in Rough stone (m<sup>3</sup>)</b>	<b>Gravel (m<sup>3</sup>)</b>
Gravel Dump 1		131	21	5		13755
Gravel Dump 2		120	43	5		25800
XY-AB	vii	28	105	5	14700	
	viii	23	95	5	10925	
	ix	18	85	5	7650	
	X	13	75	5	4875	
<b>Total</b>					<b>38150</b>	<b>39555</b>
XY-CD	i	27	27	2		1458
	ii	24	27	4	2592	
	iii	19	27	5	2565	
	iv	14	27	5	1890	

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<b>MINEABLE RESERVES</b>						
<b>Section</b>	<b>Bench</b>	<b>Length in (m)</b>	<b>Width in (m)</b>	<b>Depth in (m)</b>	<b>Mineable Reserves in Rough stone (m<sup>3</sup>)</b>	<b>Gravel (m<sup>3</sup>)</b>
	V	9	27	5	1215	
	vi	4	27	5	540	
	vii	135	117	5	78975	
	viii	130	112	5	72800	
	ix	125	107	5	66875	
	x	120	97	5	58200	
Total					285652	1458
X1Y1-CD	i	69	81	2		11178
	ii	33	66	3	6534	
	iii	58	73	5	21170	
	iv	48	68	5	16320	
	V	38	63	5	11970	
	vi	28	58	5	8120	
	vii	18	53	5	4770	
	viii	8	48	5	1920	
Total					70804	11178
Grand Total					394606	52191

*Source: Approved Mining Plan*

Total Mineable Reserves of Gravel : 52,191 m<sup>3</sup>

Total Mineable Recoverable Reserves of Rough stone : 3,94,606 m<sup>3</sup>

The mineable reserves have been computed as **3,94,606 m<sup>3</sup>** of rough stone at the rate of 100% recovery and **52,191 m<sup>3</sup>** of gravel upto a depth of 47 m (2m Gravel + 45m Rough stone).

### 2.13.4 Anticipated Life of The Mine

The estimated life of the proposed quarry is 5 years.

### 2.14 METHOD OF MINING

The method of mining is common for all the Cluster quarries, Opencast Mechanized Mining Method is being proposed by formation of 5 meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act - 1952.

The top layer of overburden (Gravel) will be directly excavated by Hydraulic Excavators and loaded into tippers directly and sold to needy customers. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to

required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

## 2.15 TOP SOIL, OVERBURDEN REMOVAL AND WASTEWATER

### Top Soil

There is no top soil in this proposed site.

### Overburden

The overburden in the form of Gravel formation which is about **52,191 m<sup>3</sup>** up to a depth of 2m. The Gravel will be directly loaded into Tippers for the filling and levelling of low-lying areas. The excavated Rough Stone (100%) will be directly loaded into Tippers to the needy customers. There is no Waste anticipated during this plan period hence, disposal of waste does not arise.

### Wastewater

There will not be any process effluent generation from the quarry lease area. Domestic effluent from the mine office is discharged in septic tank and soak pit.

There is no toxic effluent expected to generate in the form of solid liquid and gases and the no requirement of treatment of waste.

## 2.16 PRODUCTION DETAILS

Year wise Production of Rough stone and Gravel from the area will be upto maximum capacity. The recovery factor is up to 100% hence no waste expected to be generated. All excavated quantity is saleable. The summary of proposed development and production during the mine plan period is given in **Table 2.10**. The Plan showing mine development during the plan period is given in **Figure 2.5**.

**Table 2-10 YEAR- WISE DEVELOPMENT & PRODUCTION**

Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves in Rough stone (m3)	Gravel (m3)
I	XY-CD	i	27	27	2		1458
		ii	24	27	4	2592	
		iii	19	27	5	2565	
		iv	14	27	5	1890	
		V	9	27	5	1215	
		vi	4	27	5	540	
	X1Y1-CD	i	69	81	2		11178
		ii	33	66	3	6534	
		iii	58	73	5	21170	
		iv	48	68	5	16320	
		v	38	63	5	11970	



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Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves in Rough stone (m3)	Gravel (m3)	
		vi	28	58	5	8120		
		vii	18	53	5	4770		
		viii	8	48	5	1920		
		Total					79606	12636
II	Gravel Dump 2		120	43	5		25800	
	XY-CD	vii	135	117	5	78975		
		Total					78975	25800
III	Gravel Dump 1		131	21	5		13755	
	XY-CD	viii	130	112	5	72800		
		Total					72800	13755
IV	XY-AB	vii	28	105	5	14700		
		viii	23	95	5	10925		
		ix	18	85	5	7650		
		X	13	75	5	4875		
	XY-CD	ix	80	107	5	42800		
		Total					80950	
V	XY-CD	ix	45	107	5	24075		
		X	120	97	5	58200		
		Total					82275	
Grand Total						394606	52191	

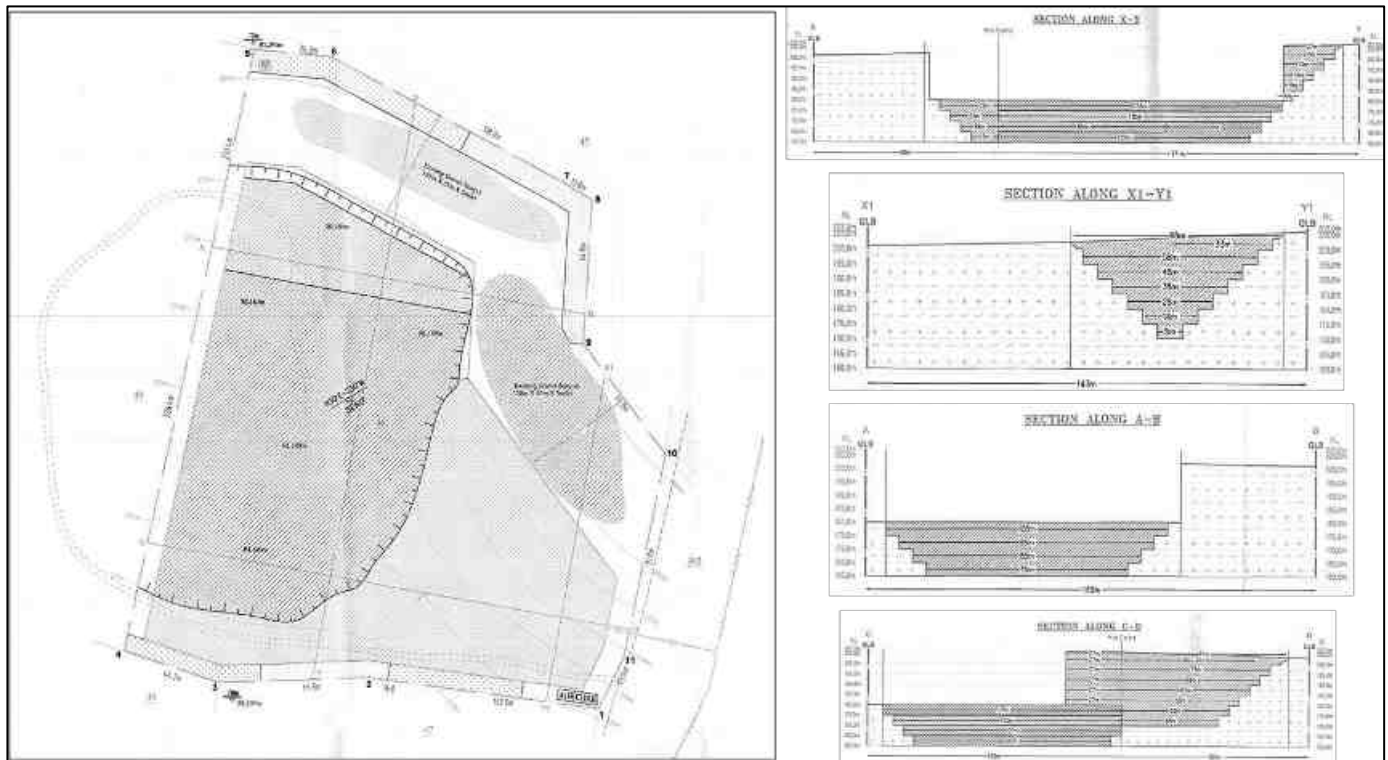
*Source: Approved Mining Plan*

Total proposed Reserves of Gravel : 52,191 m<sup>3</sup>  
 Total proposed Recoverable Reserves of Rough stone : 3,94,606 m<sup>3</sup>

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**FIGURE 2.6 PRODUCTION AND DEVELOPMENT PLAN AND SECTION**

### 2.17 DRILLING AND BLASTING PARAMETERS

Production from the fractured zone will be obtained with the help of excavator, whereas from compact zone the production will be obtained by drilling and blasting. Drilling will be done by jack hammer with the help of air compressor.

- Hole location will be properly dressed by excavator to remove the loose boulders for efficient drilling and for avoiding jamming of drilling hammer and bits.
- Drill holes of 30-32mm diameter and 1.5 m in depth will be made.
- To reduce the noise level the holes will be blasted by using nitrate mixture and Millisecond delay detonators.
- To maintain the bench height of 5m, sub bench of 2.5 m will be formed first, later on Two benches will be merged and one bench of 5m will be formed and maintained.
- The spacing and burden will be kept at 1.2 m and 1m respectively.
- About 30 to 50 holes will be blasted in one blast.
- Yield per hole will be  $1.5 \times 1 \times 1 = 1.5\text{m}^3$ .

#### 2.17.1 Blasting Pattern

The blasting pattern entirely depends on the situation of the joints present in the rocks. The drilling is done as per the requirement of the rock fragmentation with desired production of mineral.

**Table 2-11 BLASTING PROGRAM FOR THE PRODUCTION PER DAY**

<b>Particulars</b>	<b>Quantity</b>
No. of holes	288
Pattern of hole	Zigzag- Multi-rows
Inclination of holes	80 <sup>0</sup> from horizontal
Yield (Tons)	684
Powder factor (Tons/Kg of explosives)	6
Total explosive required (Kg-Slurry explosives)	114
Charge/hole (Kg)	0.5
Use of detonators	25millisecond relays
Detonating fuse	Detonating Cord

*Source: Approved Mining Plan*

### **2.17.2 Frequency of Blasting**

Blasting will be carried out only in Day time between 12.00 – 12.30P.M.

### **2.17.3 Storages of Explosives**

Licensed Portable explosive magazines will be utilized for storage of explosives. Blasting will be performed as per requirement on the face. The explosive will be handled by authorized blasting party himself and the blasting will be carried out by registered blasting contractor as per present practices. The controlled blasting is proposed by adopting all the safety measures as per "MMR 1961" and with the permission of DGMS.

### **2.17.4 Precautions**

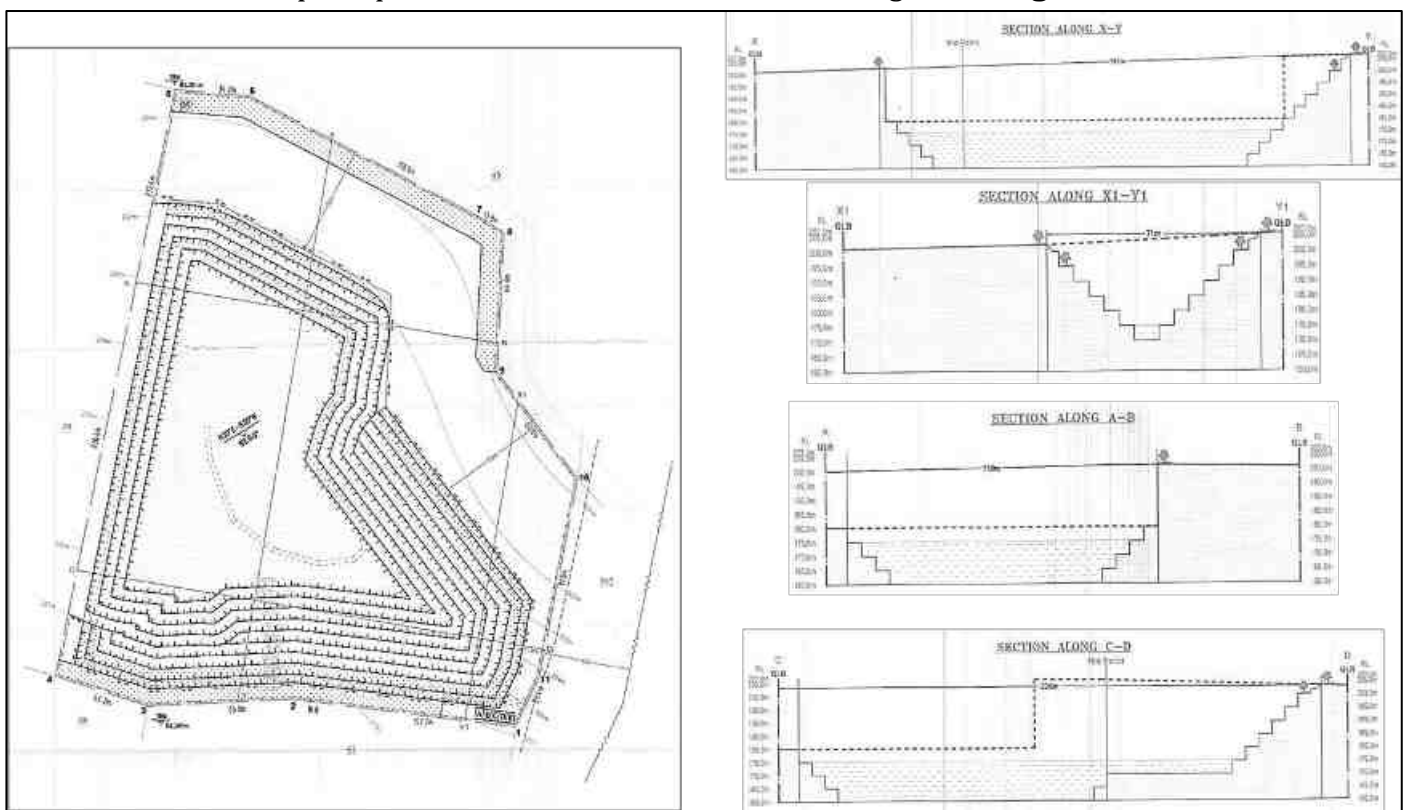
- Proper and safe storage of explosives in approved and Licensed Magazine.
- Proper, safe and careful handling and use of explosives by competent Blasters having Blaster's Certificate of Competency issued by DGMS.
- Proper security system to prevent theft/ pilferage, unauthorized entry into Magazine area and checking authorized persons to prevent carrying of match box, lights, mobile phones etc.
- The explosives of class- 2 will be used in their original cartridge packing and such cartridge shall not be cut to remove explosive for making cartridge of different size.
- Detonators will be conveyed in special containers. These will not be carried with other explosives.
- The holes which have been charged with explosives will not be left unattended till blasting is completed.
- Before starting charging, clear audible warning signals by Sirens will be given so that people nearby can take shelter.
- Blasting operations will be carried out in day times only. Also, in this project, the mining operations are proposed to be carried out in day times.

### 2.17.5 Types of Explosives Used

Slurry explosives (An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener), NONEL / Electric Detonator & Detonating Fuse.

### 2.18 CONCEPTUAL MINE PLAN

During conceptual stage the mined-out area will be converted into water reservoir and safety zone as well as upper benches will be used for plantation at the conceptual period. It will also serve the purpose as socio economic and corporate social responsibility of the lessee by way of supplying water for irrigation purpose or at will of the local people. This will help in ground water recharging as well. The conceptual plan and section of mine lease area is given in **Figure 2.6**.



**FIGURE 2.7 CONCEPTUAL PLAN**

### 2.19 LAND USE PATTERN OF MINE LEASE AREA

#### ➤ Land form

The applied area is flat terrain. The area is dry barren land. The area does not fall in forest land.

#### ➤ Land use

The area is a dry barren land devoid of Agriculture and Habitations. The land is not used for any specific vegetation.

#### ➤ Land Ownership

It is a Patta land. Registered in the name of the applicant Thiru.P.Selvasundaram vide Patta No. 588.

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The existing and proposed land use pattern of the mine lease area upto conceptual stage is given in **Table 2.12**.

**Table 2-12 EXISTING AND PROPOSED LAND USE PATTERN**

S. No.	Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
1.	Area under quarry	2.03.5	3.23.7
2.	Dump	0.64.1	Nil
3.	Infrastructure	Nil	0.01.0
4.	Roads	0.01.0	0.03.0
5.	Green Belt	Nil	0.35.6
6.	Unutilized Land	2.28.4	1.33.7
<b>Total</b>		<b>4.97.0</b>	<b>4.97.0</b>

*Source: Approved Mining Plan*

Plantation with suitable native species will be taken up along the safety zone and upper benches within mining lease area progressively with mine operation till mine closure.

**2.20 SITE SERVICES**

Following site services will be provided at the mine:

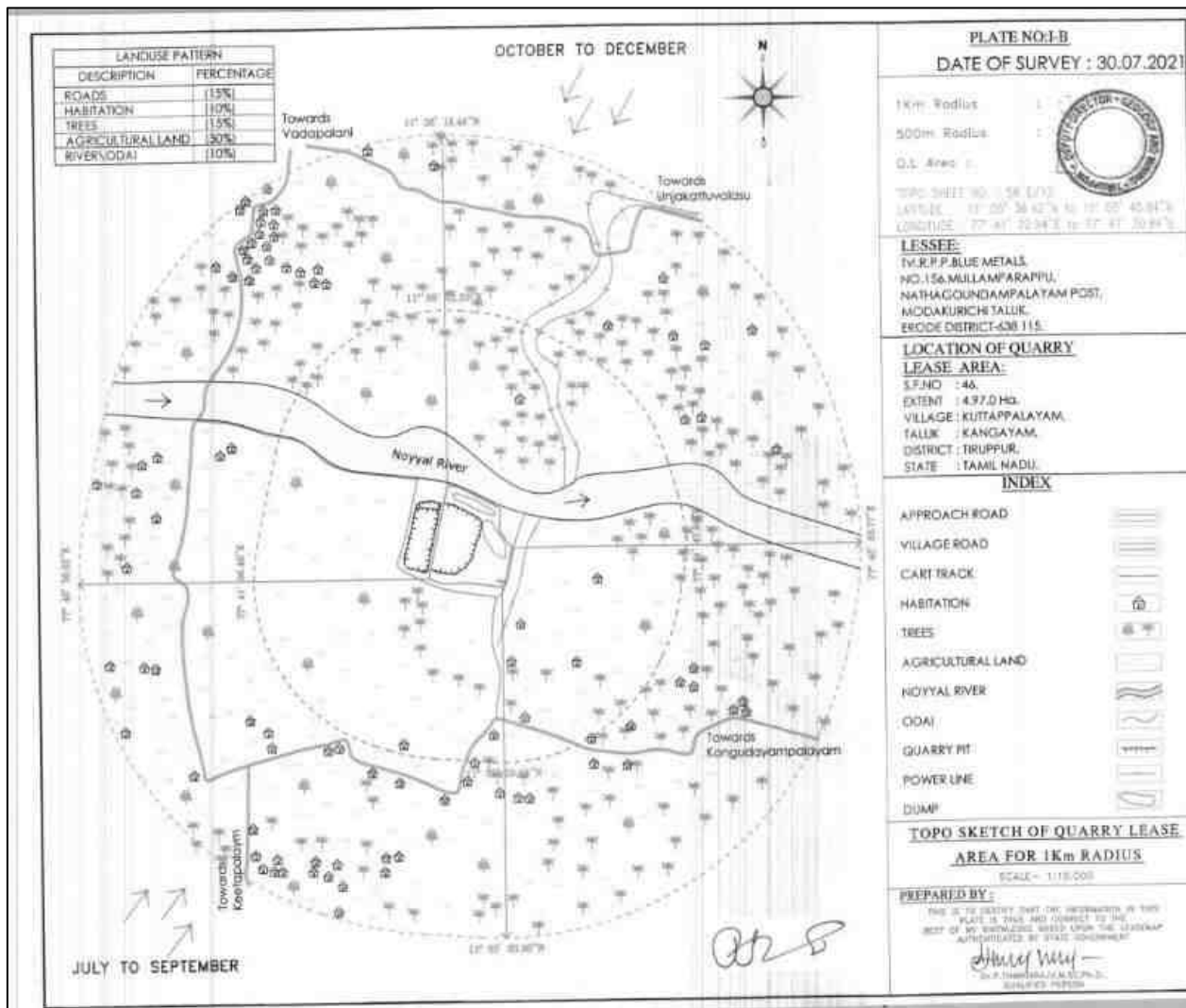
A centralized office cum store with minor maintenance shed is available near mine site outside lease area. A first aid box with necessary medical facility is available and maintained at the mine office.

- **Power supply:** The mine will work in one shift only in day time, so no electric power supply is required for mining operations. However eclectic connection and required transformer unit has been installed in the lease to support the crushing and screening unit.
- **Water supply:** There is no source of drinking water within the applied area. Drinking water & water for other purpose is brought from tube well situated outside the lease area. Drinking water stored in clean covered earthen pots and kept near working faces.
- **Washroom and Urinal:** Washroom and urinal will be provided separately for male and female worker as per rule.
- **First-Aid Room:** A first-aid room with all necessary medical facilities will be provided as per mines act and mines rules.

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**FIGURE 2.8 ENVIRONMENTAL & LAND USE PLAN**

**2.21 POTENTIAL IMPACTS & MITIGATION MEASURES**

The expected anticipated adverse environmental impacts and mitigation measures are summarized in **Table-2.13**.

**Table 2-13 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES PROPOSED**

Environmental Component	Project Activities	Impacts	Mitigation Measures
Air Quality	Drilling and Blasting	Dust is generated during drilling and blasting operations	Use of dust aprons on drilling equipment and adopting wet drilling methods. Avoiding blasting during adverse weather conditions. Use of controlled blasting practice Development of greenbelt.

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<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Mitigation Measures</b>
	Extraction of Black Trap, Loading / unloading activities	Increase in SPM/RPM levels in ambient air and SO <sub>2</sub> /NO <sub>x</sub> concentration levels in ambient air due to vehicular emissions.	Exposed area will be limited to the minimum required for mining operations. Periodic sprinkling of water on working faces, Regular preventive maintenance of mine machinery
	Transportation of Mineral	Increase in SPM/RPM level due to dust generation and SO <sub>2</sub> /NO <sub>x</sub> concentration levels in ambient air due to vehicular emissions.	Regular sprinkling of water on haul and access roads. Periodic maintenance of transport vehicles. Periodic maintenance of haul roads All tippers would be covered by tarpaulin sheets at top and avoid spillage.
	General equipment operations	Increased SPM/RPM and SO <sub>2</sub> /NO <sub>x</sub> concentrations in ambient air.	Regular maintenance of all equipment to minimize particulate matter and gaseous emissions from diesel engines.
	All activities	Excessive occupational exposures to airborne particulate matter.	Provision of dust masks to workers exposed to dusty operations / areas.
Noise Levels and Ground Vibrations	Blasting	High impulsive noise levels, overpressure and ground vibrations impacts and noise related community annoyance	Small scale blasting will be carried out. Controlled blasting using delay detonators will be carried out to minimize ground vibrations. Charge per delay will be kept optimum. Muffle blasting will be carried out in area facing habitation. Blasting will be conducted during lunch (noon) time when no employees are present in mine working area.

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<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Mitigation Measures</b>
	General activities including machine/ operations and transportation of Mineral	Increase in noise levels occupational hazard due to noise exposures and increase in ambient noise levels.	<p>Periodic maintenance of all mining machinery and transport vehicles</p> <p>Provision of effective silencers to all mine machinery</p> <p>Provision of ear plugs/ear muffs to workers exposed to high noise generating operations</p> <p>Development of thick plantation around mine lease boundary to act as a noise screen.</p> <p>Regular noise monitoring will be carried-out.</p>
Water Resources and Quality	Dewatering	<p>Reduction in groundwater availability</p> <p>Deterioration in surface/ground water quality of receiving body.</p>	<p>Surface run-off from mining area will be collected in settling tank / mine sump and will be used for dust suppression and plantation.</p> <p>There may be impact of groundwater availability since the proposed working may intersect water table.</p> <p>There will not be any process effluent discharge from the mine.</p> <p>Domestic effluent will be discharged in septic tank and soak pit system.</p> <p>At conceptual stage, mined out pit will be converted into water reservoir, which will help in recharging ground water table and will be available to nearby villagers as an additional surface water body.</p>
	Water required in mine for dust suppression, plantation and domestic use.	Reduction in groundwater availability for domestic and for irrigation purposes.	<p>Surface run-off from mining area will be collected in settling tank / mine sump and will be used for dust suppression and plantation.</p> <p>There may be impact of groundwater availability since the proposed working may intersect water table.</p> <p>Water for drinking and domestic use will be supplied by tanker from nearby village.</p>



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<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Mitigation Measures</b>
			At conceptual stage, mined out pit will be converted into water reservoir, which will help in recharging ground water table and will be available to nearby villagers as an additional surface water body.
	Waste water generated from domestic usage at mine.	Deterioration in ground water and soil quality when discharged untreated for greenbelt development	There will not be any process effluent discharge from the mine. Rain water accumulated in mine pit will be discharged in nearby drainage after passing through settling pond. Domestic effluent will be discharged in septic tank and soak pit system.
Geology	Mining activities	Change in Geomorphology of the area with disturbance of stratigraphic sequence.	The impact will be confined to lease area. Mining will be carried out as per guidelines with formation of proper benches and presence of non-disturbed safety zone of 7.5m from lease boundary. No active faults present in the area hence the change in geomorphology will be limited to lease area.
Hydrogeology and Drainage pattern	Mining activities	May impact regional hydrology and drainage pattern of the area.	There may be impact of groundwater availability since the proposed working may intersect water table. However, at conceptual stage, mined out pit will be converted into water reservoir, which will help in recharging ground water table and will be available to nearby villagers as an additional surface water body. Rainwater harvesting structures will be constructed in nearby villages.
Land use and Soil Characteristics	Mining operations.	Land use of the mine lease area will degrade.  Impact due to settling of air	Development of thick plantation around mine lease area, waste dump area and on undisturbed area. Adoption of adequate air pollution control measures to control dust emissions.

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<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Mitigation Measures</b>
		borne dust on soil outside ML area.  Land degradation due to disposal of solid wastes.	At conceptual stage, mined out pit will be converted into water reservoir. Plantation will be developed on top benches of mined out pit. This will improve aesthetic view of the ML area.
Biological environment	Dust emission due to Rough stone and Gravel mining activity in Rough stone and Gravel Mine.	Dust deposition on vegetation & agriculture paddy crop around periphery of ML area may reduce the crop productivity specifically within 500m from mine lease area.	Development of thick green belt around mine lease boundary and plantation on undisturbed area, top benches of mined out area, waste dump area etc. using native flora species.  Transport through covered trucks. Sprinkler will be installed at loading & unloading point; regular water sprinkling within the mining area and also on haulage road will be carried out.  The waste material/OB dumps will be covered with shrubs and grasses plantation.
Environmental Pollution, Health, Safety	Overall Mining operation	Occupational health issues, Community disturbance, risk of accidents, etc	Adoption of suitable pollution control measures in the mines Provision of pre-employment and periodic training on health and safety to all the workers in the mine Adoption of safe working practices Maintaining proper housekeeping at working places. Provision of necessary personal protective equipment's to all mine workers Periodic maintenance of mine machinery and transport vehicles Display of warning signals at strategic locations.
Socio-economic Aspects	Mining operations	Increase in employment opportunities both direct and indirect	Will generate direct employment for persons. While secondary employment will be generated by other ancillary activities.

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<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Mitigation Measures</b>
		thereby increasing economic status of people of the region.	Mostly local people will be employed in the mine. Mine management will carry out CER activities in the nearby villages to improve conditions of the villages. The Mine management will improve the basic facilities. in the nearby villages under CER.

### **3. DESCRIPTION OF ENVIRONMENT**

#### **3.1 BASELINE ENVIRONMENTAL STUDIES**

Baseline environmental studies were carried out within 10 km radius of the rough stone and Gravel Mine cluster area to assess the existing environmental scenario in the area. For EIA studies, Mine lease area of rough stone and gravel Mine was considered as the core zone and area outside the mine upto 10 km radius was considered as buffer zone. The baseline environmental monitoring was conducted by Enviro Tech Service (ETS), Ghaziabad it is an NABL and MOEF recognized laboratory for various components of environment, viz. Air, Noise, Water, Land was carried out during **March 2022 to May 2022** in the study area covering 10 km radial Distance from the Rough stone and Gravel mines. Other environmental data on flora and fauna, land-use pattern, forest etc. were also generated through field surveys and secondary information collected from different State Govt. departments. Sampling methods and analysis. Socio-economic survey was conducted, through interaction with the people, Sarpanch and medical officers by floating questionnaires and collection of information are supported by census data for demographic structures, amenities, and infrastructure availability within the study area.

##### **3.1.1 Methodology**

Appropriate methodologies are followed in developing the EIA-EMP report. The methodology adopted for the study is outlined below:

- Conducting reconnaissance of the study area;
- Selecting sampling locations for conducting various environment baseline studies;
  
- The sampling locations were selected on basis of the following:
- Predominant wind directions recorded by the nearest Indian Meteorological Department (IMD) observatory;
- Existing topography;
- Drainage pattern and location of existing surface water bodies like lakes, rivers and streams;
- Location of villages/towns/ sensitive areas, and;
- Areas, which represent baseline conditions;

The field observations were made to:

- Assess the positive and negative impacts due to the proposed project;
- Suggest appropriate mitigation measures for negating the adverse environmental impacts, if any, and;
- Suggest post-project monitoring;

#### **3.2 LAND USE OF STUDY AREA**

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource Sentinel-2A having 10 m spatial resolution and date of pass 14<sup>th</sup> March

2022 satellite image with reference to Google Earth data and the SRTM data having 30 m spatial resolution and date of pass September 2014. In order to strengthen the baseline information on existing land use pattern, the following data covering approx. the proposed project site as well as the 10 km radius from the periphery of the project site i.e. 11° 5'20.64"N to 11° 5'14.43"N latitude and 77°35'50.36"E to 77°46'58.90"E longitude and elevation 172 to 361 meter are observed. The project is in Survey of India topo sheet no 58E/12 while 10 km radius study area covers two topo sheets 58E/12 & 58E/16.

The digital image processing was performed on ERDAS Imagine 2014 and ArcGIS 10.8 software system on high-configured computer. This software package is a collection of image processing functions necessary for pre-processing, rectification, band combination, filtering, statistics, classification, etc. Apart from contrast stretching, there are large numbers of image processing functions that can be performed on this station. Arc GIS map 10.1 is used for final layout presentation.

**Table 3-1 Data Specification Used for Presents Study**

Satellite/ Image	Sensor	Spatial resolution	Date of Acquisition
Sentinel-2A	Sentinel-2	10 m	14th March 2022
SRTM	SRTM-1 Arc Second Global	30 m	September 2014

### 3.3 LAND ENVIRONMENT

Since, a major part of 10km study area comprises of Forest Area, Agricultural Area, Waste Land thus study on land environment of ecosystem play an imperative role in identifying susceptible issues and taking appropriate action to uphold ecological equilibrium in the region. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the project site so that temporal changes due to the industrial activities on the surroundings can be assessed in future.

#### 3.3.1 Methodology

The land use pattern of the study area was studied by analysing the available secondary data published in the District Primary Census abstract of the year 2001 & 2011.

Salient features of the adopted methodology are given below:

1. Acquisition of satellite data
2. Preparation of base map from Survey of India topo sheets
3. Data analysis using visual interpretation techniques
4. Ground truth studies or field checks using GPS
5. Finalization of the map
6. Digitization using head up vectorisation method
7. Topology construction in GIS
8. Area calculation for statistics generation
9. Masking

Four spectral bands provide high degree of measurability through band combination including FCC

generation, bands rationing, classification etc. These features of the USGS data are particularly important for better comprehension and delineation of the land use classes. Hence, Sentinental data and SRTM data having 30 m spatial resolution having pan chromatic imagery has been used for land use mapping.

The satellite data from the compact disc is loaded on the hard disk and by studying quick look (the sampled image of the appropriate area ;) the sub-scene of the study area is extracted.

Supervised classification using all the spectral bands can separate accurately, the different land use classes at level II on the basis of the spectral responses, which involve the following three steps:

1. Acquisition of ground truth
2. Calculation of the statistics of training area
3. Classification using maximum likelihood algorithm

The training areas for classification were homogeneous, well spread throughout the scene with bordering pixels excluded in processing. Several training sets have been used through the scene for similar land use classes. After evaluating the statistical parameters of training sets, the training areas were rectified by deleting no congruous training sets and creating new ones.

### **3.4 PRE-FIELD INTERPRETATION OF SATELLITE DATA**

The False Color Composite (FCC) of Sentinel-2A satellite imagery having 10 m spatial resolution satellite data at 1:50,000 scale was used for pre-field interpretation work. Taking the help of topo sheets, geology, geo-morphology and by using the image elements, the features were identified and delineated the boundaries roughly. Each feature was identified on image by their image elements like tone, texture, color, shape, size, pattern and association. A tentative legend in terms of land cover and land use was formulated. The sample area for field check is selected covering all the physiographic, land use/land cover feature cum image characteristics. **Figure 3.1** shows the FCC of 10 KM radius of Sentinental Imagery.

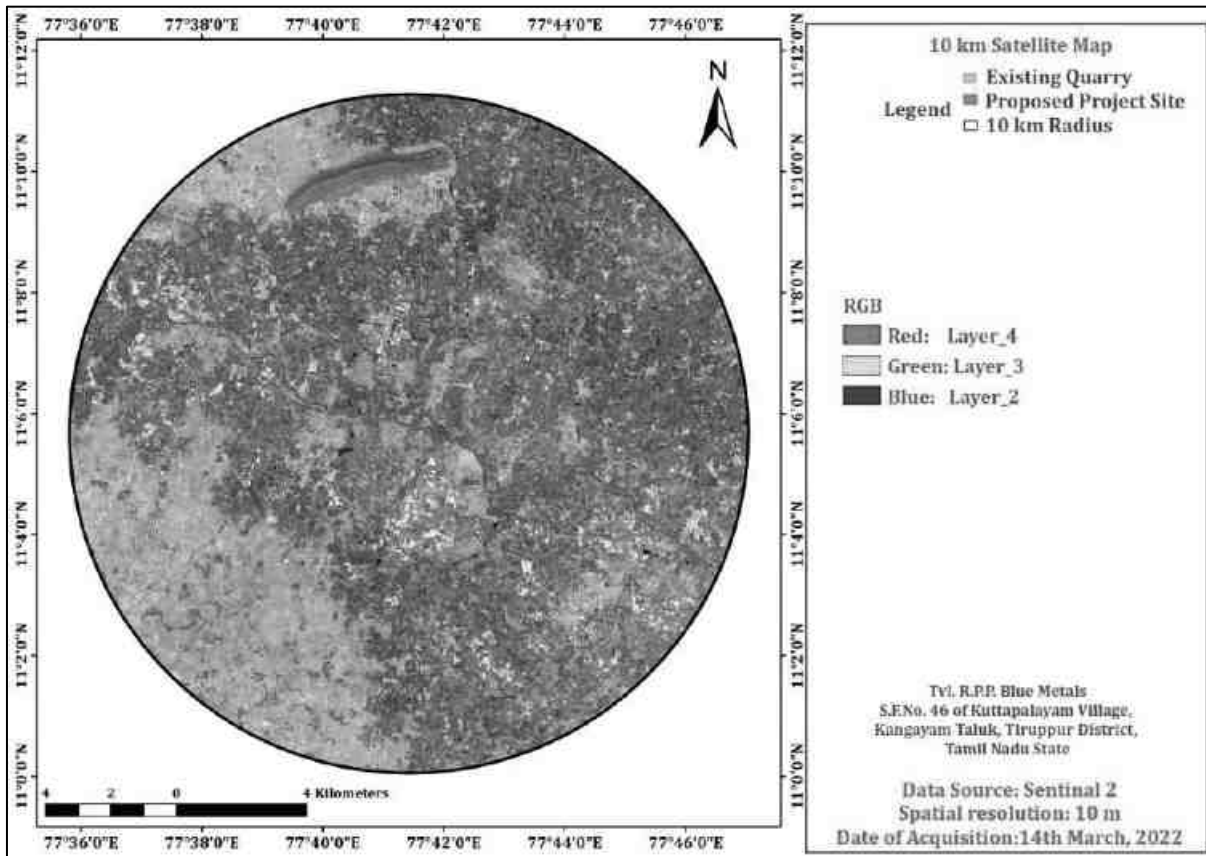
### **3.5 TOPOGRAPHY**

The physical setting of study area shows a contrast of immense dimensions and reveals a variety of landscapes influenced by relief, climate, vegetation and economic use by man. But even then, regionally, there is considerable local variation. The area is sloping from North East to south west. The Surface elevation map of the study area Figure 3. 2, 3.3 and Figure 3.4. The Elevation from 172 to 361 m MSL are observed in the study area.

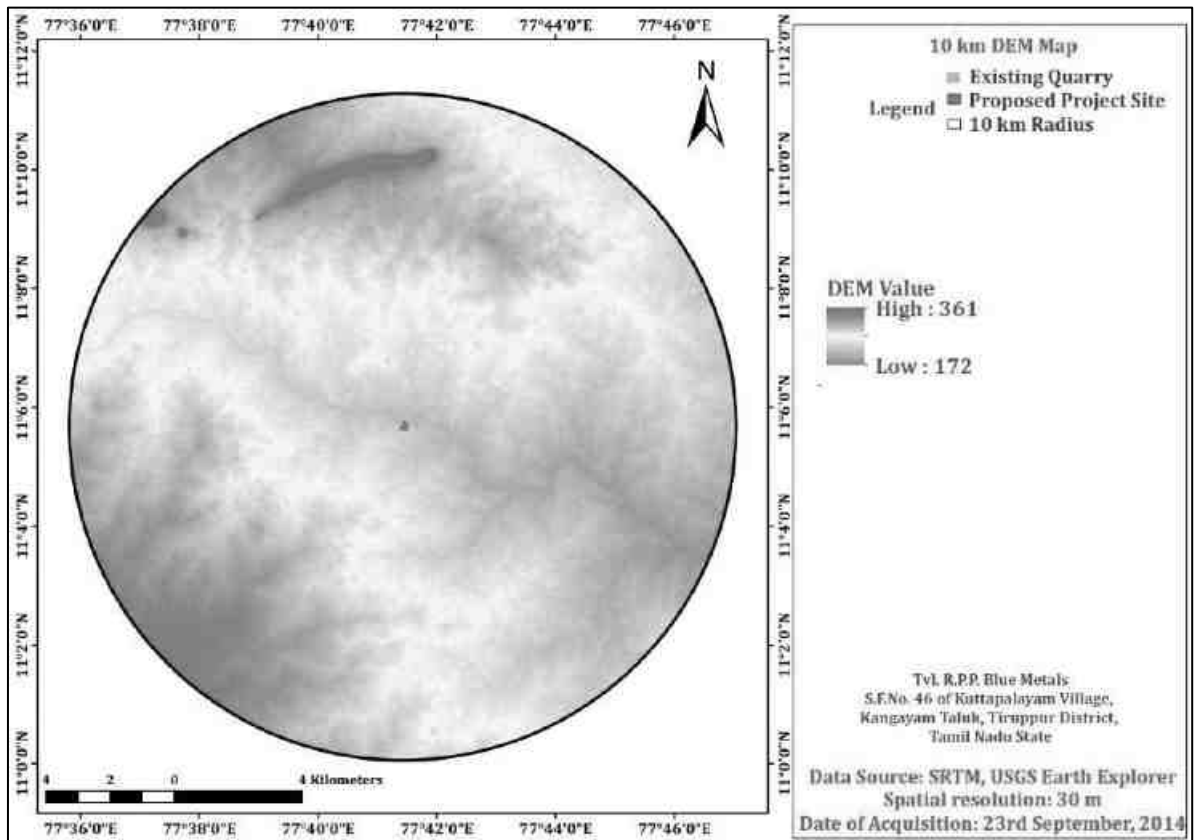
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**FIGURE 3.1 FCC OF THE 00-10 KM RADIUS WITH PROJECT LOCATION**



**FIGURE 3.2 DIGITAL ELEVATION MODEL WITH IN 10 KM RADIUS**



**FIGURE 3.3 ELEVATION PROFILE OF NW-SE DIRECTION WITH IN 10 KM RADIUS**



**FIGURE 3.4 ELEVATION PROFILE OF NE-SW DIRECTION WITH IN 10 KM RADIUS**

### 3.6 LAND USE/LAND COVER CLASSIFICATION

The major land use/land cover classes were demarcated in the study area following Level I classification furthermore a level II classification also adopted as per the requirement of **MoEF & CC**. A thematic map of 1:50,000 scale was generated incorporating these classified categories considering the area of the project

Of the 6 LU/LC classes as per NRSA-TR-LU & CD-01-90 the 10 Km radius study area has presence of 6 LU/LC classes are shown in **Table 3.2** of which the agricultural land has highest category of land comprises of plantation 17.74% (55.9 km<sup>2</sup>) and crop land 49.30 % (155.3 Km<sup>2</sup>), followed by waste land comprises of scrub /shrub 22.18 % (69.87 km<sup>2</sup>) and bare land 1.46 % (4.61Km<sup>2</sup>), followed by built-up land 7.44 % (23.45 Km<sup>2</sup>), followed by forest 1.40 % (4.44 Km<sup>2</sup>), while water body comprises of 0.24 % (0.78 Km<sup>2</sup>) and the last one is other land comprises of mining land 0.19 % (0.62 Km<sup>2</sup>). Terrain presumably makes it difficult to visualize some of the other features of the total project area. It is also observed that the study area is well connected SH 83A which is passing under the 10 km radius of the study area. The presence of different land use is shown in **Figure 3.6** of the pie chart distribution.

**Table 3-2 LU/LC AND ITS COVERAGE WITHIN 10 KM RADIUS**

S.No	Level I	Level -II	Area (Km <sup>2</sup> )	Percentage (%)
1	Built-up Land	Built-up Land	23.45	7.44
2	Forest	Reserve Forest	4.44	1.40
3	Agricultural Land	Coconut Plantation	55.9	17.74
		Crop Land	155.3	49.30
4	Waste Land	Scrub/Shrub	69.87	22.18
		Bare Land	4.61	1.46
5	Water Body	Water Body	0.78	0.24

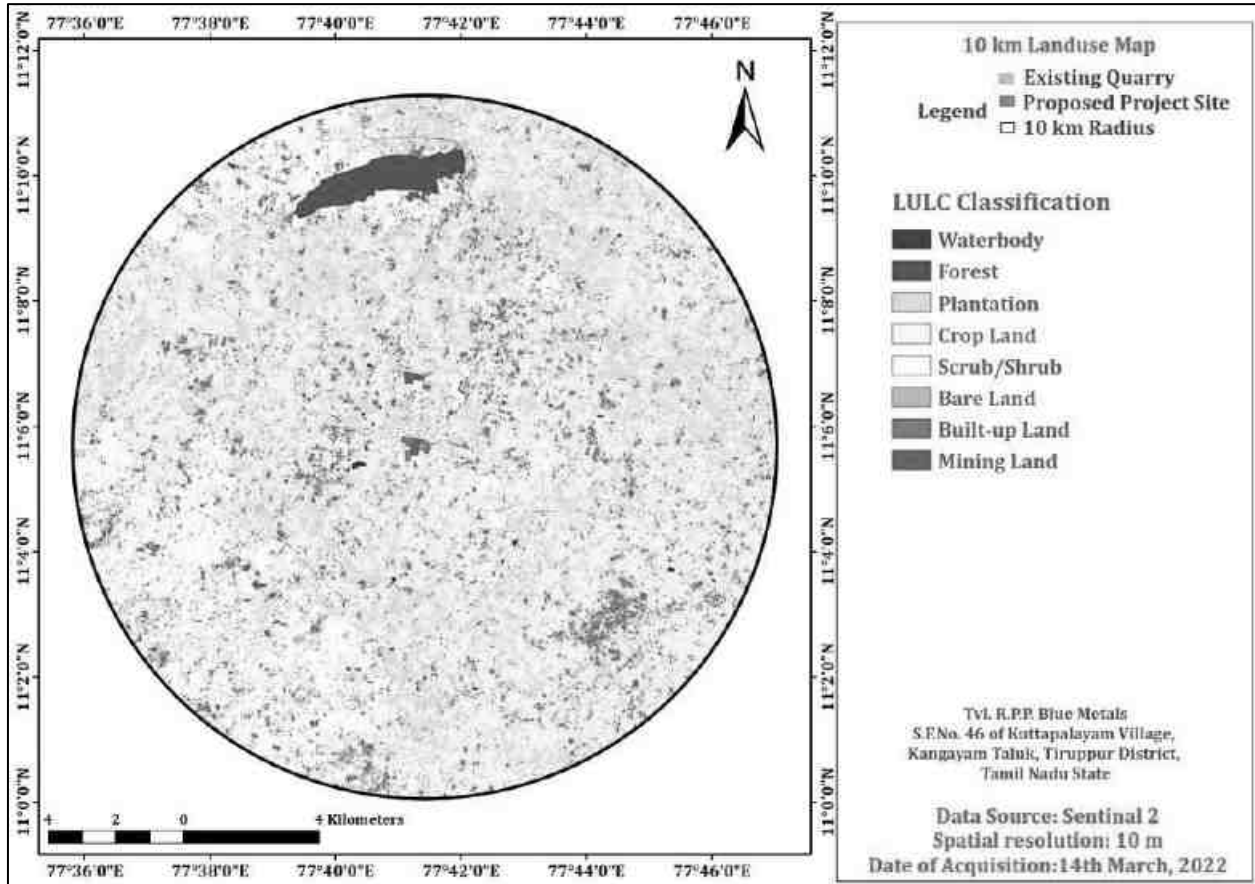


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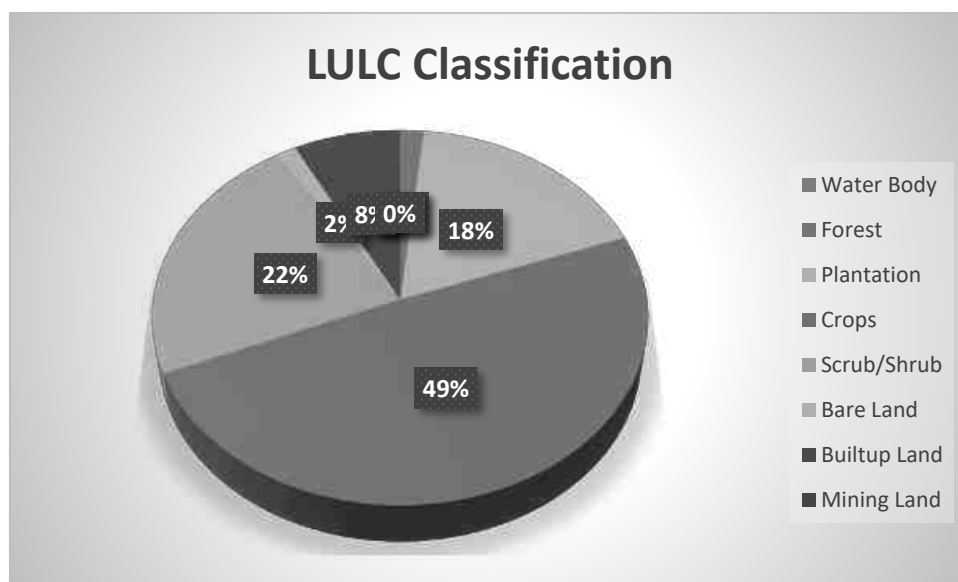
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6	Others	Mining Land	0.62	0.19
		<b>Total</b>	<b>314.97</b>	<b>100</b>



**FIGURE 3.5 LU/LC DETAILS OF 10 KM RADIUS**



**FIGURE 3.6 PIE CHART OF THE LU/LC CLASSIFICATION WITHIN 10 KM RADIUS**

From the above table and pie diagram it is inferred that most of the land in the study area is Agriculture land (includes crop land) 67.04 % and by water bodies (Rivers Stream Canals) 0.24 %. The total mining area within the study area is 0.19%. The cluster area 7.34.5 Ha contributes to the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

### 3.8 SPATIAL DATA FROM SOI TOPOGRAPHICAL SHEETS

Creating a GIS spatial database is a complex operation, and is the heart of the entire work; it involves data capture, verification and structuring processes. Raw geographical data are available in many different analogue and digital form such as toposheets, aerial photographs, satellite imageries and tables. Out of all these sources, the source of toposheets is of much concern to natural resource scientist and an environmentalist.

In the present study, the essential maps generated from SOI topographical maps. Using the topographical maps, the drainage map and contour Map were also developed. The maps are prepared to a certain scale and with attributes complying with the requirement of terms of reference (ToR). The location of entities on the earth's surface is then specified by means of an agreed co-ordinate system. For most GIS, the common frame of co-ordinate system used for the study is UTM co-ordinates system. All the maps are first Geo-referenced. The same procedure is also applied on remote sensing data before it is used to prepare the Essential maps. There is a road network connecting built-up areas and industries. As the terrain conditions are black cotton soil and bit undulated terrain and there is a drainage network around the site location. No National parks and wild life sanctuaries located in the study area.

### 3.9 SOIL CHARACTERISTICS

For studying soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the stone mining area representing various land use conditions. The samples were collected by ramming a core-cutter into the soil up to a depth of 15-20 cm. Total 6 samples within the study area were collected and analyzed. The details of the soil sampling locations are given in **Table 3.3** and shown in **Figure 3.7**. The sampling was carried out once in the study period.

**Table 3-3 DETAILS OF SOIL SAMPLING LOCATIONS**

S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
1.	S1	Project Site	-	Core zone
2.	S2	Nathakadaaiyur Village	2.89	Nearest Habitation WSW
3.	S3	Builders Engineering College, Nathakadaaiyur	4.83	Upwind SW

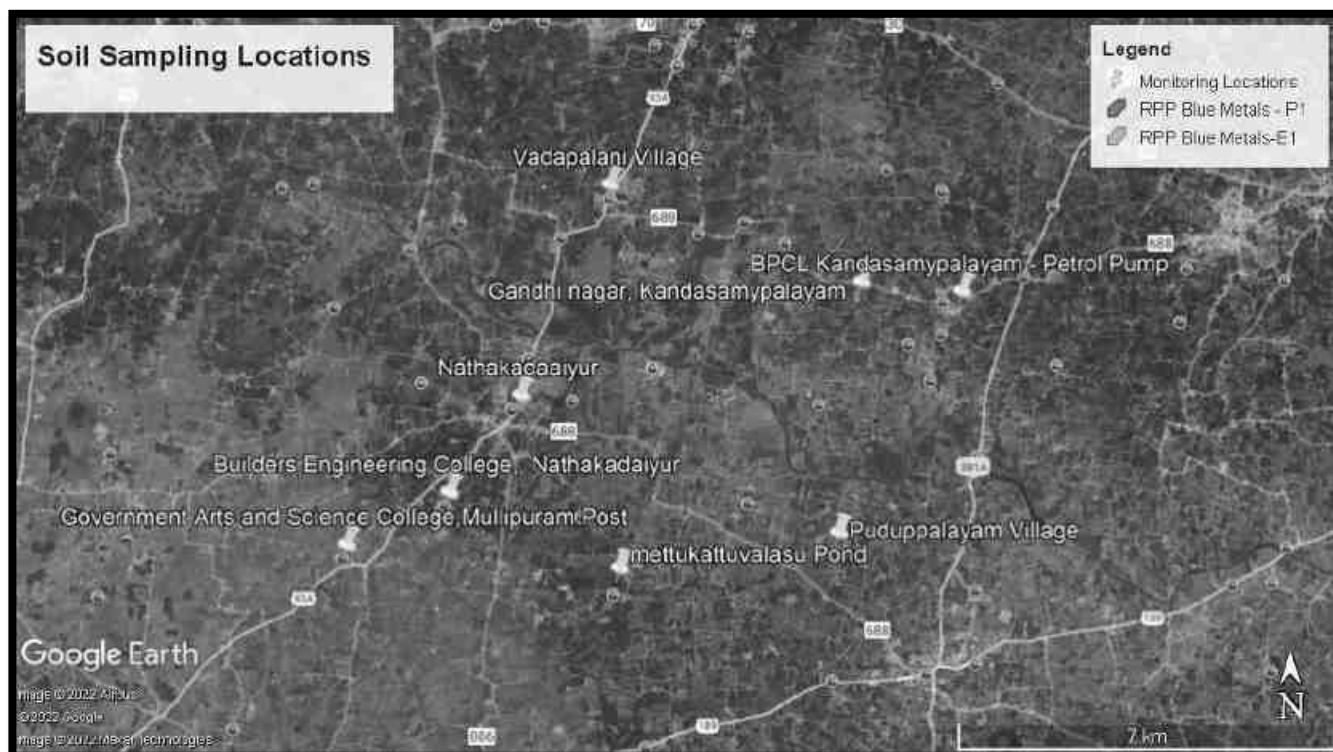
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S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
4.	S4	Government Arts and Science College, Mullipuram Post	6.96	Upwind SW
5.	S5	Gandhi nagar, Kandasampalayam	3.87	Downwind NE
6.	S6	BPCL Kandasampalayam - Petrol Pump	5.63	Downwind NE
7.	S7	Vadapalani Village	3.40	Cross wind NW
8.	S8	Puduppalayam Village	4.54	Cross wind SE

The collected soil samples were analyzed in the NABL/MOEF approved laboratory for physico-chemical and nutrition parameters. The physical, chemical properties and heavy metals concentrations were determined and the results are given in **Table 3.4**.



**FIGURE 3.7 STUDY AREA MAP WITH SOIL SAMPLING LOCATIONS**

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**Table 3-4 TEST RESULTS OF SOIL**

<b>Date of Sampling</b>	19.05.2022	<b>Sampling Method</b>	ETS/STP/SOIL-01
<b>Analysis Start Date</b>	25.05.2022	<b>Sample Quantity</b>	2.0 Kg
<b>Analysis End Date</b>	28.05.2022	<b>Packing Condition</b>	SEALED
<b>Sampling Done By</b>	ETS STAFF	<b>Packed In</b>	POLY BAG

S. No.	Test Parameter	Unit	S1 Results	S2 Results	S3 Results	S4 Results	S5 Results	S6 Results	S7 Results	S8 Results	Test Method
1	pH	...	7.25	8.52	8.02	8.05	8.02	8.02	8.05	8.02	IS 2720 (Part-26)
2	Electrical Conductivity (EC)	µs/cm	360.2	461.0	452.0	368.0	455	452.0	368.0	455	IS 14767
3	Texture	...	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	IS 2720 (Part-4)
4	Sand	%	41.2	41.2	52.0	50.2	48.3	57.1	52.5	48.1	IS 2720 (Part-4)
5	Silt	%	20.2	30.5	27.5	21.7	31.2	22.7	26.5	30.6	IS 2720 (Part-4)
6	Clay	%	36.1	39.5	20.5	28.1	20.5	20.2	21.0	21.3	IS 2720 (Part-4)
7	Water Holding Capacity (WHC)	%	45.52	47.79	31.4	37.08	47.38	29.89	35.28	45.08	IS 2720 (Part-2)
8	Bulk Density	g/cm <sup>3</sup>	2.34	1.23	2.00	1.79	1.18	0.93	1.6	1.12	IS 2386 (Part-4)
9	Porosity	%	38.6	33.57	26.16	32.9	26.78	24.89	31.36	25.48	IS 13030
10	Calcium,(Ca)	mg/kg	1170.1	1067	968.2	1038.5	1170	1073.2	984.5	1143	IS 2720 (Part-23)

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S. No.	Test Parameter	Unit	S1 Results	S2 Results	S3 Results	S4 Results	S5 Results	S6 Results	S7 Results	S8 Results	Test Method
11	Magnesium,(Mg)	mg/kg	431	522	464.2	527.2	410.2	456.2	467.2	506.2	ETS/STP/SOIL-08
12	Manganese,(Mn)	mg/kg	31.0	23.27	20.0	25.9	25.75	19.11	24.69	24.5	ETS/STP/SOIL-18
13	Zinc,(Zn)	mg/kg	0.56	0.92	2.28	1.24	1.56	2.17	1.18	1.48	ETS/STP/SOIL-18
14	Boron (as B)	mg/kg	0.46	0.82	0.70	0.84	1.26	0.66	0.80	1.20	ETS/STP/SOIL-18
15	Chloride,(Cl)	mg/kg	175.1	140.65	134.41	131.8	128.23	127.89	125.44	122.01	BS 1377 -3
16	Total Soluble Sulphate	%	169.95	158.62	128.85	159.8	185.6	122.59	152.09	176.59	IS 2720 (Part-27)
17	Potassium (K )	mg/kg	197.8	227.83	260.7	237.10	140.2	199.13	194.23	182.47	ETS/STP/SOIL-18
18	Phosphorus (PO4)	mg/kg	52.44	48.04	44.06	56.13	49.79	40.94	53.41	59.13	ETS/STP/SOIL-19
19	Total Nitrogen (N)	mg/kg	123.6	175.61	169.12	175.1	173.04	160.9	166.6	164.64	ETS/STP/SOIL-15
20	Cadmium,(Cd)	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ETS/STP/SOIL-18
21	Chromium,(Cr)	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ETS/STP/SOIL-18
22	Copper,(Cu)	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ETS/STP/SOIL-18

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S. No.	Test Parameter	Unit	S1 Results	S2 Results	S3 Results	S4 Results	S5 Results	S6 Results	S7 Results	S8 Results	Test Method
23	Lead,(Pb)	mg/kg	0.63	0.63	0.90	1.23	1.56	0.86	1.176	1.4896	ETS/STP/SOIL-18
24	Iron,(Fe)	mg/kg	2.62	2.14	2.29	2.36	1.52	2.18	2.25	1.45	ETS/STP/SOIL-18
25	Organic Matter,(OM)	%	1.59	1.56	1.8	1.87	1.66	1.7	1.78	1.58	IS 2720 (Part-22)
26	Organic Carbon,(OC)	%	0.77	1.55	1.33	1.27	1.18	1.27	1.21	1.12	BS 1377 -3
27	Cation Exchange Capacity (CEC)	meq/100g	35.22	36.15	42.43	29.97	35.53	40.37	28.51	33.81	IS 2720 (Part-24)

### **Observations:**

- pH of the soil samples varied from 7.25 to 8.52 indicating slightly alkaline soil
- Bulk density of the soil samples varied from 0.93 to 2.34 g/cm<sup>3</sup>
- Organic matter in the soil samples varied from 1.56 to 1.87 %
- Total Nitrogen in the soil samples varied from 123.6 to 175.61 mg/kg
- Water Holding Capacity (WHC) in the soil samples varied from 29.89 to 47.79%.

From the analysis results of the soil samples, it was observed that the soil was low to medium fertile and having low productivity. The soil in the study area needs additional fertilizers for improving the fertility status and increase in crop productivity. This also indicates the poor level of micro-nutrient. The organic matter was found in the range of 1.56 to 1.87 % indicating moderate organic content in the soil. Overall, the soil quality in the area was found to medium to fair fertile with moderate productivity.

## **3.10 AIR ENVIRONMENT**

### **3.10.1 Meteorology**

The district enjoys a tropical climate. The weather is pleasant during the period from November to January. The normal rain fall occurs during North East monsoon and moderate rainfall is received during South West monsoon.

Meteorology is the key to understand the Air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A temporary meteorological station was installed at project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

The district enjoys a tropical climate. The weather is pleasant during the period from November to January. Mornings in general are more humid than the afternoons, with the humidity exceeding 78% on an average. In the period June to November the afternoon humidity exceeds 66% on an average. In the rest of the year the afternoons are drier, the summer afternoons being the driest.

The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district and summer rains are negligible. The average annual rainfall and the 5 years rainfall collected from IMD, Tiruppur is as follows:

**Table 3-5 RAINFALL DATA**

Actual Rainfall (mm)					Normal Rainfall (mm)
2013	2014	2015	2016	2017	
622.30	589.30	818.6	388.2	783.7	649.3

Source: <https://www.twadboard.tn.gov.in/content/Tiruppur>

**Table 3-6 METEOROLOGICAL DATA RECORDED AT SITE**

S.No	Parameters		March, 2022	April, 2022	May, 2022
1	Temperature (°C)	Max	38.7	39.2	38.4
		Min	18.9	20.5	21.3
		Avg.	28.5	29.7	28.6
2	Relative Humidity (%)	Avg.	74	76	78
3	Wind Speed (m/s)	Max	6.3	6.9	9.4
		Min	4.1	4.4	5.8
		Avg.	4.9	5.1	6.6
4	Cloud Cover (OKTAS)	-	0-8	0-8	0-8
5	Wind Direction	-	NE, E	E, SW	S, SW

Source: On-site monitoring/sampling

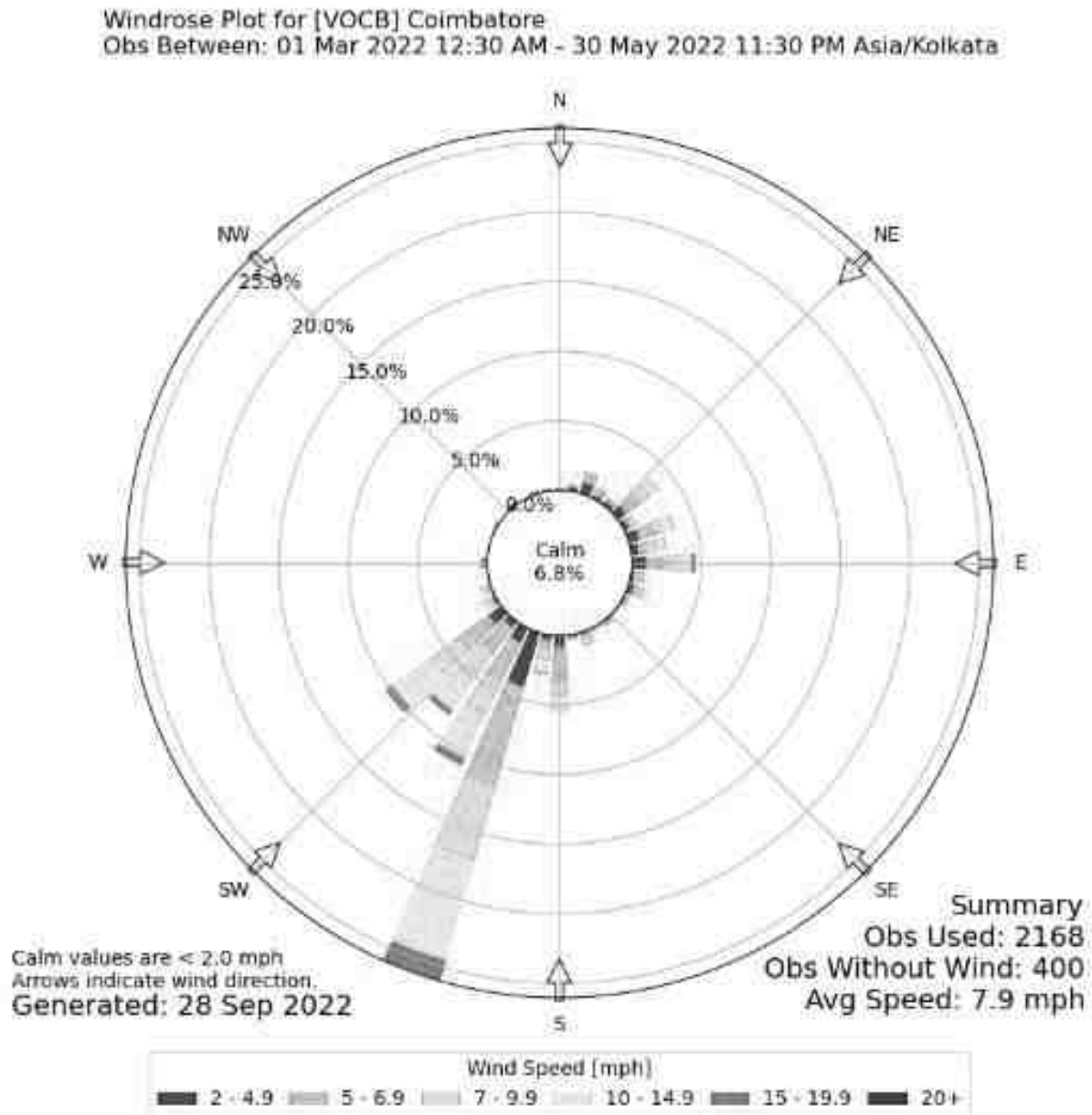
### 3.10.2 Analysis of Meteorological Data, Tiruppur

The Indian Meteorological Department records the data at two times a day viz. 08:30 hr and 17:30 hr.

The meteorological data recorded during the monitoring period is very useful for proper interpretation of the baseline information as well as input for air quality prediction. Historical data on meteorological parameters also plays an important role in identifying the general meteorological regime of the region. The year may broadly be divided into four seasons based on meteorological variations:

Winter	:	December to February
Pre-Monsoon/Summer	:	March to May
Monsoon	:	June to September
Post-Monsoon	:	October to November





**FIGURE 3.8 SITE SPECIFIC WINDROSE MARCH 2022 TO MAY 2022**

**Table 3-7 WIND DIRECTION AND WIND SPEED**

Wind Direction	Frequency %
Upwind Direction	SW (25 %)
Downwind Direction	NE (5%)
Calm conditions (%)	6.8 %
Average Speed	7.9 mph

### 3.10.3 Baseline Ambient Air Quality

The status of ambient air quality within the study area was monitored during March 2022 to May 2022 at 8 locations including the Rough stone and Gravel Mine lease area and in nearby villages. The monitoring locations are given in **Table 3.8** and are shown in **Figure 3.9**.

The various sources of air pollution in the region are stone mining, crushing activities and vehicular traffic. The prime objective of the baseline air quality study (10-km radius) was to assess the existing air quality of the area to form baseline information. The study area represents mostly rural environment with stone mining quarries & crushers.

The regional climatologically data, was used as a guideline to know the predominant wind direction during study period. The locations were identified keeping in view predominant wind directions prevailing during study period, sensitive receptors, human settlements, and mining activities around.

The levels of Respirable Particulate Matter (PM<sub>10</sub>), Fine Particulates (PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>) were monitored for establishing the baseline status. PM<sub>10</sub> were sampled with the help of Respirable Dust Samplers on filter papers and SO<sub>2</sub>& NO<sub>x</sub> were absorbed in the respective absorption media in the impingers attached to RD samplers and analyzed spectro-photometrically. PM<sub>2.5</sub> was monitored with the help of Fine Particulate Samplers. The minimum, maximum, average and 98<sup>th</sup> percentile values have been computed from the observed raw data for all the AAQ monitoring stations and the results are summarized in **Table 3.9**.

**Table 3-8 DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS**

S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
1.	AAQ 1	Project Site	-	Core zone
2.	AAQ 2	Nathakadaaiyur Village	2.89	Nearest Habitation WSW
3.	AAQ 3	Builders Engineering College, Nathakadaiyur	4.83	Upwind SW
4.	AAQ 4	Government Arts and Science College, Mullipuram Post	6.96	Upwind SW
5.	AAQ 5	Gandhi nagar, Kandasampalayam	3.87	Downwind NE
6.	AAQ 6	BPCL Kandasampalayam - Petrol Pump	5.63	Downwind NE
7.	AAQ 7	Vadapalani Village	3.40	Cross wind NW
8.	AAQ 8	Puduppalayam Village	4.54	Cross wind SE

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**FIGURE 3.9 STUDY AREA MAP WITH MONITORING LOCATIONS**

**Table 3-9 SUMMARY OF AMBIENT AIR QUALITY RESULTS**

<b>Date of Sampling</b>	-	<b>Sampling Method</b>	ETS/STP/AIR-01
<b>Analysis Start Date</b>	05.02.2022	<b>Sample Quantity</b>	-
<b>Analysis End Date</b>	30.05.2022	<b>Packing Condition</b>	-
<b>Sampling Done By</b>	ETS STAFF	<b>Weather Condition</b>	Clear

Station ID	Max	Min	Mean	98 Percentile Value	STDEV
<b>Particulate matter PM-2.5</b>					
AAQ-1	41.41	31.57	35.5	40.09	2.1
AAQ-2	38.18	31.72	34.31	37.39	1.71
AAQ-3	35.8	28.55	32.91	35.69	1.92
AAQ-4	35.46	27.98	31.79	34.93	1.8
AAQ-5	39.31	31.27	35.8	39.31	2
AAQ-6	39.2	33.08	35.69	38.78	1.76
AAQ-7	39.2	31.38	35.16	38.57	1.75
AAQ-8	41.52	33.24	37.2	40.83	1.85
<b>Particulate matter PM-10</b>					
AAQ-1	70.35	57.54	60.86	69.35	3.15
AAQ-2	67.86	55.63	59.97	67.23	2.88
AAQ-3	65.26	55.06	58.46	64.99	2.57
AAQ-4	64.69	53.93	57.16	63.12	2.51
AAQ-5	67.52	46.11	59.38	67.1	3.96
AAQ-6	68.99	58	61.81	68.52	2.71

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Station ID	Max	Min	Mean	98 Percentile Value	STDEV
AAQ-7	68.88	56.98	60.3	67.78	2.87
AAQ-8	72.92	60.31	63.82	71.72	3.03
<b>Sulphur Di-oxide as SO<sub>2</sub></b>					
AAQ-1	13.72	8.12	10.33	13.56	1.54
AAQ-2	17.78	9.51	11.77	17.57	2.41
AAQ-3	15.29	9.06	11.2	14.87	1.77
AAQ-4	15.52	8.83	12.05	15.36	1.56
AAQ-5	16.65	9.74	12.37	16.25	1.92
AAQ-6	16.42	10.42	12.08	15.73	1.36
AAQ-7	13.14	7.7	10.81	12.77	1.2
AAQ-8	13.96	8.15	11.43	13.56	1.29
<b>Oxide of Nitrogen as NO<sub>2</sub></b>					
AAQ-1	31.82	24.8	28.56	31.48	1.59
AAQ-2	33.15	25.2	29.78	33.03	1.87
AAQ-3	33.63	25.65	29.8	33.18	1.89
AAQ-4	36.42	28.79	32.28	36.02	1.68
AAQ-5	35.09	27.9	31.14	34.86	1.72
AAQ-6	34.72	27.83	31.24	34.17	1.56
AAQ-7	33.39	26.13	29.96	33.39	1.81
AAQ-8	35.37	27.72	31.71	35.37	1.91

**3.10.4 Observations of Primary Data:**

- PM<sub>10</sub> concentration in the study area varied from 57.54 to 70.35 µg/m<sup>3</sup> during the study period.
- PM<sub>2.5</sub> concentration in the study area varied from 31.57 to 41.41 µg/m<sup>3</sup> during the study period.
- SO<sub>2</sub> concentration in the study area varied from 8.12 to 13.72 µg/m<sup>3</sup> during the study period.
- NO<sub>2</sub> concentration in the study area varied from 24.8 to 31.82 µg/m<sup>3</sup> during the study period.

From the above results, it is observed that the ambient air quality with respect to PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>2</sub> at all the monitoring locations was within the permissible limits specified by CPCB.

**3.11 NOISE ENVIRONMENT**

**3.11.1 Baseline Status**

Ambient noise level monitoring was carried out at the 8 monitoring locations; those were selected for ambient air quality monitoring. The details of noise monitoring locations are given in **Table 3.10** and are shown in **Figure-3.10**. Monitoring stations and the results are summarized in **Table 3.11**.

**TABLE 3-10 NOISE SAMPLING LOCATIONS IN THE STUDY AREA**

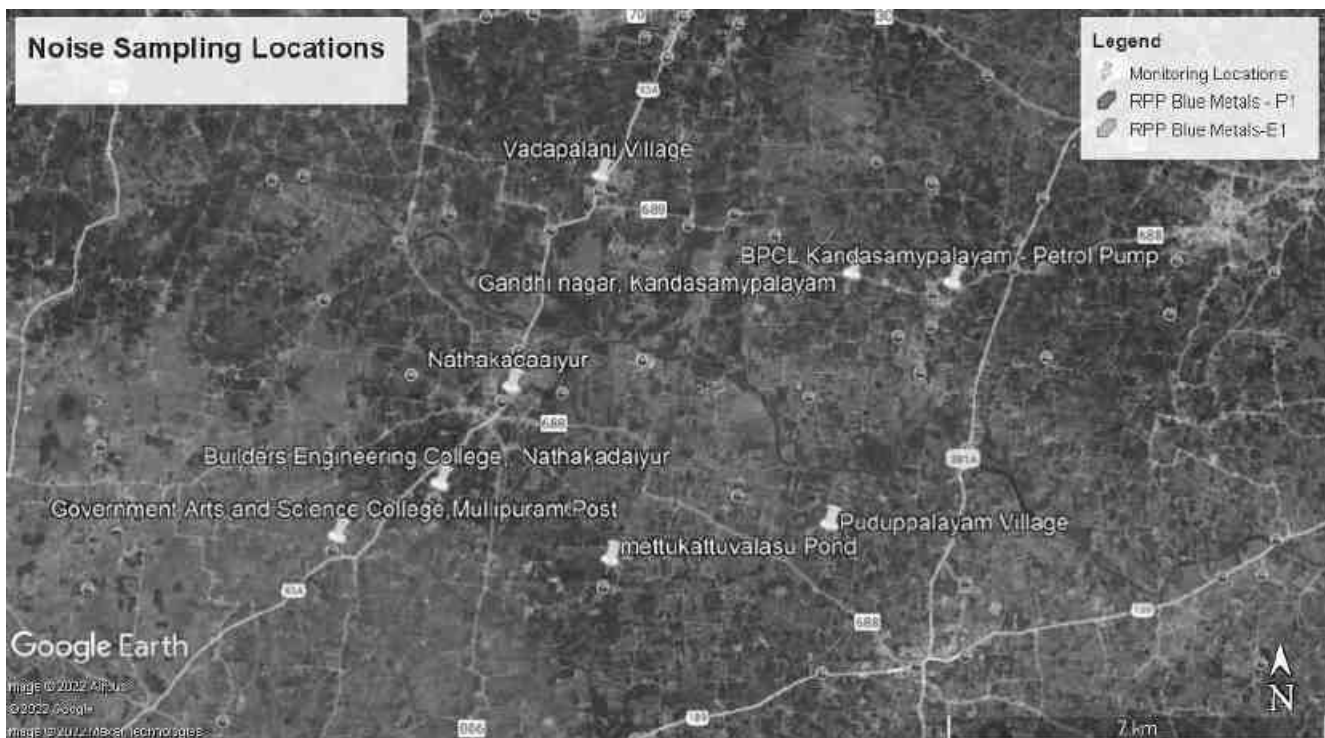
S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
1.	N1	Project Site	-	Core zone
2.	N2	Nathakadaaiyur Village	2.89	Nearest Habitation WSW

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S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
3.	N3	Builders Engineering College, Nathakadaiyur	4.83	Upwind SW
4.	N4	Government Arts and Science College, Mullipuram Post	6.96	Upwind SW
5.	N5	Gandhi nagar, Kandasampalayam	3.87	Downwind NE
6.	N6	BPCL Kandasampalayam - Petrol Pump	5.63	Downwind NE
7.	N7	Vadapalani Village	3.40	Cross wind NW
8.	N8	Puduppalayam Village	4.54	Cross wind SE



**FIGURE 3.10 NOISE SAMPLING LOCATIONS**

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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**Table 3-11 AMBIENT NOISE LEVEL MONITORING RESULTS, [dB(A)]**

<b>Date of Sampling</b>	-	<b>Sampling Method</b>	ETS/STP/NOISE-01
<b>Analysis Start Date</b>	02.02.2022	<b>Sample Quantity</b>	-
<b>Analysis End Date</b>	21.05.2022	<b>Packing Condition</b>	-
<b>Sampling Done By</b>	ETS STAFF	<b>Category of Area</b>	<b>Industrial Area</b>

Location		N1			N2			N3			N4		
S.No	Time (Hrs)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)
1	0600	40.1	49.5	<b>47.0</b>	42.6	45.6	<b>44.4</b>	45.2	55.2	<b>50.2</b>	35.1	37.1	<b>36.1</b>
2	0700	41.5	51.2	<b>48.6</b>	42.6	45.1	<b>44.0</b>	46.5	52.5	<b>49.5</b>	33.2	40.2	<b>36.7</b>
3	0800	42.6	52.6	<b>50.0</b>	43.2	45.2	<b>44.3</b>	45.2	48.6	<b>46.9</b>	34.2	40.5	<b>37.35</b>
4	0900	42.6	53.1	<b>50.5</b>	44.9	49.8	<b>48.0</b>	47.2	46.2	<b>46.7</b>	36.8	39.5	<b>38.15</b>
5	1000	43.1	45.8	<b>44.7</b>	41.9	50.6	<b>48.1</b>	46.2	50.1	<b>48.15</b>	36.5	37.6	<b>37.05</b>
6	1100	44.5	46.6	<b>45.7</b>	42.5	52.6	<b>50.0</b>	45.5	47.3	<b>46.4</b>	38.2	45.2	<b>41.7</b>
7	1200	45.6	47.8	<b>46.8</b>	44.2	54.2	<b>51.6</b>	46.1	49.7	<b>47.9</b>	34.9	41.4	<b>38.15</b>
8	1300	46.9	49.6	<b>48.5</b>	41.6	51.6	<b>49.0</b>	47.2	48.8	<b>48</b>	36.2	41.3	<b>38.75</b>
9	1400	47.1	50.2	<b>48.9</b>	42.2	53.5	<b>50.8</b>	48.2	46.4	<b>47.3</b>	36.2	44.2	<b>40.2</b>
10	1500	45.4	51.8	<b>49.7</b>	42.6	54.5	<b>51.8</b>	47.2	47.2	<b>47.2</b>	35.4	44.8	<b>40.1</b>
11	1600	43.6	52.8	<b>50.3</b>	43.2	46.5	<b>45.2</b>	44.2	52.5	<b>48.35</b>	38.2	40.2	<b>39.2</b>
12	1700	44.8	52.6	<b>50.3</b>	43.5	48.3	<b>46.5</b>	45.8	53.5	<b>49.65</b>	32.5	40.9	<b>36.7</b>
13	1800	46.2	55.3	<b>52.8</b>	42.5	47.6	<b>45.8</b>	44.3	53.0	<b>48.65</b>	32.1	42.4	<b>37.25</b>
14	1900	43.5	52.1	<b>49.7</b>	40.9	49.6	<b>47.1</b>	44.9	50.5	<b>47.7</b>	30.2	39.7	<b>34.95</b>
15	2000	40.9	50.2	<b>47.7</b>	43.5	47.6	<b>46.0</b>	42.6	55.3	<b>48.95</b>	35.8	46.2	<b>41</b>
16	2100	40.5	49.8	<b>47.3</b>	41.5	47.1	<b>45.1</b>	42.9	52.0	<b>47.45</b>	33.4	40.8	<b>37.1</b>

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Location		N1			N2			N3			N4				
S.No	Time (Hrs)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)		
17	2200	38.6	46.9	<b>44.5</b>	38.2	45.6	<b>43.3</b>	42.6	53.2	<b>47.9</b>	36.1	42.4	<b>39.25</b>		
18	2300	37.5	38.1	<b>37.8</b>	39.8	43.5	<b>42.0</b>	36.1	44.1	<b>40.1</b>	35.2	40.2	<b>37.7</b>		
19	0000	36.1	40.5	<b>38.8</b>	37.6	43.7	<b>41.6</b>	34.4	47.2	<b>40.8</b>	32.9	37.8	<b>35.35</b>		
20	0100	35.3	39.7	<b>38.0</b>	36.8	42.5	<b>40.5</b>	32.9	38.2	<b>35.55</b>	33.5	37.2	<b>35.35</b>		
21	0200	36.1	38.6	<b>37.5</b>	37.3	44.1	<b>41.9</b>	31.6	39.8	<b>35.7</b>	34.2	35.8	<b>35</b>		
22	0300	33.5	35.8	<b>34.8</b>	37.1	39.1	<b>38.2</b>	34.2	38.2	<b>36.2</b>	32.5	34.2	<b>33.35</b>		
23	0400	34.1	37.8	<b>36.3</b>	35.9	39.8	<b>38.3</b>	33.1	37.2	<b>35.15</b>	34.5	36.6	<b>35.55</b>		
24	0500	34.6	36.9	<b>35.9</b>	36.5	38.2	<b>37.4</b>	32.1	35.5	<b>33.8</b>	33.5	35.5	<b>34.5</b>		
<b>Day Mean dB(A)</b>				<b>46.3</b>	<b>Day Mean dB(A)</b>			<b>48.6</b>	<b>Day Mean dB(A)</b>			<b>45.8</b>	<b>Day Mean dB(A)</b>		<b>41.17</b>
<b>Night Mean dB(A)</b>				<b>36.0</b>	<b>Night Mean dB(A)</b>			<b>42.0</b>	<b>Night Mean dB(A)</b>			<b>37.22</b>	<b>Night Mean dB(A)</b>		<b>36.27</b>

Location		N5			N6			N7			N8		
S.No	Time (Hrs)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)
1	0600	41.2	45.3	<b>43.25</b>	46.2	49.0	<b>47.6</b>	40.2	42.5	<b>41.5</b>	39.6	43.6	<b>42.0</b>
2	0700	42.5	46.2	<b>44.35</b>	48.2	50.5	<b>49.35</b>	41.5	42.6	<b>42.1</b>	40.3	46.5	<b>44.4</b>
3	0800	44.2	44.1	<b>44.15</b>	47.2	53.5	<b>50.35</b>	42.4	44.9	<b>43.8</b>	40.6	48.9	<b>46.5</b>
4	0900	42.8	51.2	<b>47</b>	46.5	48.2	<b>47.35</b>	42.8	45.8	<b>44.6</b>	41.6	49.8	<b>47.4</b>
5	1000	45.5	47.2	<b>46.35</b>	45.2	53.2	<b>49.2</b>	43.8	47.6	<b>46.1</b>	41.9	50.6	<b>48.1</b>
6	1100	47.1	52.5	<b>49.8</b>	44.2	48.5	<b>46.35</b>	44.7	45.5	<b>45.1</b>	42.5	52.6	<b>50.0</b>
7	1200	47.5	51.4	<b>49.45</b>	48.2	49.2	<b>48.7</b>	45.6	49.9	<b>48.3</b>	43.5	49.8	<b>47.7</b>

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Location		N5			N6			N7			N8		
S.No	Time (Hrs)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)	Min dB(A)	Max dB(A)	dB(A)
8	1300	48.5	53.5	<b>51</b>	46.1	51.4	<b>48.75</b>	46.5	50.2	<b>48.7</b>	41.6	51.6	<b>49.0</b>
9	1400	46.1	51.8	<b>48.95</b>	46.5	57.6	<b>52.05</b>	46.4	52.5	<b>50.4</b>	41.5	53.5	<b>50.8</b>
10	1500	47.2	51.3	<b>49.25</b>	47.3	54.4	<b>50.85</b>	45.8	54.2	<b>51.8</b>	42.6	52.6	<b>50.0</b>
11	1600	46.2	51.8	<b>49</b>	46.8	53.2	<b>50</b>	44.2	54.7	<b>52.1</b>	41.6	46.5	<b>44.7</b>
12	1700	46.2	50.4	<b>48.3</b>	47.1	53.8	<b>50.45</b>	43.8	53.9	<b>51.3</b>	43.5	48.3	<b>46.5</b>
13	1800	45.5	50	<b>47.75</b>	46.2	54.7	<b>50.45</b>	42.7	54.2	<b>51.5</b>	42.5	47.6	<b>45.8</b>
14	1900	45.2	47.2	<b>46.2</b>	47.5	51.4	<b>49.45</b>	42.8	51.8	<b>49.3</b>	40.9	48.9	<b>46.5</b>
15	2000	46.5	49.5	<b>48</b>	35.1	46.5	<b>40.8</b>	41.9	50.4	<b>48.0</b>	43.5	47.6	<b>46.0</b>
16	2100	44.1	47.2	<b>45.65</b>	36.4	45.4	<b>40.9</b>	40.5	49.7	<b>47.2</b>	41.5	47.1	<b>45.1</b>
17	2200	43.4	44.6	<b>44</b>	33.7	44.7	<b>39.2</b>	41.5	46.9	<b>45.0</b>	39.8	45.6	<b>43.6</b>
18	2300	31.5	38.9	<b>35.2</b>	34.5	40.2	<b>37.35</b>	39.8	40.2	<b>40.0</b>	38.8	43.5	<b>41.8</b>
19	0000	32.5	38.2	<b>35.35</b>	34.6	38.7	<b>36.65</b>	38.9	42.3	<b>40.9</b>	37.6	42.8	<b>40.9</b>
20	0100	33.5	36.9	<b>35.2</b>	33.2	39.9	<b>36.55</b>	38.4	40.5	<b>39.6</b>	36.8	41.6	<b>39.8</b>
21	0200	31.5	34.5	<b>33</b>	32.1	34.9	<b>33.5</b>	36.5	38.9	<b>37.9</b>	37.3	43.8	<b>41.7</b>
22	0300	34.4	36.8	<b>35.6</b>	30.5	36.6	<b>33.55</b>	35.4	37.8	<b>36.8</b>	36.3	38.9	<b>37.8</b>
23	0400	33.5	36.2	<b>34.85</b>	30.1	38.8	<b>34.45</b>	34.2	36.6	<b>35.6</b>	35.9	36.8	<b>36.4</b>
24	0500	32.2	34.2	<b>33.2</b>	30.2	38.2	<b>34.2</b>	34.8	35.5	<b>35.2</b>	34.8	35.6	<b>35.2</b>
<b>Day Mean dB(A)</b>				<b>44.10</b>	<b>Day Mean dB(A)</b>		<b>50.02</b>	<b>Day Mean dB(A)</b>		<b>51.6</b>	<b>Day Mean dB(A)</b>		<b>46.3</b>
<b>Night Mean dB(A)</b>				<b>35.8</b>	<b>Night Mean dB(A)</b>		<b>38.28</b>	<b>Night Mean dB(A)</b>		<b>42.0</b>	<b>Night Mean dB(A)</b>		<b>40.1</b>

**3.11.2 Observations:**



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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From the above table, it is observed that the ambient noise levels at all the monitoring locations and villages as the permissible limits of 55 dB(A) for day time and 45 dB(A) for night time observed within permissible limit.

## **3.12 WATER ENVIRONMENT**

### **3.12.1 Topography & Drainage Pattern**

#### **Topography**

The lease applied area exhibits plain terrain. The area has gentle sloping towards North eastern side. The maximum altitude of the area is 207m above Mean Sea level.

#### **Drainage Pattern of the area**

There are no developed surface drainage channels in the study area. The area is studded with few tanks that serve as the source of drinking water and their surplus feeds adjoining tanks. The area is mostly dry in all seasons except rainy seasons.

Palladam area is drained by River Noyil. The major drainage patterns observed is Dendritic to sub-dendritic. The drainage from southwest to north-northeast. Basin sub soil water is used to irrigate the lands. Tanks and surface water bodies are spread over the entire firka. The drainage pattern is the dendritic and sub- dendritic.

No prominent water course or nallah is inferred. During rainy season the surface runoff flows in NE to SW direction. The drainage pattern of the study area is dendritic type. The quarrying activity will not hinder the natural flow of rainwater.

### **3.12.2 Rainfall**

The area receives rainfall by South-West monsoon. Rainy season sets in the middle of June and lasts till September. The normal average rainfall in the Tiruppur district is 577.8 mm IMD, Tiruppur.

### **3.12.3 HYDROLOGY:**

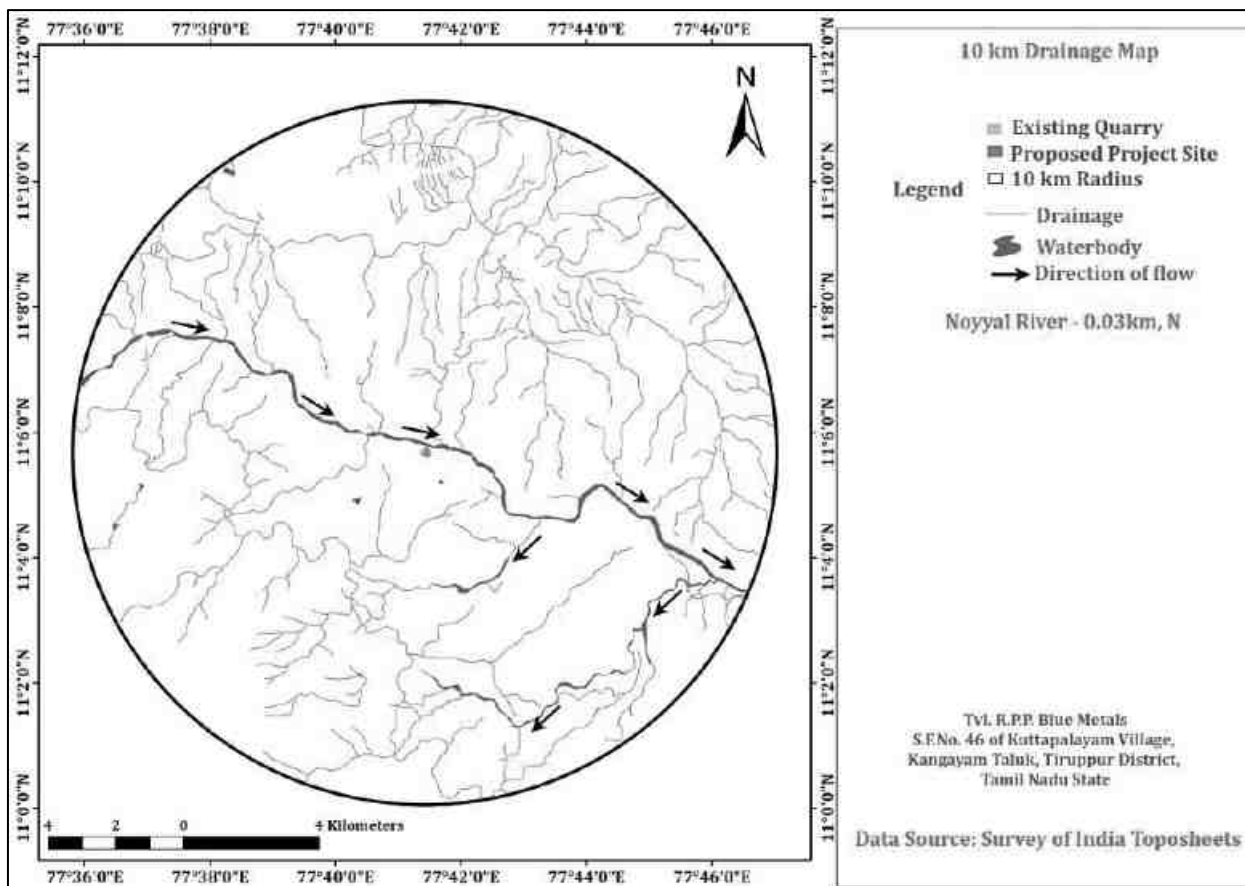
The district is underlain by hard rock formation fissured and fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-80 Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 60-70m. Hence there is no possibilities of water table intersection during the entire mine life period. Besides it is also inferred that topographically there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion.

During the rainy season there is a possibility of collection of seepage water from the subsurface levels, which will be collected and stored in the mine sump pits, the collected water will act as a temporary reservoir during the end of the life of the mine. The collected water will be used for dust suppression, greenbelt development.

Dendritic to sub dendritic type of drainage is observed in study area. The 10km study area comprises of one river i.e. Noyyal River which is located at 0.03km in north direction.

**Table 3-12 DISTANCE & DIRECTION OF RIVER/STREAM/NALA WITHIN THE 10KM RADIUS**

Name of the River/Stream/Nala	Distance from Project Site (Km)	Direction from Project Site
Noyyal River	0.03 km	N



**FIGURE 3.11 DRAINAGE PATTERN PRESENT IN THE STUDY AREA WITHIN 10 KM RADIUS**

### 3.12.4 Hydrogeological studies

The district is underlain by both porous and fissured formations. The important aquifer systems in the district are constituted by i) unconsolidated formations and ii) weathered and fractured crystalline rocks. The porous formations in the district are represented by alluvium and colluvium. The Colluvial formations are occurring in the western boarder of Tiruppur district. The porous formations in the district include sandstones and clays of Recent to sub recent and Tertiary age (Quaternary). The alluvial formations comprising mainly sands, clays and gravels are confined to major drainage courses in the district. The maximum thickness of alluvium is 35.0m whereas the average thickness is about 25.0m.

The area falls in one major river basins namely Thirumanimuthar River. River Thirumanimuthar originates from the Shevroy hills in Salem District, Tamilnadu State and flows in the south and south-eastern direction before it debouches into Gulf of Mannar. The river connecting of Cauvery River.

*(Source: District Groundwater Brochure, Tiruppur District, Tamil Nadu, CGWB 2013).*

**3.12.5 Site Specific Ground Water Table scenario**

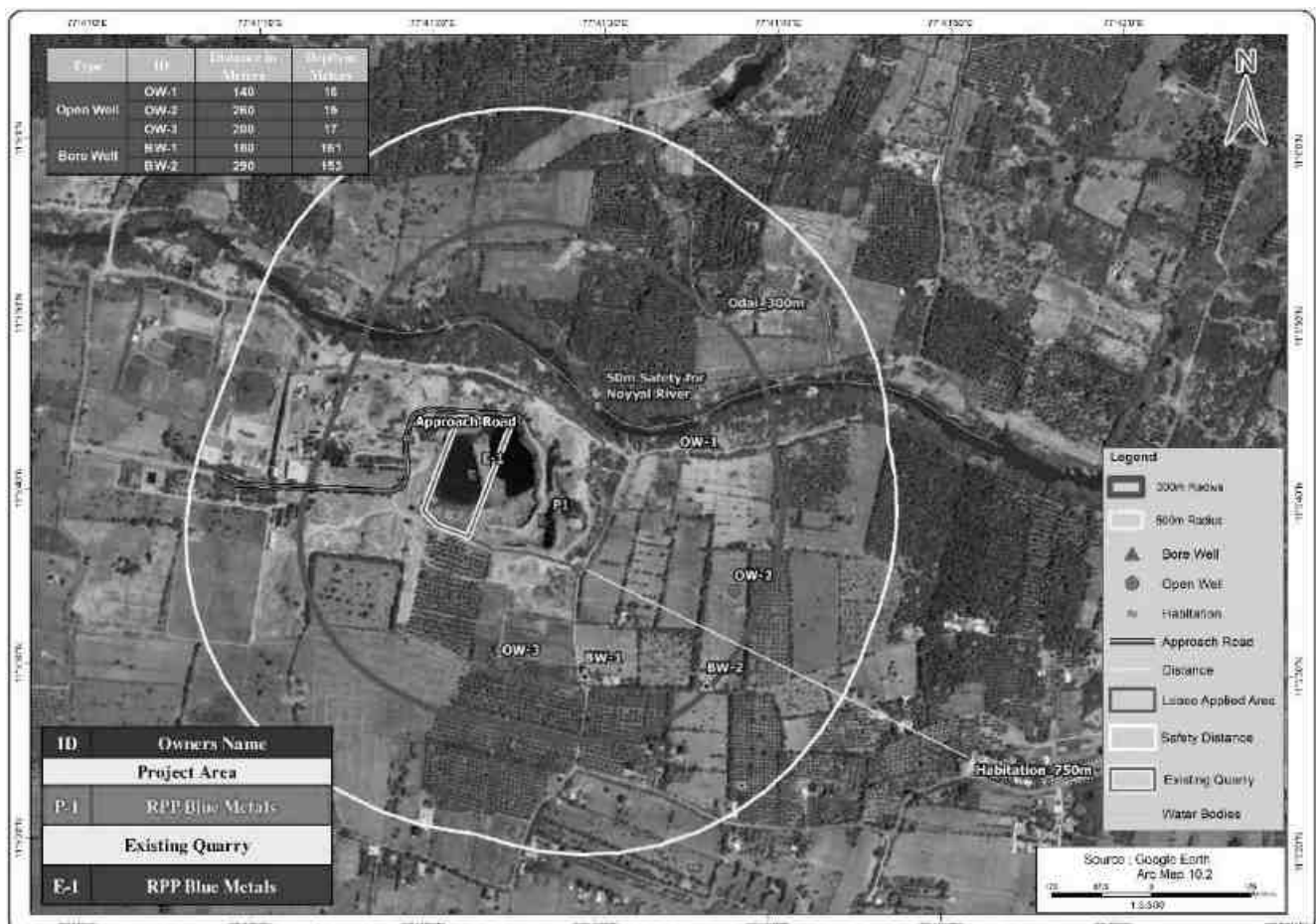
The pre monsoon water level in wells in adjoining villages near project site is observed at 65 to 67m bgl while Post Monsoon water level in the area is observed from 63 to 65m bgl. As per data obtained from nearby village borewells are tabulated in **Table 3.14**.

**Table 3-13 WATER LEVEL**

Particulars	Depth
<b>Water Table Level</b>	
During summer	64-67m
Rainy Season	63-65m

**TABLE 3-14 NEARBY OPEN WELLS & BORE WELLS  
(Measured from Water Level Meter)**

Particulars	Distance & Direction	Depth (m)	Water Level (m)
<b>Bore Well (1 No)</b>	368m, SSE	162	65
<b>Bore Well (1 No)</b>	540m, SE	160	67



**Figure 3.12 OPEN WELL & BORE WELL LOCATIONS NEAR PROJECT**

**Figure 3.13 PRE-MONSOON WATER LEVEL OBSERVED IN BOREWELLS WITH 1KM RADIUS**

Station Code	Latitude	Longitude	March	April	May	Average
			Water Level bgl in m			
A.	11° 5'29.22"N	77°41'30.87"E	65	66	66	66
B.	11° 5'29.12"N	77°41'37.01"E	67	66	67	67
C.	11° 5'25.01"N	77°41'53.43"E	64	64	65	64
D.	11° 5'23.41"N	77°41'29.57"E	65	65	65	65
E.	11° 5'21.70"N	77°41'13.91"E	66	67	67	67
F.	11° 5'29.28"N	77°40'57.05"E	66	66	67	66
G.	11° 5'47.79"N	77°40'55.96"E	67	67	67	67
H.	11° 6'5.61"N	77°41'11.24"E	64	65	65	65
I.	11° 5'48.92"N	77°41'55.70"E	65	66	66	66
J.	11° 5'26.85"N	77°41'48.17"E	67	66	66	66
K.	11° 5'13.57"N	77°41'36.05"E	64	64	64	64

### 3.10.6 GEOPHYSICAL SURVEY

Geophysical survey was carried out in that area by SSRMP-ATS Instrument with the help of IGIS software. Low resistance encountered at the depth between 65 to 70m bgl. There are no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion due to this proposed project. During rainy season there is a possibility of collection of seepage water from the subsurface levels this is due to the fracture and fissures at a depth of 65 to 70m bgl. The water seepage from the fractured zone is not anticipated.

#### 3.10.6.1 Methodology and Data Acquisition

VES Resistivity Method for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface is well established. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral in homogeneities and can provide higher depth of investigation. The four electrodes collinear set up where in the outer electrodes send current into the ground and the inner electrodes measure the potential difference.

The present study utilizes maximum current electrode separation AB/2. The data from this survey are commonly arranged and contoured in the form of Pseudo-section that gives an approximate of the subsurface resistivity. This technique is used for the inversion of Schlumberger VES data to predict the layer parameter namely layer resistivity and Geo electric layer thickness. The main goal of the present study is to search the vertical in homogeneities that is consistent with the measured data.

For a Schlumberger among the Apparent resistivity can be calculated as follows

$$\rho_a = \frac{GA}{V}$$

**I**

$\Delta V$  = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10-8 more than 10+14 ohmmeter. On a broad classification, one can group the rocks falling in the range of 10-8 to 1 ohmmeter as good conductors. 1 to 106 ohmmeter as intermediate conductors and 106 to 1012 ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

$$\rho_r = F \rho_w = a \phi^m \rho_w$$

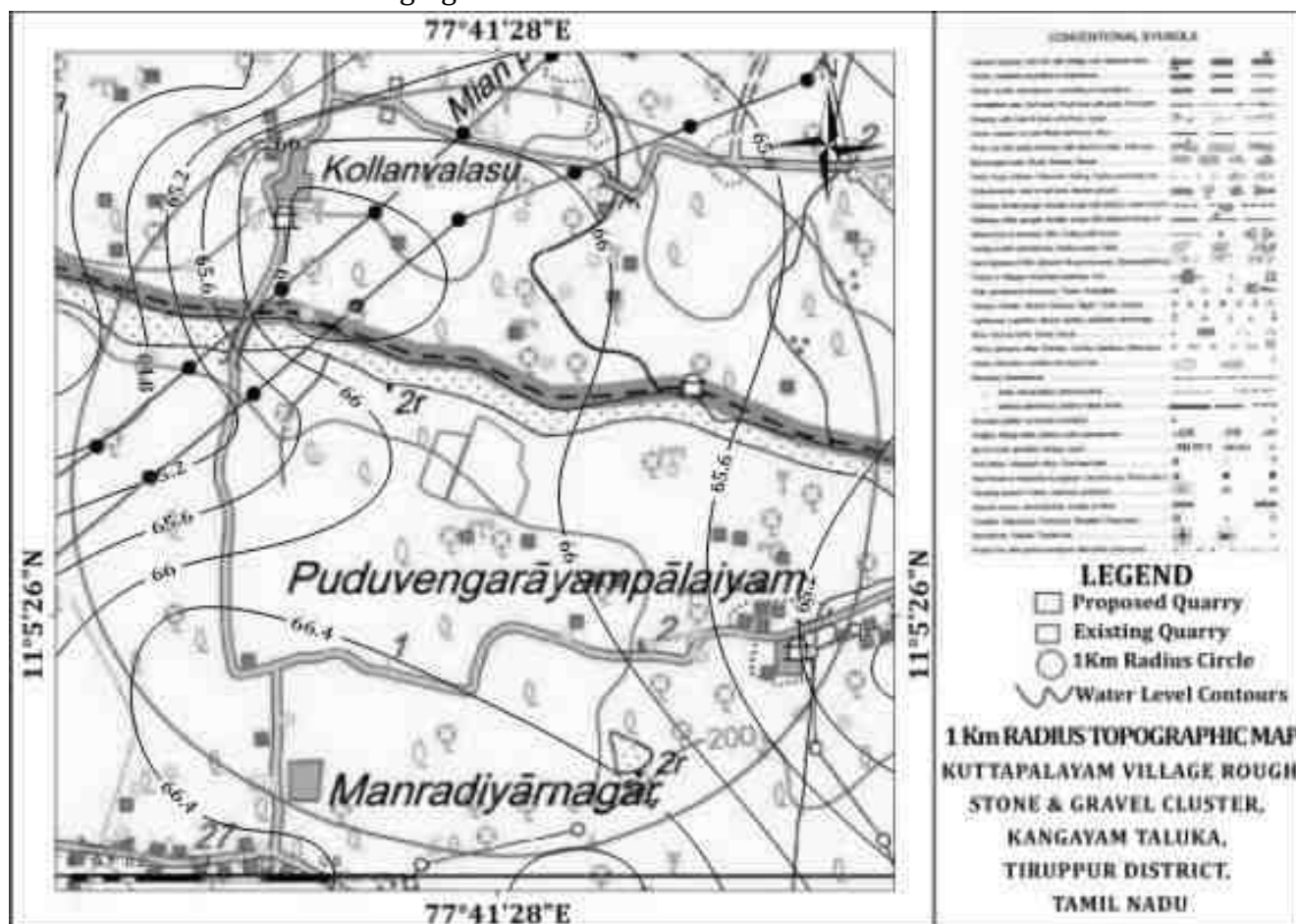
$\rho_r$  = Resistivity of Rocks

$\rho_w$  = Resistivity of water in pores of rock

F = Formation Factor

$\phi$  = Fractional pore volume

A = Constants with values ranging from 0.5 to 2.5

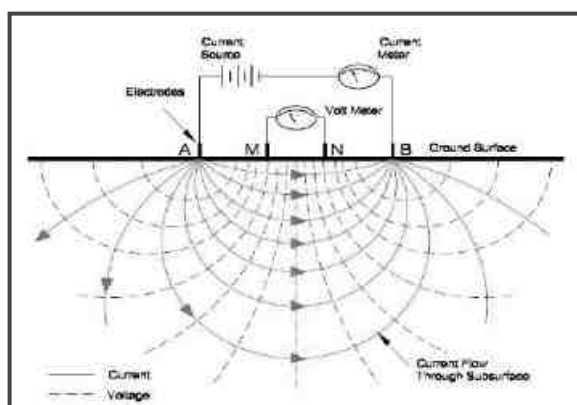


**Table 3-15 WATER LEVEL CONTOURS OBSERVED WITHIN 1KM RADIUS**

**3.10.6.2 Survey Layout**

Here the present study is considered with Schlumberger array. The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. In which the distance may be used for current electrode separation while

potential electrode separation is kept on third to one fifth of the same. One interesting aspect in VES is the principle of reciprocity, which permits interchange of the potential and current electrode without any effect on the measured apparent resistivity. The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – ATS. This Signal stacking Resistivity meter is a high quality data acquisition system incorporating several innovation features for Earth resistivity. In the presence of random earth Noises the signal to nose ration can be enhanced by  $\sqrt{N}$  where N is the number of stacked readings. This SSR meter in which running averages of measurements [1, (1+2)/2, (1+2+3)/3 ... (1+2...+16/16)] up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.



**Figure 3.14 RESISTIVITY SURVEY PROFILE**

Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes ( $C_1$  &  $C_2$ ) and measuring the resulting potential by two other electrodes called potential electrode ( $P_1$  &  $P_2$ ). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity, and the depth of interest.

**Table 3-16 GPS CO-ORDINATES OF VES LOCATION**

No of station	Co-ordinates	Vertical Electrical Sounding depth in (m)
Station 1	11° 5'38.76"N 77°41'25.26"E	100m

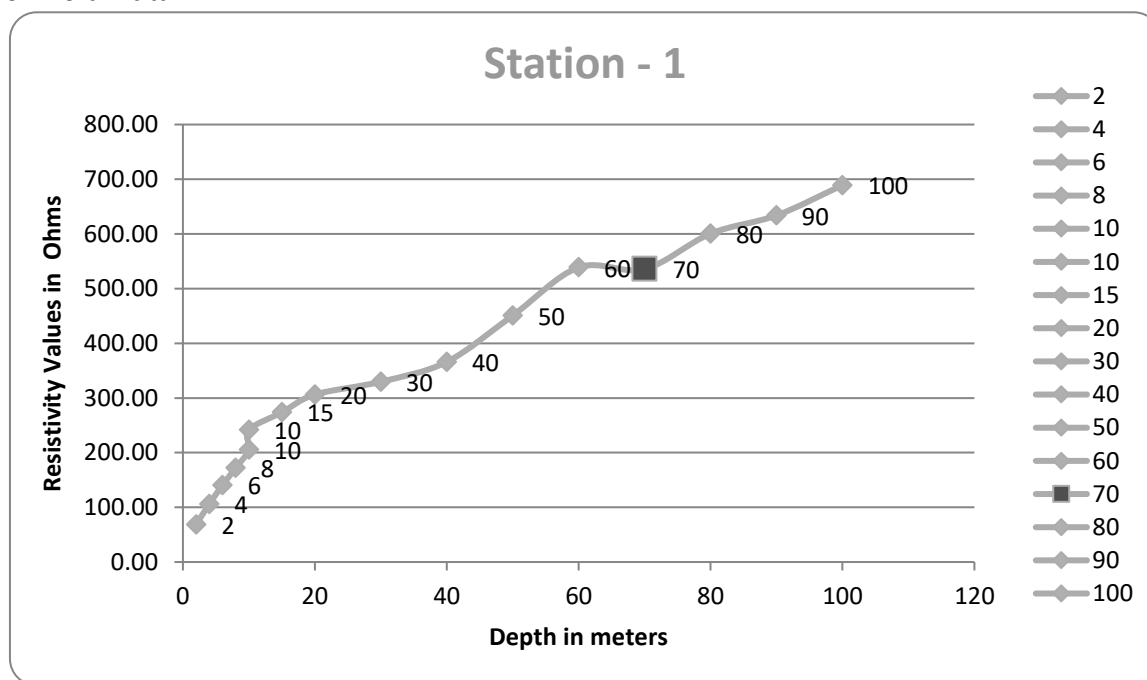
### 3.12.6.3 Data Presentation

**Table 3-17 VES RESULTS OF STATION 1**

S. No	Ab/2	Mn/2	Geometrical factor (G)	Resistance Value in Ohms	Apparent Resistance in Ohms
<b>STATION 1</b>					
1	2	1	4.71	14.57	68.58
2	4	1	23.55	4.50	105.98
3	6	1	54.95	2.56	140.67
4	8	1	98.91	1.74	172.10
5	10	1	155.45	1.32	205.19

S. No	Ab/2	Mn/2	Geometrical factor (G)	Resistance Value in Ohms	Apparent Resistance in Ohms
6	10	5	23.55	10.26	241.62
7	15	5	62.8	4.36	273.81
8	20	5	117.75	2.60	306.15
9	30	5	274.75	1.21	329.70
10	40	5	494.55	0.74	365.97
11	50	5	777.15	0.58	450.75
12	60	5	1122.55	0.48	538.82
13	70	5	1530.75	0.35	535.76
14	80	5	2001.75	0.30	600.53
15	90	5	2535.55	0.25	633.89
16	100	5	3132.15	0.23	689.07

Source: Field Data



**FIGURE 3.15 VES SOUNDING RESISTANCE TO DEPTH GRAPH**

### 3.12.5 Water requirement

Total water requirement in the rough stone and Gravel Mine for the project is estimated to be 4.3 KLD. Water will be supplied from mostly rainwater accumulated in mine pit (when available) for dust suppression and plantation and by tanker from nearby villages. Drinking water will be supplied from nearby villages.

### 3.12.6 Baseline Status

The existing status of groundwater and surface water quality was assessed by identifying 7 ground water (Bore wells/dug wells) samples in different villages and 2 surface water samples.

The physio-chemical characteristics of ground and surface water are given in the **Tables 3.20** respectively.



**Table 3-18 DETAILS OF WATER SAMPLING LOCATIONS**

S. No.	Location Code	Location	Distance (Km)	Direction of wind
			w.r.t Project Site	
1.	GW 1	Nathakadaaiyur Village	2.89	Nearest Habitation WSW
2.	GW 2	Builders Engineering College, Nathakadaaiyur	4.83	Upwind SW
3.	GW 3	Government Arts and Science College, Mullipuram Post	6.96	Upwind SW
4.	GW 4	Gandhi nagar, Kandasampalayam	3.87	Downwind NE
5.	GW 5	BPCL Kandasampalayam - Petrol Pump	5.63	Downwind NE
6.	GW 6	Vadapalani Village	3.40	Cross wind NW
7.	GW 7	Puduppalayam Village	4.54	Cross wind SE
Surface water locations				
1.	SW1	Noyal River	0.4 Km	N
2.	SW2	Mettukattuvalasu Pond	4 Km	SW



**FIGURE 3.16 WATER MONITORING LOCATIONS**

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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**Table 3-19 PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER**

<b>Date of Sampling</b>	05-05-2022	<b>Sampling Method</b>	ETS/STP/WATER-01
<b>Analysis Start Date</b>	07-05-2022	<b>Sample Quantity</b>	2.0+ 0.5 Litre
<b>Analysis End Date</b>	10-05-2022	<b>Packing Condition</b>	Sealed
<b>Sampling Done By</b>	ETS STAFF	<b>Packed IN</b>	PVC and Glass Bottle

S. No.	Test Parameters	Unit	GW1 Result	GW2 Result	GW 3 Result	GW 4 Result	GW 5 Result	GW6 Result	GW7 Result	Drinking Water Standards / Limit (IS:10500 2012 )		Test Method
										Desirable	Permissible	
1.	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5	15	IS:3025 (Pt-4)
2.	Odour	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS:3025 (Pt-5)
3.	pH	---	7.87	7.81	6.81	7.57	7.43	7.21	7.52	6.5 - 8.5	No Relaxation	IS:3025 (Pt-11)
4.	Taste	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS:3025 (Pt-8)
5.	Turbidity	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	5	IS:3025 (Pt-10)
6.	Total Dissolve Solid (TDS)	mg/L	342.0	371.0	415.0	361.0	534.0	321.0	418.8	500	2000	IS:3025 (Pt-16)
7.	Total Alkalinity (CaCO <sub>3</sub> )	mg/L	153.2	147.2	161.5	142.1	181.2	137.7	170.3	200	600	IS:3025 (Pt-23)
8.	Total Hardness(CaCO <sub>3</sub> )	mg/L	131.4	128.2	195.2	132.3	272.5	121.2	221.5	200	600	IS:3025 (Pt-21)
9.	Chloride (Cl)	mg/L	48.1	43.2	53.5	48.1	63.3	41.3	72.6	250	1000	IS:3025 (Pt-32)
10.	Calcium (Ca)	mg/L	39.3	36.5	40.1	45.3	47.1	37.1	54.1	75	200	IS:3025 (Pt-40)
11.	Mineral Oil	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5	No Relaxation	IS:3025 (Pt-39)
12.	Sulphate (SO <sub>4</sub> )	mg/L	33.2	32.1	33.2	29.1	36.3	31.8	38.1	200	400	IS:3025 (Pt-24)
13.	Nitrate (NO <sub>3</sub> )	mg/L	2.51	2.56	2.41	2.32	2.23	1.95	3.05	45	No Relaxation	IS:3025 (Pt-34)

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S. No.	Test Parameters	Unit	GW1 Result	GW2 Result	GW 3 Result	GW 4 Result	GW 5 Result	GW6 Result	GW7 Result	Drinking Water Standards / Limit (IS:10500 2012 )		Test Method
										Desirable	Permissible	
14.	Fluoride (F)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	1.5	IS:3025 (Pt-60)
15.	Iron (Fe)	mg/L	0.27	0.23	<0.05	<0.05	0.18	<0.05	0.20	0.3	No Relaxation	IS:3025 (Pt-53)
16.	Aluminium (Al)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.2	APHA-3500 (B)
17.	Selenium (Se)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No. Relaxation	APHA-3113 (B)
18.	Cyanide (Cn)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No. Relaxation	APHA-4500 (C)
19.	Copper(Cu)	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	1.5	APHA-3111(B)
20.	Magnesium (Mg)	mg/L	23.2	23.1	30.4	28.6	19.6	25.6	23.7	30	100	IS:3025 (Pt-45)
21.	Manganese(Mn)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	APHA-3111(B)
22.	Zinc(Zn)	mg/L	0.71	0.79	0.79	0.87	0.54	0.93	1.01	5	15	APHA-3111 (B)
23.	Cadmium(Cd)	mg/L	<0.001	<0.001	<0.00	<0.00	<0.001	<0.00	<0.001	0.003	No. Relaxation	APHA-3111 (B)
					1	1		1				
24.	Lead(Pb)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No. Relaxation	APHA-3111 (B)
25.	Mercury(Hg)	mg/L	<0.001	<0.001	<0.00	<0.00	<0.001	<0.00	<0.001	0.001	No. Relaxation	APHA-3112 (B)
					1	1		1				
26.	Nickel (Ni)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	No. Relaxation	APHA-3111 (B)
27.	Arsenic(As)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05	APHA-3500 (B)
28.	Chromium (Cr+6)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No. Relaxation	APHA-3500 Cr-B
29.	Phenolic Compound (C6H5OH)	mg/L	<0.001	<0.001	<0.00	<0.00	<0.001	<0.00	<0.001	0.001	0.002	APHA-5530
					1	1		1				
30.	Conductivity (25 °C)	mhos/Cm	473.3	513.5	573.3	499.3	807.4	441.9	517.1	Not Specified	Not Specified	APHA-2510
31.	E. Coli	Coli/100ml	Absent	Absent	Abse nt	Abse nt	Absent	Absen t	Absent	Shall Not Be Detectable	---	IS:1622-1981

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S. No.	Test Parameters	Unit	GW1 Result	GW2 Result	GW 3 Result	GW 4 Result	GW 5 Result	GW6 Result	GW7 Result	Drinking Water Standards / Limit (IS:10500 2012 )		Test Method
										Desirable	Permissible	
32.	Total Coliform	MPN/100m l	Absent	Absent	Abse nt	Abse nt	Absent	Absen t	Absent	Shall Not Be Detectable	---	IS:1622-1981

**Table 3-20 SURFACE WATER QUALITY**

<b>Date of Sampling</b>	12.05.2022	<b>Sampling Method</b>	ETS/STP/WATER-01
<b>Analysis Start Date</b>	14.05.2022	<b>Sample Quantity</b>	2.0+ 0.5 Litre
<b>Analysis End Date</b>	17.05.2022	<b>Packing Condition</b>	Sealed
<b>Sampling Done By</b>	ETS STAFF	<b>Packed IN</b>	PVC and Glass Bottle

S. No.	Test Parameters	Unit	SW1 Result	SW2 Result	Test Method
1.	Colour	Hazen	<1.0	<1.0	IS:3025 (Pt-4)
2.	Odour	---	Agreeable	Agreeable	IS:3025 (Pt-5)
3.	Taste		Agreeable	Agreeable	IS:3025 (Pt-8)
4.	pH	---	7.86	7.65	IS:3025 (Pt-11)
5.	Turbidity	NTU	10.10	9.8	IS:3025 (Pt-10)
6.	Total Dissolve Solid (TDS)	mg/L	764.4	1034.2	IS:3025 (Pt-16)
7.	Total Suspended Solid (TSS)	mg/L	11.3	10.6	IS:3025 (Pt-16)
8.	Total Alkalinity (CaCO <sub>3</sub> )	mg/L	274.1	214.1	IS:3025 (Pt-23)
9.	Total Hardness(CaCO <sub>3</sub> )	mg/L	352.6	335.3	IS:3025 (Pt-21)
10.	Calcium (Ca)	mg/L	140.2	128.3	IS:3025 (Pt-40)
11.	Magnesium (Mg)	mg/L	50.4	47.1	IS:3025 (Pt-45)
12.	Chloride (Cl)	mg/L	72.5	80.7	IS:3025 (Pt-32)

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13.	Sulphate (SO <sub>4</sub> )	mg/L	88.1	110.5	IS:3025 (Pt-24)
14.	Fluoride (F)	mg/L	0.32	0.28	IS:3025 (Pt-60)
15.	Aluminum (Al)	mg/L	<0.05	<0.05	IS:3025 (Pt-55)
16.	Iron (Fe)	mg/L	0.26	0.35	IS:3025 (Pt-53)
17.	Nitrate	mg/L	1.05	0.86	IS:3025 (Pt-34)
18.	Zinc(Zn)	mg/L	<0.01	<0.01	APHA-3111 (B)
19.	Cadmium(Cd)	mg/L	<0.01	<0.01	APHA-3111 (B)
20.	Lead(Pb)	mg/L	<0.01	<0.01	APHA-3111 (B)
21.	Nickel (Ni)	mg/L	0.07	0.09	APHA-3111 (B)
22.	Conductivity (25 °C)	us/Cm	1034.46	1307.1	APHA-2510
23.	Boron	mg/L	<0.05	<0.05	IS:3025 (Pt-57)
24.	Selenium as (Se)	mg/L	<0.05	<0.05	APHA-method
25.	Manganese (Mn)	mg/L	0.08	0.06	IS:3025 (Pt-59)
26.	Mercury (Hg)	mg/L	<0.001	<0.001	IS:3025 (Pt-48)
27.	Total Arsenic (As)	mg/L	<0.01	<0.01	IS:3025 (Pt-37)
28.	Total chromium (Cr)	mg/L	<0.05	<0.05	IS:3025 (Pt-52)
29.	Molybdenum (Mo)	mg/L	<0.05	<0.05	IS:3025 (Pt-2)
30.	Ammonia (Total Ammonia-N)	mg/L	<0.05	<0.05	IS:3025 (Pt-34)
31.	Chemical Oxygen Demand (COD)	mg/L	21.4	18.3	APHA-5220 (B)
32.	Biological Oxygen Demand (BOD at 27°C for 3 day)	mg/L	4.0	5.8	APHA-4500 (D)
33.	Dissolve Oxygen (DO)	mg/L	5.1	4.3	APHA-5210
34.	Free Residual Chlorine	mg/L	<0.01	<0.01	IS:3025 (Pt-26)
35.	Total Coliform	MPN/100 ml	190	240	IS:1622-1981
36.	E.Coil	Coil/100 ml	170	210	IS:1622-1981

### **3.12.7 Result Discussion**

#### **3.12.7.1 Ground Water Quality**

The physico-chemical characteristics of groundwater are presented in **Table 3.20** and are compared with the standards. The pH of the water samples collected ranged from 6.81 to 7.87 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found in the range of 321 to 418.8 mg/l in all samples. The total hardness varied between 121.2 to 272.5 mg/l for all samples collected at 7 locations.

In all samples, iron content is 0 to 0.3 mg/l, Nitrate is between 1.95 to 3.05 mg/l, fluoride varied between 0 to 0.1 mg/l, chloride varies from 41.3 to 72.6 mg/l, Sulphate varies from 29.1 to 38.1 mg/l, alkalinity varies from 137.7 to 170.3 mg/l, calcium varies from 36.5 to 54.1 mg/l and magnesium varies from 19.6 to 30.4 mg/l. The overall ground water quality was found to be good in most of the villages. The levels of heavy metals content were found to be within permissible limits.

#### **3.12.7.2 Surface Water Quality**

The results of the surface water samples analyzed are presented in **Table 3.21** and are compared with the standards.

The pH of the water samples collected is 7.65 and 7.86 and is within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found is 764.4 and 1034.2 mg/l in all samples. The total hardness is 335.3 and 352.6 mg/l for all samples collected at 2 locations.

Iron is 0.26 and 0.35 mg/l, Nitrate is 0.86 and 1.05 mg/l, fluoride is 0.28 and 0.32 mg/l, chloride is 72.5 and 80.7 mg/l, Sulphate 88.1 and 110.5 mg/l, alkalinity 214.1 and 274.1 mg/l, calcium 128.3 and 140.2 mg/l and magnesium is 47.1 and 50.4 mg/l. The overall ground water quality was found to be good in most of the villages. The levels of heavy metals content were found to be within permissible limits.

### **3.13 BIOLOGICAL ENVIRONMENT**

#### **3.13.1 Introduction**

Biological environment of any area constitutes all living beings of that area. It is an integral part of the environment. Biodiversity is often considered synonymous with species richness of the area. Identifying, measuring, and monitoring biodiversity is a complex exercise. The biodiversity assessment generally concerns with, conducting biodiversity inventories, inventories for assessing existing biodiversity. This provides the information on the biodiversity richness of the area under consideration. The selection of indicators differs for each biodiversity monitoring and is entirely based on the output required from such biodiversity inventory. Any change in the surrounding environment could cause loss of species or decrease in biodiversity of the area. Therefore, the present study is proposed to assess the impact of the Rough stone and Gravel mining project on biological environment of the project site and surrounding area within 10 km radius. Accordingly, mitigation measures are planned to sustain the biological diversity.

### **3.13.2 Ecological Impact Assessment**

Ecological Impact Assessment is used to predict and evaluate the impacts of development activities on ecosystems and their components, thereby providing the information needed to ensure that ecological issues are given full and proper consideration in development planning. Environmental Impact Assessment (EIA) has emerged as a key to sustainable development by integrating social, economic and environmental issues. EIA has a major part to play as a component of EIA but also has other potential applications in environmental planning and management. Ecological Impact Assessment provides a comprehensive review of the EIA process and summarizes the ecological theories and tools that can be used to understand, explain and evaluate the ecological consequences of development proposals.

Environmental Impact Assessments have become an integral part of development projects in India ever since 1994, to formulate policies and guidelines for environmentally sound economic development. Proper assessment of biological environment and compilation of its taxonomical data is essential for the impact predictions.

Consistent and regularly updated data on regional and local taxonomy and floristic and faunal diversity of the areas are almost non-existent in country as diverse as India. Instant information on biodiversity profiles of the area, where the proposed project is setting up, is an essential part of the baseline studies of EIA. In such a situation, good primary baseline biodiversity survey is a pre-requisite for the collection of reliable data. These contributions towards biodiversity surveys may sometimes recognized as the actual value additions in terms of new records or a new data base but are more often recognized in the validation and updating of the existing information base.

There is no National Parks, Eco sensitive areas, Wild life sanctuaries, Reserve Forest within the radius of 10km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area.

### **3.13.3 Objectives of the study**

The ecological study of the area was conducted in order to understand the existing status of the flora and fauna to generate baseline information and evaluate the possible impacts on biological environment. The present study highlights the various issues pertaining to floristic diversity and faunal wealth in the surrounding area up to 10 km radius of the proposed project site.

### **3.13.4 Methodology Adopted & Objective**

To achieve the above objective, a detailed study of the area was undertaken in 10 km radius from the proposed project area. The different methods adopted were as follows:

- Primary field surveys to establish primary baseline of the study area;

- Compilation of information available in published literatures and as obtained from Forest survey of India, Environmental Information Centre, Botanical Survey of India and Zoological Survey of India.
- The present report gives the review of published secondary data and the results of field sampling conducted and there are no forest blocks in study area. The detailed ecological assessment of the study area has been carried out with the following objectives:
- Identification of flora and fauna within the study area;
- Preparation of checklist of species which also include endangered, endemic and protected (both floral and faunal categories); and
- Evaluation of impact of proposed expansion on flora and fauna of the area.

The present study was carried out in given steps

- Field survey was conducted by visual encounter survey for flora present within the 10 km radius study area of all the proposed mine site.
- After surveying the core and buffer areas, a detailed floral inventory has been compiled. List of all plants of the study area was prepared and their habitats were recorded.
- Verification of Rare, Endangered and Threatened Flora species from IUCN Red Data Book.
- Plants and Animals communities were noted.

### **3.13.5 Site selection criteria**

The core study area is located at Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu. The buffer study area comprises of 10 km radius from all the proposed Rough stone and gravel quarry area. Selection of sampling locations was made with reference to topography, land use, vegetation pattern, etc. The observations were taken on natural vegetation, roadside plantation and non-forest area (agricultural field, in plain areas, village wasteland, etc.) for quantitative representation of different species.

A methodology of Sampling Flora and fauna studies were carried out to assess the list of terrestrial plant and animal species that occur in the core area and the buffer area up to 10 km radius from the project site. No damage was created to flora and fauna during the sampling.

### **3.13.6 Flora Methodology**

In order to provide representative ecological status for the study area, the 10-km buffer zone has been divided into four quartiles for biodiversity sampling, i.e., NE (Quartile-1), NW (Quartile-2) SW (Quartile-3) and SE (Quartile-4). Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (25x25-m), shrubs (10x10-m) and herbs (2x2-m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

### **3.13.7 Fauna Methodology**

The assessment of fauna was done collecting the primary data from the project sites. The presence was also confirmed from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area. In addition, officials, local people were another source



of information for studying the fauna of the area. Field activities were physical search, hollow inspection, covering rocks, location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife envis data base ([wiienviis.nic.in/Database/Schedule Species Database](http://wiienviis.nic.in/Database/Schedule%20Species%20Database)) and Zoological Survey of India (ZSI).

#### **3.13.7.1 Survey and Monitoring of Mammals**

Intensive survey was done by line transect method (Walking and in vehicle) for all major habitats for surveying of mammals by direct and indirect evidence. Indirect methods such as scat (i.e. faecal matter,) and pug mark by establishing 10 × 100-m linear transects depending on the habitat (i.e., existing wildlife game routes/foresttrails used).

Direct observation technique was used for surveying large and medium sized mammals but this technique was perfectly suitable for surveying of diurnal mammals.

#### **3.13.7.2 Survey and Monitoring of Birds**

Birds are sampled by using point count methods, and opportunistic bird sightings. By this bird vocal sounds, the species were identified in consultation with village local people.

Point count: In this method, the observer will stand in a randomly chosen point and birds seen or heard in 50m radius will be recorded for 5-min, this observation will be repeated in another point at least 30m from the first point. We have enumerated 20 point – counts in each quartile, which constitute a total of 80 points-count (20 x 4) within 10 km radius area.

#### **3.13.7.3 Survey and Monitoring of reptiles**

Several survey techniques such as standard walk transect visual encounter survey methods were used to sampling reptiles in each habitat of the study area. Species identification was done by using standard field guides in consultation with village people expert.

The butterfly was enumerated by 2 linear transects of 10 × 100 m, laid within each quartile at minimum interval of 1 km. Further, amphibians and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts.

#### **3.13.8 Flora in Core Zone**

Taxonomically a total of 21 species belonging to 17 families have been recorded from the core mining lease area. It is very dry and exhibit plain topography. Based on habitat classification of the enumerated plants most species were Tree 8 (38.09%) followed by Shrubs 6 (28.57%), Herbs 4 (19.04%) and Climber 3 (14.28%). The result of core zone of flora studies shows that Fabaceae and Arecaceae are the main dominating species.

#### **3.13.9 Flora in Buffer Zone**

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby some agriculture land. The agriculture land was found to dominate mostly in North, and East directions. Majority of the flat landscape around project unit is occupied by agriculture fields. It contains a total of 74 species belonging to 39 families have been

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recorded from the buffer zone. The floral (74) varieties among them thirty-four trees (34), eleven shrubs (11) and sixteen herbs (16) and Climbers eleven (11) were identified. The result of buffer zone of flora studies shows that Fabaceae and Lamiaceae, Moraceae are the main dominating species in the study area. There is no Rare, Endangered and Threatened Flora species in mining area and their surrounding area.

**Table 3-21 FLORA IN CORE ZONE**

SI. No	English Name	Vernacular Name	Scientific Name	Family Name
<b>TREES</b>				
1	Acacia Nilotica	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae
2	Asian Palmyra plam	Panai maram	<i>Borassus flabellifer</i>	Arecaceae
3	Coconut tress	Thennai maram	<i>Cocos nucifera</i>	Arecaceae
4	Noni	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae
5	Neem	Vembu	<i>Azadirachta indica</i>	Meliaceae
6	Millettia pinnata	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae
7	Mesquite	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae
8	Mango	Manga maram	<i>Mangifera indica</i>	Anacardiaceae
<b>SHRUBS</b>				
9	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae
10	Sarphonka	Katu-kolingi	<i>Tephrosia purpurea</i>	Fabaceae
11	Avar am	Avarai	<i>Senna auriculata</i>	Fabaceae
12	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae
13	Wild sage	Unichedi	<i>Lantana camara</i>	Verbenaceae
14	Indian mallow	Thuththi	<i>Abutilon indicum</i>	Malvaceae
<b>HERBS</b>				
15	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae
16	Devil's thorn	Nerunji	<i>Tribulus terrestris</i>	Zygophyllales
17	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
18	Yellow-fruit Nightshade	Kantang kathrikai	<i>Solanum virginianum</i>	Solanaceae
<b>CLIMBER</b>				
19	Slender dwarf morning-glory	Vishnukrandi	<i>Evolvulus alsinoides</i>	Convolvulaceae
20	wild water lemon	Sirupunaikkali	<i>Passiflora foetida</i>	Passifloraceae
21	stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae

**Table 3-22 FLORA IN BUFFER ZONE**

SI.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type
<b>TREES</b>					
1	Neem or Indian lilac	Vembu	<i>Azadirachta indica</i>	Meliaceae	M
2	Mango	Manga	<i>Mangifera indica</i>	Anacardiaceae	E
3	Creamy Peacock Flower	Vadanarayani	<i>Delonix elata</i>	Fabaceae	M
4	Millettia pinnata	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	E

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Sl.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type
5	Bamboo	Moonghil	<i>Bambusa bambo</i>	Poaceae	E
6	Indian fig tree	Athi	<i>Ficus recemosa</i>	Moraceae.	EM
7	Gum arabic tree	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	NE
8	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	EM
9	Asian Palmyra plam	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	E
10	Indian gooseberry	Nelli	<i>Emblica officinalis</i>	Phyllanthaceae	EM
11	Fragrant manjack	Mukuchalipazham	<i>Cordia dichotoma</i>	Boraginaceae	M
12	Cannon balltree	Nagalingam	<i>Couroupita guianensi</i>	Lecythidaceae	M
13	Black plum	Navalmaram	<i>Sygygium cumini</i>	Myrtaceae	EM
14	Beauty leaf	Punnai	<i>Calophyllu inophyllum</i>	Calophyllaceae	M
15	Tamarind	Puliyamaram	<i>Tamarindus indica</i>	Legumes	EM
16	Banyan tree	Alamaram	<i>Ficus benghalensis</i>	Moraceae	E
17	Guava	Koyya	<i>Psidium guajava</i>	Myrtaceae	EM
18	Rain tree	Mazhaimaram	<i>Enterolobium soman</i>	Fabaceae	E
19	Teak	Thekku	<i>Tectona grandis</i>	Verbenaceae	E
20	Five leaf chastera	Nochi	<i>Vitex negundo</i>	Lamiaceae	M
21	Eucalyptus	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	EM
22	Jack fruit	Palamaram	<i>Artocarpus heterophyllus</i>	Moraceae	E
23	Henna	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	EM
24	Lemon	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	EM
25	Papaya	Pappali maram	<i>Carica papaya L</i>	Caricaceae	EM
26	Indian fir tree	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	E
27	Acacia Nilotica	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	M
28	Chinese chaste tree	Nochi	<i>Vitex negundo</i>	Verbenaceae	E
29	Peepal	Arasanmaram	<i>Ficus religiosa</i>	Moraceae	M
30	Noni	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	M
31	Manilkara zapota	Sapota	<i>Manilkara zapota</i>	Sapotaceae	E
32	custard apple	Seethapazham	<i>Annona reticulata</i>	Annonaceae	E
33	Curry tree	Velipparuthi	<i>Murraya koenigii</i>	Asclepiadaceae	EM
34	banana tree	Vazhaimaram	<i>Musa</i>	Musaceae	EM
<b>SHRUBS</b>					
35	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	M
36	Flame of the Woods	Idlipoo	<i>xoracoc cineae</i>	Rubiaceae	M
37	Puriging nut	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	EM
38	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	EM
39	Ceylon Date Palm	Icham	<i>Phoenix pusilla</i>	Arecaceae	EM
40	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae	M
41	Shoe flower.	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	EM

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Sl.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type
42	Rosary pea	Kundumani	<i>Abrus precatorius</i>	Fabaceae	M
43	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	M
44	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	M
45	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae	M
<b>HERBS</b>					
46	Carrot grass	Parttiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	NE
47	Prickly chaff flower	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	M
48	Carryme seed	Kilanell	<i>Phyllanthus amarus</i>	Phyllanthaceae	M
49	Nabhali	Kuthiraikulambadi	<i>Cyanotis cristata</i>	Commelinaceae	M
50	Benghal dayflower	Kanamvazha	<i>Commelina benghalensis</i>	Commelinaceae	M
51	False daisy	Karisilanganni	<i>Eclipta prostrata</i>	Asteraceae	EM
52	Indian pennywort.	Vallarai	<i>Centella asiatica</i>	Apiaceae	EM
53	Common nut sedge	Korai	<i>Cyperus rotundus</i>	Cyperaceae	NE
54	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	M
55	Poor land flatsedg	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	NE
56	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	M
57	Indian Copperleaf	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	M
58	Red Hogweed	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	M
59	Tridax daisy	Veetukaayapoond u	<i>Tridax procumbens</i>	Asteraceae	M
60	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	E
61	European black nightshade	Manathakkali	<i>Solanum nigrum</i>	Solanaceae	EM
<b>CLIMBER</b>					
62	Ivy gourd	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	M
63	Balloon vine	Mudakkotan	<i>Cardiospermum helicacabum</i>	Sapindaceae	M
64	Pointed gourd	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	EM
64	butterfly pea	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	M
68	Bottle Guard	Sorakkai	<i>Lagenaria siceraria</i>	Cucurbitaceae	EM
69	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	M
70	Indian sarsparilla	Nannari	<i>Hemidesmus indicus</i>	Asclepiadaceae	M
71	Wild water lemon	Sirupunaikkali	<i>Passiflora foetida</i>	Passifloraceae	M
72	Butterfly-pea	Sangupoo	<i>Clitoria ternatea</i>	Fabaceae	M
73	Wild jasmine	Malli	<i>Jasminum augustifolium</i>	Oleaceae	EM
74	Purple fruited pea eggplant	Thuthuvelai	<i>Solanum trilobatum</i>	Solanaceae	EM

\*E- Economical, M- Medicinal, EM- Both Economical and Medicinal, NE- Not evaluated

### 3.13.10 FAUNA

The faunal survey has been carried out as per the methodology cited and listed out Mammals, birds, Reptiles, Amphibians and Butterflies. All the listed species were compared with Red Data Book and Indian Wildlife Protection Act, 1972. There are no rare, endangered, threatened (RET) and endemic species present in core area.

### 3.13.11 FAUNA IN CORE ZONE

A total of 23 varieties of species observed in the Core zone of Morattupalayam village, Rough stone and gravel quarry (Table No.3.7). Among them numbers of Insects 9 (37.5%), Reptiles 5 (20.83%), Mammals 3 (12.5%) and Avian 7 (29.16%). A total of 23 species belonging to 19 families have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and six species are under schedule IV according to Indian wild life Act 1972. A total seven species of bird were sighted in the mining lease area. Dominant species are mostly birds and insects and three amphibians were observed during the extensive field visit (*Hoplobatrachus tigerinus*), (*Rana hexadactyla*), (*Bufo melonosticatus*). There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna in core zone with the scientific name were mentioned in **Table 3.24**.

**Table 3-23 LIST OF FAUNA IN CORE ZONE**

SI. No	English Name	Family Name	Scientific Name	WPA Schedule	IUCN List
<b>INSECTS</b>					
1	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
2	Acraea violae	Nymphalidae	<i>Acraea violae</i>	NL	LC
3	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
4	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
5	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
6	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
7	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
8	Termite	Blattodea	<i>Hamitermes silvestri</i>	NL	LC
9	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
<b>REPTILES</b>					
10	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
11	Brahminy skink	Scincidae	<i>Eutropis carinata</i>	NL	LC
12	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
13	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
<b>MAMMALS</b>					
14	Indian Field Mouse	Muridae	<i>Musbooduga</i>	Schedule IV	NL
15	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule II	LC

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Sl. No	English Name	Family Name	Scientific Name	WPA Schedule	IUCN List
16	Common rat	Muridae	<i>Rattus rattus</i>	Schedule IV	LC
<b>AVES</b>					
17	Asian green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC
18	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
19	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
20	common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
21	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
22	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
23	Koel	Cuculidae	<i>Eudynamis</i>	Schedule IV	LC

\*NE- Not evaluated; LC- Least Concern, NT -Near Threatened, T-Threatened

#### 3.13.11.1 FAUNA IN BUFFER ZONE

Taxonomically a total of 40 species belonging to 29 families have been recorded from the buffer zone area. Based on habitat classification the majority of species were Insects 14 (35%), followed by Birds 15 (37.5%), Reptiles 5 (12.5%), Mammals 3 (7.5%) and amphibians 3 (7.5%). There are one Schedule II species and twenty-two species are under schedule IV according to Indian wild life Act 1972. A total 15 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable and endemic species were observed. The result of core & Buffer zone of fauna studies shows that Nymphalidae and *Scincidae*, *Agamidae* are the main dominating species in the study area; it is mentioned in Table No.3.5. There is no schedule I Species in study area. A detail of fauna diversity of family's pattern is given in Fig No.3.9. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of faunal diversity in buffer zone are given in **Table 3.25**.

**Table 3-24 FAUNA IN BUFFER ZONE**

Sl. No	English Name	Family Name	Scientific Name	WPA Schedule	IUCN List
<b>INSECTS</b>					
1	Indian honey bee	Apidae	<i>Apis cerana</i>	Schedule IV	LC
2	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
3	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
4	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
5	Jewel beetle	Buprestidae	<i>Eurythyrea austriaca</i>	Schedule IV	NA
6	Red-veined darter	Libellulidae	<i>Sympetrumfonscolombii</i>	NL	LC
7	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
8	Dragonfly	Gomphidae	<i>Ceratogomphus pictus</i>	Schedule IV	
9	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
10	Common Indian crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
11	Praying mantis	Mantidae	<i>Mantis religiosa</i>	NL	NL
12	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC

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Sl. No	English Name	Family Name	Scientific Name	WPA Schedule	IUCN List
13	Lesser grass blue	Lycaenidae	<i>Zizina Otis indica</i>	Schedule IV	LC
14	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
<b>REPTILES</b>					
15	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
16	Brahminy skink	Scincidae	<i>Eutropis carinata</i>	NL	LC
17	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
18	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
19	Common skink	Scincidae	<i>Mabuya carinatus</i>	NL	LC
<b>MAMMALS</b>					
20	Indian palm squirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
21	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
22	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule II	LC
<b>AVES</b>					
23	Koel	Cuculidae	<i>Eudynamys</i>	Schedule IV	LC
24	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
25	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
26	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
27	Asian green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
28	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
29	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	NL	LC
30	Shikra	Accipitridae	<i>Accipiter badius</i>	NL	LC
31	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
32	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
33	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
34	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC
35	Common Quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
36	White-breasted waterhen	Rallidae	<i>Amaurornis phoenicurus</i>	NL	LC
37	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC

\*NL- Not listed, LC- Least concern, NT- Near threatened

#### 3.13.12 Interpretation & Conclusion

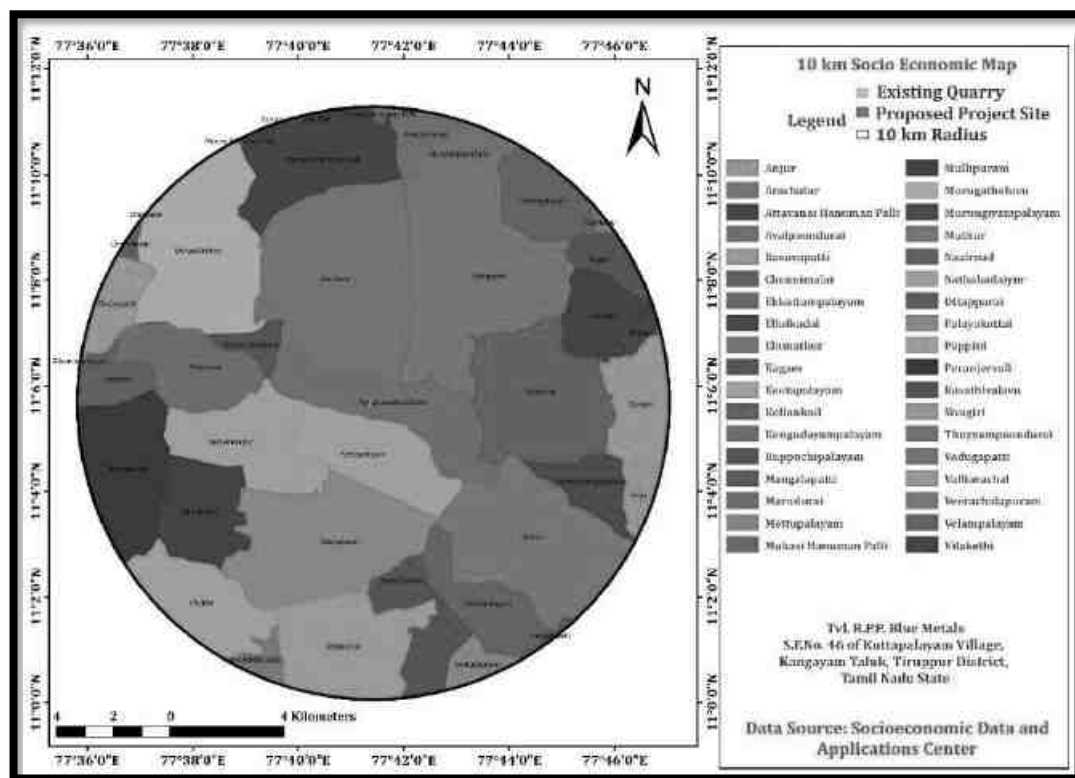
There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small mining operation over short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

#### 3.14 SOCIO ECONOMIC ENVIRONMENT

A prosperous nation needs well-developed industries to provide the amenities of life to its citizens. Industrial development has had an important role in the socio-economic growth of

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countries. Rapid economic growth is often essential for achieving a reduction in absolute poverty. Industrialization is often essential for economic and social growth. Poverty reduction the pattern of industrialization, however, impacts remarkably on how the poor benefit from growth. Pro-poor economic and industrial policies focus on increasing the economic returns to the productive factors that the poor possess, e.g. raising returns to unskilled labour, whereas policies promoting higher returns to capital and land tend to increase inequality, unless they also include changes in existing patterns of concentration of physical and human capital and of land ownership. Use of capital-intensive methods instead of labour-intensive ones tends to increase employment, labour regulation, social protection, health, education, etc. Where the level of education is low and human capital concentrated. Income disparities, as does the employment of skill-based technologies, especially Also, the location of industrial facilities has an impact on overall poverty reduction and inequality. As enterprises are often concentrated in urban areas. The industrial revolutions led to the development of factories for large-scale production, with consequent changes in society like Growth and structure of employment, impact of Socio-economic reforms and globalization trade and employment, labour regulation, social protection, health, education, etc. In this manner all developmental projects have direct as well as indirect relationship with socio-economic aspect, which also include public acceptability for new developmental projects. Thus the study of socio-economic component incorporating various facets related to prevailing social & cultural conditions and economic status of the project region is an important part of EIA study. The Village Map of the Study Area is provided in **Figure 3.17**.



**FIGURE 3.17 10KM RADIUS VILLAGE MAP OF STUDY AREA**



### 3.14.1 Reconnaissance

EIA study for Rough stone and gravel quarry Proposed Capacity 349606 Cu.m and at Survey No.46 over an extent of 4.97.0 ha. of patta lands in Kuttapalayam village, Kangayam Tehsil, Tiruppur District in Tamilnadu state. The details of information on demographic structure of the villages in the study area are presented in in **Table 3.2.**

**TABLE 3-25 LIST OF VILLAGES IN THE STUDY AREA**

Sr.No	District	Subdistt	Town/Village	Name	Type
1	Tiruppur	Kangayam	644599	Peranjervali	Rural
2	Tiruppur	Kangayam	644600	Naalroad	Rural
3	Tiruppur	Kangayam	644601	Marudurai	Rural
4	Tiruppur	Kangayam	644602	Nathakadaiyur	Rural
5	Tiruppur	Kangayam	644603	Mullipuram	Rural
6	Tiruppur	Kangayam	644604	Palayakottai	Rural
7	Tiruppur	Kangayam	644605	Keetapalayam	Rural
8	Tiruppur	Kangayam	644607	Mangalapatti	Rural
9	Tiruppur	Kangayam	644608	Velampalayam	Rural
10	Tiruppur	Kangayam	644609	Mettupalayam	Rural
11	Tiruppur	Kangayam	644610	Rasathivalavu	Rural
12	Tiruppur	Kangayam	644611	Valliarachal	Rural
13	Tiruppur	Kangayam	644612	Pappini	Rural
14	Tiruppur	Kangayam	804011	Muthur (TP)	Urban
15	Tiruppur	Kangayam	644623	Veeracholapuram	Rural
16	Tiruppur	Perundurai	635007	Chennimalai	Rural
17	Tiruppur	Perundurai	635014	Ellaigramam	Rural
18	Tiruppur	Perundurai	635015	Ekkattampalayam	Rural
19	Tiruppur	Perundurai	635021	Ottapparai (CT)	Urban
20	Tiruppur	Perundurai	635008	Murungatholuvu	Rural
21	Erode	Erode	635042	Thuyyampoondurai	Rural
22	Erode	Erode	635046	Avalpoondurai	Rural
23	Erode	Erode	803551	Arachalur (TP)	Urban
24	Erode	Erode	803552	Sivagiri (TP)	Urban
25	Erode	Erode	635056	Velampalayam	Rural
26	Erode	Erode	635066	Vilakethi	Rural
27	Erode	Erode	635067	Kongudayampalayam	Rural
28	Erode	Erode	635068	Murungiyampalayam	Rural
29	Erode	Erode	803554	Kollankoil (TP)	Urban
30	Erode	Erode	635055	Elumathur	Rural
31	Erode	Erode	635057	Mukasi Hanuman Palli	Rural
32	Erode	Erode	635058	Attavanai Hanuman Palli	Rural
33	Erode	Erode	635059	Kagam	Rural
34	Erode	Erode	803550	Vadugapatti (TP)	Urban
35	Erode	Erode	635069	Anjur	Rural

### 3.14.2 Objectives of Socio-Economic Assessment

- To examine, status of developmental parameter in identified study area.
- To identify the direct and indirect impact on the social environment as a result of development project.
- To evaluate the nature and magnitude of these impacts.
- To provide probable mitigating measures on identified negative impacts due to proposed development activity on socio economic environment.

### 3.14.3 Baseline Status

Baseline information is collected after delineation of the baseline study area in order to study the socio-economic profile of the project affected area. The process related to baseline database analysis includes:

- Demographic Structure
- Infrastructure Base
- Economic Structure
- Health Status
- Cultural Attributes
- Salient Observations

### 3.14.4 Demographic Structure

The demographic structure of the study area was derived primarily from data of Census record of two districts covering three tehsils and 29 villages with 6 towns. Summary of demographic structure is presented in **Table 3.27**. The demographic structures of each village in the study area as per Census 2011 are presented in **Table 3.28**.

**TABLE 3-26 SUMMARY OF DEMOGRAPHIC STRUCTURE IN STUDY AREA**

<b>Demographic Parameters</b>	<b>Details</b>
No. of States	1
No. of District	2
No. of Tehsil	3
No. of Villages	29
No. of Town Panchayat	6
Total Area of village /Town(ha)	59637.94
Total No. of Households	55518
Total Population	180990
Density of Population (per km <sup>2</sup> )	303
Sex Ratio (No. of female\ 1000 males)	1,008
Child Population	13297(7.34%)
Scheduled Castes	35720(19.73%)
Scheduled Tribes	59(0.03%)
Literacy	117398(65%)
Male	66182(37%)
Female	51216(28%)

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**TABLE 3-27 Demographic Structure of Village in the Study Area**

Sr. No	Name	Total Area in ha	Total Household	Total Population			0-6 child population			Scheduled Cast			Scheduled Tribes		
				Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Peranjervali	1835.62	1212	3876	1973	1903	282	147	135	936	473	463	1	1	0
2	Naalroad	1744.07	810	2695	1364	1331	212	120	92	765	395	370	5	3	2
3	Marudurai	1078.04	630	1980	989	991	108	56	52	293	146	147	0	0	0
4	Nathakadaiyur	964.33	2022	6574	3293	3281	435	238	197	968	492	476	19	12	7
5	Mullipuram	1146.28	472	1445	719	726	70	35	35	262	137	125	0	0	0
6	Palayakottai	1779.14	788	2618	1328	1290	194	106	88	355	173	182	0	0	0
7	Keetapalayam	1752.55	1095	3579	1812	1767	278	139	139	432	211	221	0	0	0
8	Mangalapatti	1007.12	1058	3512	1734	1778	294	140	154	902	442	460	0	0	0
9	Velampalayam	969.78	1206	3943	1941	2002	298	153	145	1192	595	597	0	0	0
10	Mettupalayam	1784.25	1521	4854	2338	2516	366	184	182	1179	577	602	0	0	0
11	Rasathivalavu	1828.84	923	2987	1502	1485	180	90	90	683	337	346	0	0	0
12	Valliarachal	2075.1	1233	3883	1887	1996	262	126	136	860	418	442	0	0	0
13	Pappini	3321.84	1229	3990	1995	1995	273	135	138	751	389	362	0	0	0
14	Muthur (TP)	3270.00	3948	13212	6588	6624	1003	531	472	3875	1909	1966	3	1	2
15	Veeracholapuram	1909.74	533	1568	777	791	95	51	44	226	112	114	0	0	0
16	Chennimalai	2230.02	820	2604	1298	1306	201	104	97	415	216	199	0	0	0
17	Ellaigramam	605.72	350	1101	558	543	85	46	39	177	88	89	0	0	0
18	Ekkattampalayam	1383.96	1506	4720	2360	2360	346	184	162	1268	647	621	0	0	0
19	Ottapparai (CT)	700.00	2942	9493	4747	4746	732	367	365	688	324	364	0	0	0
20	Murungatholuvu	2801.27	2166	7097	3614	3483	513	264	249	1172	599	573	6	3	3
21	Thuyyampoondurai	3280.35	3283	10800	5433	5367	789	410	379	2506	1267	1239	3	1	2
22	Avalpoondurai	3449.08	654	2136	1065	1071	153	81	72	371	179	192	7	4	3
23	Arachalur (TP)	2400.00	3667	12034	5941	6093	871	421	450	2461	1199	1262	0	0	0

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24	Sivagiri (TP)	2340.00	5407	17979	8909	9070	1427	740	687	2328	1140	1188	0	0	0
25	Velampalayam	1499.69	1124	3748	1890	1858	304	152	152	974	493	481	6	2	4
26	Vilakethi	797.73	671	2238	1112	1126	154	75	79	334	164	170	0	0	0
27	Kongudayampalaya m	1360.66	796	2490	1232	1258	169	75	94	486	238	248	0	0	0
28	Murungiyampalaya m	501.99	267	826	412	414	58	29	29	6	3	3	0	0	0
29	Kollankoil (TP)	12.12	2833	9196	4617	4579	677	353	324	1499	755	744	0	0	0
30	Elumathur	2167.59	2712	8929	4389	4540	726	380	346	1701	821	880	4	0	4
31	Mukasi Hanuman Palli	844.77	1306	4081	2025	2056	290	164	126	658	333	325	5	3	2
32	Attavanai Hanuman Palli	1662.1	1325	4300	2124	2176	292	139	153	1220	601	619	0	0	0
33	Kagam	875.24	952	3085	1514	1571	193	94	99	713	356	357	0	0	0
34	Vadugapatti (TP)	3000.00	2928	9657	4810	4847	699	346	353	2357	1162	1195	0	0	0
35	Anjur	1258.95	1129	3760	1862	1898	268	150	118	707	357	350	0	0	0
<b>Total</b>		<b>59637.94</b>	<b>55518</b>	<b>180990</b>	<b>90152</b>	<b>90838</b>	<b>13297</b>	<b>6825</b>	<b>6472</b>	<b>35720</b>	<b>17748</b>	<b>17972</b>	<b>59</b>	<b>30</b>	<b>29</b>

### **SALIENT FEATURES OF DEMOGRAPHIC STRUCTURE**

In the study area, Ottapparai (CT) is likely to have high Population density. The reason for this could be equipped facilities like education, health, sanitization, banking and transportation

In the study area, Avalpoondurai village is likely to have very low population density. The reason for this could be lack of facilities like education, health, sanitization, communication, transportation and banking.

#### **3.14.5 INFRASTRUCTURE RESOURCES**

The infrastructure resources base of the eleven study areas with reference to education, medical facility, water supply, post and telegraph, transportation, communication facility, power supply, sanitation, road, bank etc. according to the Village Directory Census CD 2011 supply is given in Table 3.29.

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**TABLE 3-28 INFRASTRUCTURE RESOURCE BASE OF THE STUDY AREA**

Sr. No	Village Name	Education	Medical/Health care	Water	Drainage	Communication	Transportation	Road	Banking/Other	Power
1	Peranjervali	GPS,GMS,GN NFTC	NA	TWT,TWU,CW,UW, HP,TW/BH	CD, OD, ND, OKD	SPO, TP,PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
2	Naalroad	GPS,GMS,GN NFTC	PHSC	TWT,TWU,CW,UW, HP,TW/BH	CD, OD, ND, OKD	TP,PCO	PBS,PV BS,T	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
3	Marudurai	GPS,GMS,GN NFTC	PHSC,MCWC	TWT,TWU,CW,UW, HP,TW/BH	CD, OD, ND, OKD	SPO,TP, PCO	PBS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
4	Nathakadaiyur	GPS,GMS,GSS ,GSSS,GNFTC	CHC,PHC,PHSC, MCWC,TBC,D,FC W	TWT,TWU,CW,UW, HP,TW/BH	CD, OD, ND, OKD	PO,SPO ,TP,PC O	PBS,PV BS,T	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
5	Mullipuram	GPS, GNFTC	NA	TWT,TWU,CW,UW, HP,TW/BH	CD, OD, ND, OKD	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
6	Palayakottai	GPS,GMS,GN NFTC	PHSC	TWT,TWU,CW,UW,T W/BH	CD,OD,ND,OP DU,OKD	TP,PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
7	Keetapalayam	GPS,GNFTC	PHSC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
8	Mangalapatti	GPS,GMS,GSS ,GNFTC	PHSS,MCWC	TWT,TWU,CW,UW, HP,TW/BH,T/P/L	CD,OD,ND,OP DUOKDCT,OK D	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSAU
9	Velampalayam	GPS,GNFTC	PHSS	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OP DU,OKD	TP,PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U

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Sr. No	Village Name	Education	Medical/Health care	Water	Drainage	Communication	Transportation	Road	Banking/Other	Power
10	Mettupalayam	GPS,GMS,GN NFTC	PHSS	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
11	Rasathivalavu	GPS,GMS,GN NFTC	PHSC,MCWC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	TP,PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
12	Valliarachal	GPS,GMS,GN NFTC	PHSC,MCWC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OP DU,OKD	SPO,TP, PCO	PBS,PV BS,T	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
13	Pappini	GPS,GMS,GN NFTC	PHC,PHSC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
14	Veeracholapuram	GPS,GMS,GN NFTC	PHSC,MCW	TWT,TWU,UW,HP,T W/BH	CD,OD,ND,OP DU	SPO,TP, PCO	PBS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
15	Chennimalai	GPS,GNFTC	PHSC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	TP, PCO	PBS	BTPR, GKR,F P	NA	PSDU,PSAG U,PSCU,PSA U
16	Ellaigramam	GPS,GNFTC	PHSS	TWT,TWU,CW,UW, HP,TW/BH,	CD,OD,ND,OP DU	SPO,TP	PBS	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSCU,PSA U
17	Ekkattampalayam	GPS,GMS,GN NFTC	PHSC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	SPO,TP, PCO	PBS,PV BS,T	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSAU
18	Murungatholuvu	GPS,GMS,GSS ,GSSS,GNFTC	PHSC,MCWC	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OK D	SPO,TP, PCO	PBS,PV BS,T	BTPR, GKR,F P	SHG	PSDU,PSAG U,PSAU
19	Thuyyampondurai	GPS,GMS,GN NFTC	PHSC,PHC,MCWC ,TBC,D,FCW	TWT,TWU,CW,UW, HP,TW/BH	CD,OD,ND,OP DU,OKD	SPO,TP, PCO	PBS,PV BS	BTPR, GKR,F P	COB,S HG	PSDU,PSAG U,PSCU,PSA U

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**Chapter 3: Description of Environment**

Sr. No	Village Name	Education	Medical/Health care	Water	Drainage	Communication	Transportation	Road	Banking/Other	Power
20	Avalpoondurai	GPS,GNFTC	NA	TWT,TWU,CW,UW,HP,TW/BH,S,R/C	CD,OD,ND,OPDU,OKD	TP	PBS,PVBS	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSCU,PSAU
21	Velampalayam	GPS,GNFTC	PHSC	TWT,TWU,CW,UW,HP,TW/BH,S	CD,OD,ND,OPDCT,OKD	SPO,TP,PCO	PBS	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSAU
22	Vilakethi	GPS,GMS,GNFTC	PHSS	TWT,TWU,CW,UW,HP,TW/BH,S	CD,OD,ND,OPDU,OKD	SPO,TP,PCO	PBS,T	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSCU,PSAU
23	Kongudayampalayam	GPS,GNFTC	NA	TWT,TWU,CW,UW,HP,TW/BH	CD,OD,ND,OKD	SPO,TP,PCO	PBS	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSAU
24	Murungiyampalayam	GPS,GNFTS	NA	TWT,TWU,UW,HP,R/C	CD,OD,ND,OPDU	TP	PVBS	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSAU
25	Elumathur	GPS,GMS,GSS,GSSS,GNFTC	PHC,PHSC(2),MCWC,TBC,D,FCW	TWT,TWU,CW,UW,HP,TW/BH,R/C	CD,OD,ND,OKD	SPO,TP,PCO	PBS,T	BTPR,FP	SHG	PSDU,PSAGU,PSCU,PSAU
26	Mukasi Hanuman Palli	GPS,GMS,GSS,GSSS,GNFTC	PHSC	TWT,TWU,CW,UW,HP,TW/BH,S	CD,OD,ND,OPDCT,OPDU,OKD	SPO,TP,PCO	PBS,PVBS,T	BTPR,GKR,FP	CB,SHG	PSDU,PSAGU,PSCU,PSAU
27	Attavanai Hanuman Palli	GPS,GMS,GMI,GNFTC	PHSC	TWT,TWU,CW,UW,HP,TW/BH	CD,OD,ND,OPDU	SPO,TP,PCO	PBS,PVBS	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSCU,PSAU
28	Kagam	GPS,GMS,GNFTC	PHSC	TWT,TWU,CW,UW,HPTW/BH,S,R/C,T/P/L	CD,OD,ND,OPDCT,OPDU	SPO,TP,PCO	PBS,PVBS,T	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSCU,PSAU
29	Anjur	GPS,GMS,GNFTC	PHSC,MCW	TWT,TWU,CW,UW,HP,TW/BH	CD,OD,ND,OPDU	SPO,TP,PCO	PBS,PVBS,	BTPR,GKR,FP	SHG	PSDU,PSAGU,PSCU,PSAU



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**Abbreviations:**

EDUCATION	MEDICAL FACILITY	WATER	TRANSPORTATION	SANITATION	COMMUNICATION
AC: Anganwadi Center	AH: Allopathic Hospital	TWT: Tap Water Treated	GBS: Govt. Bus Service PBS: Private Bus Service	OD: Open Drainage	PO: Post Office
GPS: Govt. Primary School	PHC: Primary Health Centre	TWU; Tap Water Untreated	A/MA: Auto/Modified Autos	OPDC: Open Pucca Drainage Covered	SPO: Sub Post Office
PPS: Private Primary School	PHSC: Primary Health Sub Centre	CW; Covered Well	V:Van CPR: Cycle-pulled Rickshaws	OPDU: Open Pucca Drainage Uncovered	P&TO: Post &Telegraph office
GMS: Govt. Middle School	M&CWC: Maternity And Child Welfare Centre	UW: Uncovered Well	T:Taxi Trc: Tractor	ND: No Drainage	TP: Telephone
PMS: Private Middle School	FWC: Family Welfare Centre	HP; Hand Pump	SH: State Highway	OKD: Open Kuccha Drainage	PCO: Public Call Office
		SR: Service Reservoir	NH: National Highway	PL: Public Latrine	DNA: Data Not Available
GSS: Govt. Secondary School	D: Dispensary	R/C: River/Canal	<b>ROAD</b>	<b>BANK</b>	<b>POWER</b>
GSS: Govt. Secondary School	VH: Veterinary Hospital	T/P/L: Tank/Pond/Lake	BTPR: Black Topped pakka Road	CB: Commercial Bank	PSDU: Power Supply for Domestic use
	MHC: Mobile Health clinic		PR: Pakka Road	NB: Nationalize Bank	
GSSS: Govt. Senior Secondary School	NA: Not Applicable	TWB: Tube Wells/Borehole	GKR: Gravel (kuchha) Road	COB: Co Operative Bank	PSAU: Power Supply Agriculture use
PSSS: Private Senior Secondary School	<b>SHG: SELF HELP GROUP</b>	OHT: Over Head Tank	AWR: All Weather Road	ACS: Agriculture Credit Society	PSCU: Power Supply For Commercial Use
DC: Degree College			F:Footpath	PCB: Private Commercial Bank	PSIU: Power Supply For Industrial Users

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#### **3.14.6 Socio-Economic Survey - Sampling Methodology**

To assess and evaluate the likely impacts arising out of any developmental projects on socio-economic environment, it is necessary to gauge the apprehensions of the people in the project area. Socio-economic survey serves as an effective tool for fulfilling this requirement. Sarpanch, ward members, school teachers, medical practitioners, self-help group members and village youth and other respondents (adult's male-female) are involved for awareness and opinion, by using judgmental or purposive sampling methods representing different socioeconomic sections of the community. The respondents were asked for their awareness/opinion about the project, job opportunities, drinking water, road and drainage construction, education, health care, housing, transportation facility and economic status.

#### **Data Collection Method**

To assess and evaluate the likely impacts arising out of any developmental projects on socio-economic environment, it is necessary to gauge the apprehensions of the people in project area. For the process of data collection through primary and secondary sources certain methods are used as given below:

#### **Field Survey and Observation**

Field survey and observations is made at each sampling villages and the quality of life of that region is studied. Visits are made to hospitals, primary health centres to know the health status of the region. Various governmental organizations such as statistical department, department of census operations are visited to collect the population details of that region.

#### **Interview Method**

Structured interview method is used to collect data regarding the awareness and opinion of sample selected from various socio-economic sections of the community. Structured interviews involve the use of predetermined set of questions that includes fixed and alternative questions. The questionnaire mainly highlights the parameters such as income, employment and working conditions, housing, food, clothing, water supply, sanitation, health, energy, transportation, communication, education, environment, and pollution to assess the quality of life of that particular region, general awareness and opinion of the respondents about the project. Interview method helps to collect error free and accurate information to the interviewer during the field survey. The respondents were asked for their awareness / opinion about the project and also the impacts of the project which is an important aspect of socio-economic environment, viz. job opportunities, education, health care, transportation facility and economic status.

#### **Focus Group Discussion**

A focus group discussion is a small, but demographically diverse group of people. It is a form of qualitative research consisting of interviews in which a group of people are asked about their perceptions, opinions, beliefs, and attitudes towards an employment, income, transport, education, Medical facilities, Sanitation, housing, health, agriculture, pollution etc. Questions are asked in an interactive group setting where participants are free to talk with other group members. During this process, the researcher either takes notes.

Through the focus group discussion of all these factors, the proposed project helps in evaluating socio-economic conditions in the study area.

The study was carried out with a participatory approach by involving the stakeholders, particularly the project beneficiaries and probable affected persons through a series of consultative process. The population groups consulted include beneficiary group of people shopkeepers, farmers, school teachers, gram panchayat sarpanch/members, village leaders, etc.

The significant features of these important parameters for each study area are discussed as follows:

- (a) **Education Facilities:** In the study area, education is available from Primary School to sr. collage. Higher education facilities including colleges and other diploma courses are available at Kangayam, Sivagiri, Nathakadaiyur etc. at a distance of 10-20 km respectively from the project site.
- (b) **Medical Facilities:** There is 1 Community Health Centre, 4 PHC, 26 sub health centers, 17 Maternity And Child Welfare Centre, 15 TB Clinic facilities available within the study area. However; five (5) villages in the study areas were lacking in medical facilities. Hospitals and other better medical facilities were available at Kangayam, Sivagiri, Nathakadaiyur etc.
- (c) **Drinking Water:** The main water supply in the surveyed villages is through tap water, hand pump, well and tube well is the main sources of drinking water in the region.
- (d) **Power Supply:** All villages are accessed with electricity supply.
- (e) **Transportation:** For transportation purpose Government bus Auto and Taxi Service are available in the study area. Transportation facilities were not frequently available in the region. Private vehicles like Bicycles and Motor Cycles were mostly used by villagers for transportation purpose.
- (f) **Communication Facilities:** For communication purpose mainly Sub Post Office, Telephone, Mobile phones and newspaper are available in most of the villages.

- (g) **Agriculture:** Most of the respondents are engaged in labor work, agriculture, and livestock activities. Farming is the main occupation; a few respondents service in government sectors. Most of the respondents are labors and others are trying to migrate towards other city places.
- (h) **Houses:** Most of the houses are pakka and Semi pakka with good construction in the study area.
- (i) **Employment:** : main occupations of the people in the study area are agriculture and labor work. The labors were getting daily wage in the range of Rs. 500-600, depending on the type of work involved
- (j) **Fuel:** The primary source of cooking fuel is LPG and wood. Kerosene is also been as per the requirement.
- (k) **Main Crops:** The principal crops grown in agricultural farm are Coconut, sugarcane, paddy, turmeric etc.
- (l) **Language:** The official language of Tamil Nadu is Tamil. The most widely spoken language within the study area is Tamil, English and Hindi.
- (m) **Migration:** During survey it was found that local population were migrating maximum towards the district place(Tirupur & Erode) city as a purpose of employment and some to other states.
- (n) **Sanitation:** Systems of individual and combined septic tanks are in use at some places of this Study area. Toilet facility is one of the most basic facilities required in a house. Most of the households were having toilet facilities in their houses. There was no proper drainage line in the villages
- (o) **Road Connectivity:** Most of the roads are tar and connects to the villages. Both tar and gravel roads were commonly seen in the villages.
- (p) **Market Facility:** Study area was predominantly semi urban type. In villages, small shops were available for daily needs. Weekly market facility was available in some villages. Wholesale markets were available at town place. Kangayam, Sivagiri, Nathakadaiyur etc. are major hub for all type of market facilities in the area.
- (q) **Recreation:** Temples, Samajbhawan, Television and Radio are the main recreation facilities in the study area. Newspaper/Magazine is also used by the villagers.

### **3.14.7 Employment Pattern**

Economic resource base of any region mainly depends upon its economically active group i.e. the working population involved in productive work. Work may be defined as participation in any economically productive activity. Such participation may be physical or mental in nature. Work not only involves actual work but also effective supervision and direction of work. It also includes unpaid work on farm or in family enterprise.

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There are different types of workers that may be classified as - those persons who had worked for at least six months or 180 days are treated to be Main Workers, on the other hand if person categorized as worker has participated in any economic or productive activity for less than six months or 180 days during the last one year is treated as Marginal Worker. Non-workers are those who have not worked any time at all in the year preceding the enumeration.

The workers coming under the main and marginal workers category are those involved in activities such as cultivation, agriculture, livestock, forestry, fishing, hunting, plantations, orchards and allied activities, mining and quarrying, manufacturing, processing, servicing and repairs in household industry, construction, trade and commerce, transport, storage and communication and other services. **Table 3.30.**

**Table 3-29 Summary of Economic Attributes in Study Area**

<b>Demographic Parameters</b>	<b>Details</b>
Total Worker	109870(61%)
Marginal Worker	5597(3%)
Non Worker	71120(39%)
Main Worker	104273(58%)
Cultivators	26093(25%)
Agriculture	38545(37%)
Household	4784(5%)
Others	34851(33%)

**Source:** Primary Census Abstract 2011, Tirupur & Erode District, State Tamil Nadu

**3.14.8 Health Status**

Diarrhea / Cholera, Malaria, Cough, Cough; viral fever, eye disease, skin disease and Unhygienic are the general health problems which are attributed due to improper sanitation, mosquito nuisance and water logging. Malaria is one of the most frequently occurring diseases and respiratory infection in the region.

**Cultural and Aesthetic Environment**

There is no, culturally, and aesthetically important of tourist places in the study area. Hence, there shall be no impact on places of interest.

**3.14.9 Quality of Life**

The average Quality of life for the study area is leading to satisfactory level due to satisfactory status like, educational facilities, also availability of basic needs viz., food, clothing & housing.

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

### **4.1 INTRODUCTION**

This Chapter provides a brief overview of the potential impacts on various environmental components due to the Rough stone and Gravel mining project which will be operated by mechanized method with controlled blasting. The opencast mining operations involve development of benches, approach roads, haul roads, excavation and loading and unloading, manual sorting and transportation of materials. If adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause environmental degradation and ultimately lead to irreversible damage to the ecosystem. Various environmental impacts, which are identified due to mining project, are discussed in the following sections:

### **4.2 ENVIRONMENTAL IMPACT ASSESSMENT & MITIGATION MEASURES**

Mining activities causes environmental problems such as degradation of land, deteriorating air, water and soil quality, affecting the biological and socio-economic environment of the area. The impacts of mining on various environmental parameters were assessed and are given below:

### **4.3 IMPACT ON AIR QUALITY**

To assess the impact of the Rough stone and Gravel mining, crushing and transportation operations from the Rough stone and Gravel Mine, air quality modeling was carried out for the mining operations and the mineral transportation activities. The modeling was carried out using MoEF/CPCB approved Lakes AERMOD model. The incremental ground level concentration of PM<sub>10</sub> due to mining and allied activities was predicted using the above-mentioned models and the resultant concentration of PM<sub>10</sub> were compared with the National Air Quality Standards.

#### **4.3.1 Ground Level Concentration Increment**

##### **4.3.1.1 Air Environment**

Base line ambient air monitoring report reveals air pollutant concentrations of SPM, SO<sub>2</sub> and NO<sub>x</sub> are well within the permissible limits as prescribed by National Ambient Air Quality Standards (NAAQS). The major air pollutant from the mining activity will be suspended particulate matter. SPM will be emitted during various stages of the mining activity like excavation, drilling, blasting, loading, Haulage, etc. The pollutants released into the atmosphere will disperse in the down wind direction and finally reach the ground at farther distance from the source. The concentration of ground level concentrations mainly depends upon the strength of the emission source and micrometeorology of the study area.

##### **4.3.1.2 Meteorological data**

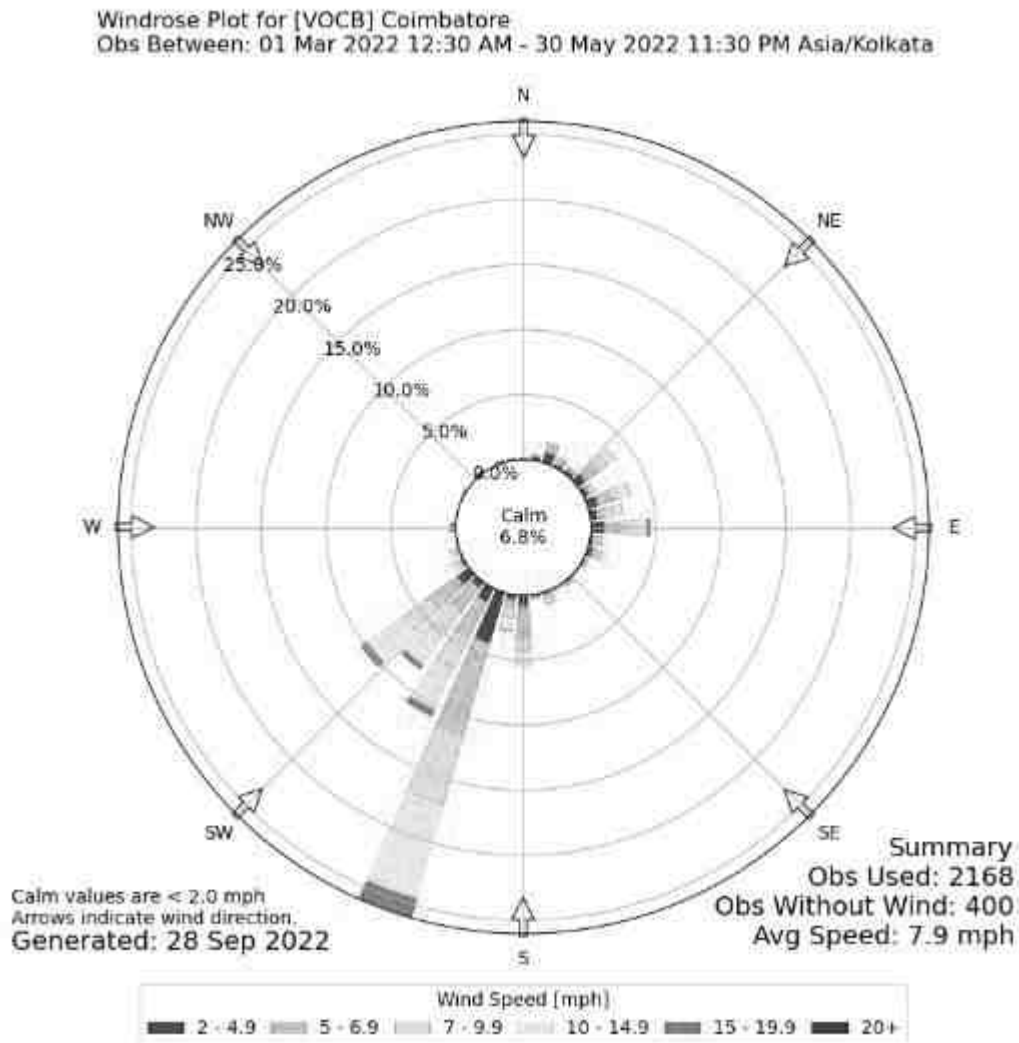
The meteorological data for the monitoring date, i.e., 01/03/2022 to 31/05/2022 was considered for the study. Data included for the AERMET processing were daily wind speed, wind direction, temperature, relative humidity, station pressure, precipitation, solar radiation, and cloud cover

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recorded during the period. AERMET reformats raw meteorological data as to be availed as input for AERMOD model.



**FIGURE 4.1 WINDROSE DIAGRAM OF THE PROJECT SITE**

**Table 4-1 Site weather summary for Mar 2022 – May 2022**

Average Temperature (°C)	20.2
Predominant Wind direction from	SW, NE
Calm (%)	6.8
Average Wind speed (m/h)	7.9

**4.3.1 EMISSION CALCULATIONS FROM MINING AREA**

Excavation by various activities in project area is construed as an area source which includes excavation pit(s) and activities happening in the excavation area like digging, dozing, hauling and loading/unloading. The dust emission from these areas will be fugitive in nature. The excavator

#### **Chapter 4: Anticipated Environmental Impacts and Mitigation Measures**

operations, loading/unloading operations will also cause dust emission though it will be confined to the area of operation of the machinery. The gaseous emission from their operation shall be minimal and limited within the project. Transportation of excavated material from the project site to dumping sites are categorized as line source. Since the dumper movement on haul road will be within the project area, no adverse impact shall be felt in the settlement area.

#### **Dust Dispersion Modeling for Excavation Operation**

In the present study, United States Environmental Protection Agency (USEPA-42 series) approved mathematical equations have been used to predict concentrations for different operations in project including the material transportation. To predict the particulate emissions, Envitran AERMOD Cloud. (Air Dispersion Modeling Software) an interface based on ISCST3 – was used to predict changes in air quality i.e., maximum ground level concentration (GLC's) of Particulate Matter. Short term model options were opted for uniform emissions rates. The air modeling was restricted to determination of PM10, PM2.5, SO2 and NO2 in the present case. The emission factors adopted for various project operations are mentioned below:

#### **Emission Factor for Excavation and Material Loading/unloading**

For excavation and material handling the emission factor has been adopted as per USEPA – 42 series.

For Dozing Operation:

$$EFPM10 \text{ (kg/hr)} = 0.34 \times S^{1.5}(\%) / M^{1.4}(\%)$$

Where,

EFPM10 (kg/hr) = emission factor in kg/hr

S = silt contents in percentage by weight

M = moisture content in percentage by weight

For Material Loading/unloading:

$$EFPM10 \text{ (kg/hr)} = 0.34 [0.119 / M^{0.9}]$$

Where,

EFPM10 (kg/hr) = emission factor in kg/ton

M = moisture content in percentage by weight.

Emission Factor for Material Haulage within Project:

The emission rate is dependent on several factors which include soil properties, climatic conditions, vehicular traffic, wind forces and machinery operation. The Empirical equation for calculation of emission rate is as under.

$$E = k \cdot (1.7)^s \cdot (S/48) \cdot (W/2.7)^{0.7} \cdot (W/2.7)^{0.7} \cdot (w/4)^{0.5} \cdot (365-p/365) \text{ g/VKT}$$

Where,

E=Emission Rate

K = Particle size multiplier



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s=Silt Content of the Road surface material

S= Mean Vehicle Speed (km/hr)

W=Mean Vehicle Weight (tons)

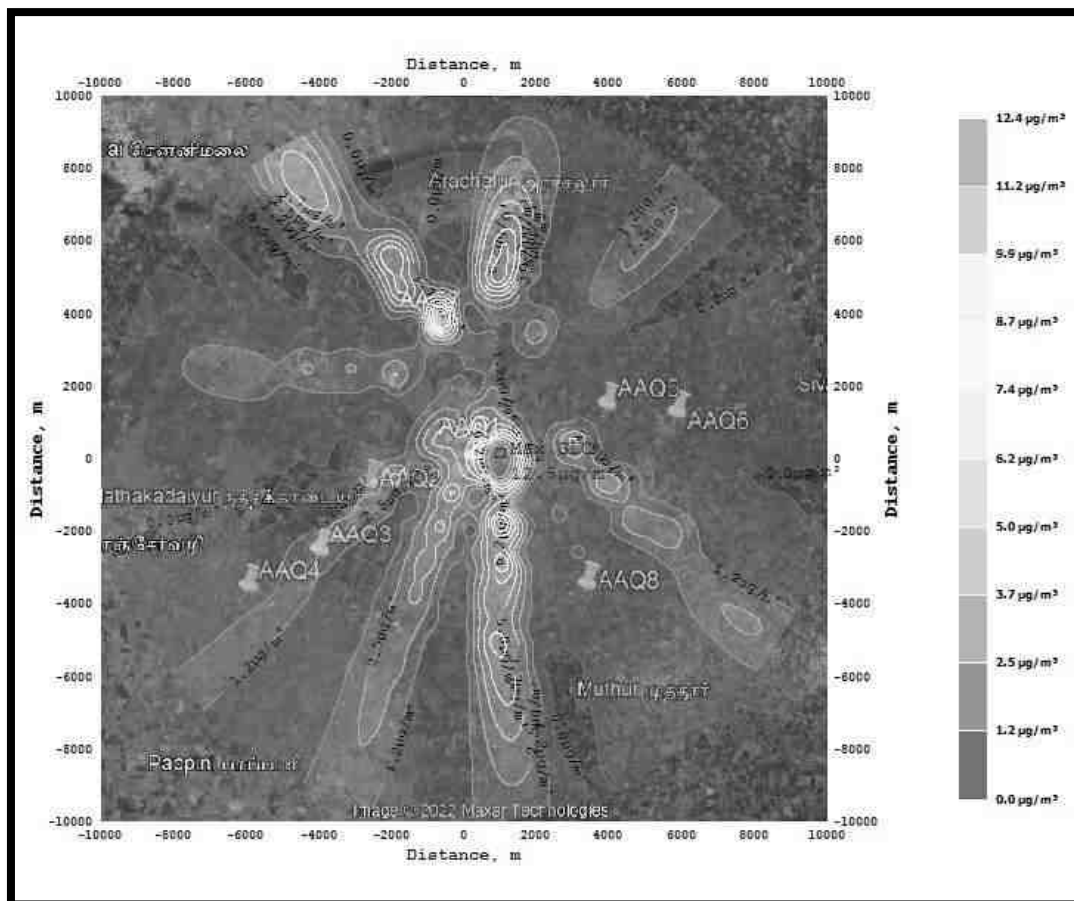
w=Mean number of wheels

p= Number of days with at least 0.254mm of precipitation per year

The Isoleths developed are shown in **Figure 4.2, Figure 4.3, Figure 4.4** and **Figure 4.5** for PM10, PM2.5, SO2 and NO2 respectively. The maximum GLC due to excavation, loading & unloading activities for PM10, PM2.5, SO2 and NO2 has been shown in Table 4.2

**Table 4-2 MAXIMUM GROUND LEVEL CONCENTRATION**

S.No.	Pollutants	Max. GLC observed, ( $\mu\text{g}/\text{m}^3$ )	Distance and Direction
1	PM10	12.5	1000, NE
2	PM2.5	7.1	1000, NE
3	SO <sub>2</sub>	5.3	1000, NE
4	NO <sub>2</sub>	6.3	1000, NE

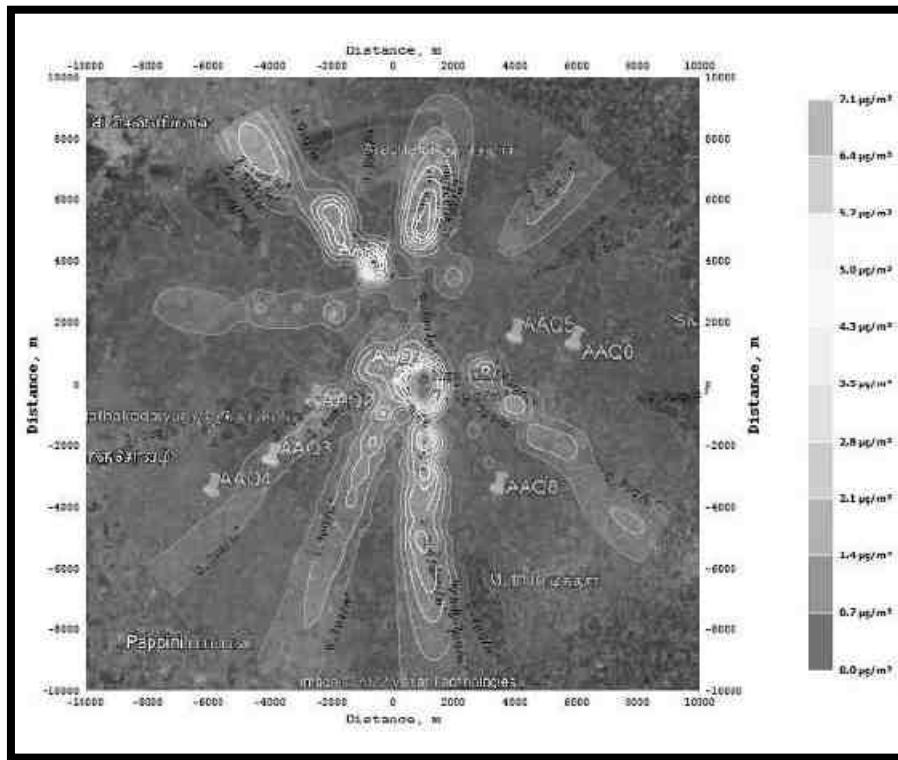


**FIGURE 4.2 PREDICTED 24-HRS GLC OF PARTICULATE MATTER PM10 WITHIN 10 KM RADIUS OF THE STUDY AREA**

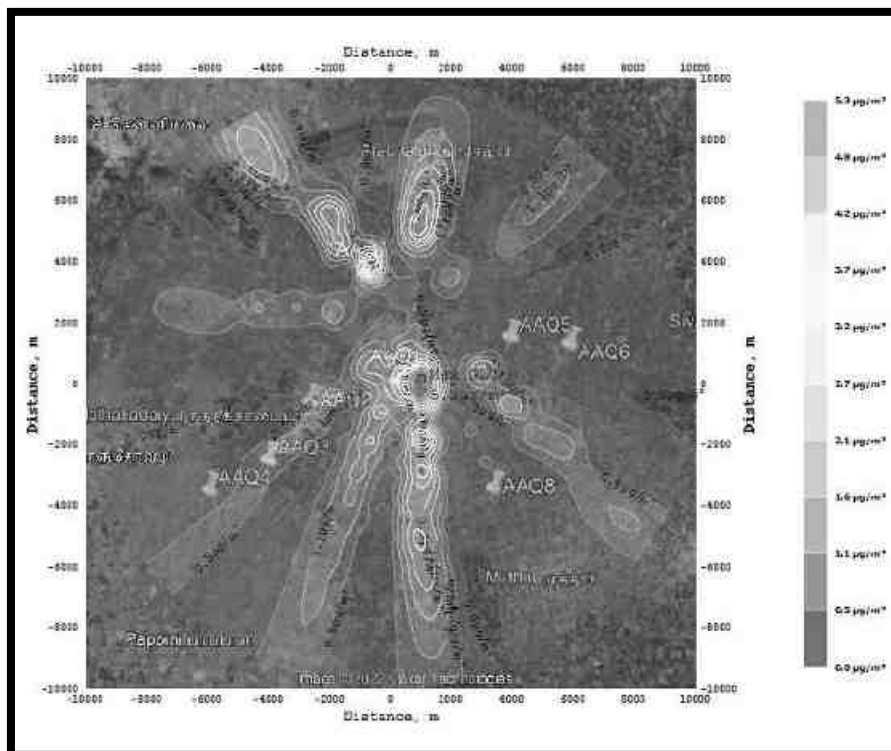
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**FIGURE 4.3 PREDICTED 24-HRS GLC OF PM2.5 WITHIN 10 KM RADIUS OF THE STUDY AREA**

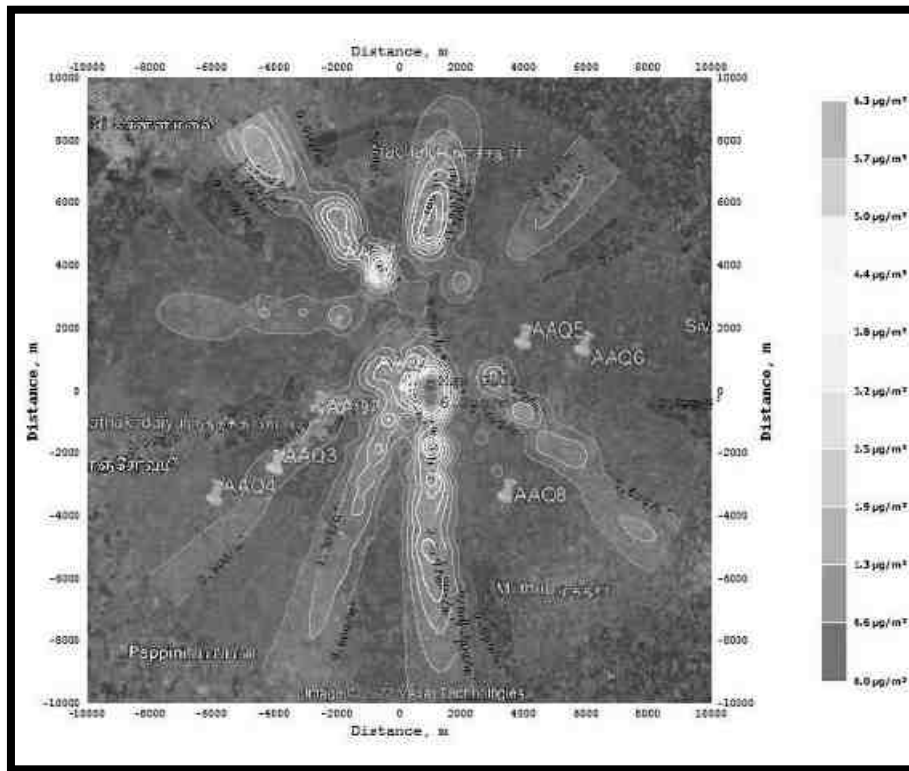


**FIGURE 4.4 PREDICTED 24-HRS GLC OF SO2 WITHIN 10 KM RADIUS OF THE STUDY AREA**

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**FIGURE 4.5 PREDICTED 24-HRS GLC OF NO2 WITHIN 10 KM RADIUS OF THE STUDY AREA**

**4.3.2 Results & Conclusion**

It was observed that the maximum concentration observed due to mining, for PM10, PM2.5 SO2 and NO2 are well below the concentration standards specified in NAAQS GSR826(E). The maximum GLC due to excavation, loading & unloading activities for PM10, PM2.5, SO2 and NO2 is summarized in 3.

**Table 4-3 RESULTANT LEVELS DUE TO EXCAVATION**

S.No.	Locations	PM10 (µg/m³)			PM2.5 (µg/m³)			SO2 (µg/m³)			NO2 (µg/m³)		
		Inc	Max	Total	Inc	Max	Total	Inc	Max	Total	Inc	Max	Total
1	AAQ-1	2.5	70.35	72.85	1.6	41.41	43.01	1	13.72	14.72	1.2	31.82	33.02
2	AAQ-2	1.2	67.86	69.06	1	38.18	39.18	0.4	17.78	18.18	0.5	33.15	33.65
3	AAQ-3	1	65.26	66.26	0.7	35.8	36.5	0.5	15.29	15.79	0.6	33.63	34.23
4	AAQ-4	0.7	64.69	65.39	0.4	35.46	35.86	0.3	15.52	15.82	0.5	36.42	36.92
5	AAQ-5	2.7	67.52	70.22	1.4	39.31	40.71	1.1	16.65	17.75	1.3	35.09	36.39
6	AAQ-6	1.2	68.99	70.19	1	39.2	40.2	0.6	16.42	17.02	0.5	34.72	35.22
7	AAQ-7	3.2	68.88	72.08	2.3	39.2	41.5	1.2	13.14	14.34	1.4	33.39	34.79
8	AAQ-8	1	72.92	73.92	0.8	41.52	42.32	0.5	13.96	14.46	0.6	35.37	35.97
<b>NAAQS (µg/m³)</b>		100			60			80			80		

There will be slight increase in particulate matter concentrations in ambient air due to the Rough stone and Gravel mining activities. Particulate matter levels will be higher within the active operational areas (mine area) due to transportation. However, there will not be any significant

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increase in the dust concentration in the villages located in the study area. Also, due air pollution control measures as suggested below, will be adopted to control dust generation from the mining and allied activities.

#### **4.3.3 OCCUPATIONAL HEALTH IMPACT**

Progressive deposition of inhaled particles or dust results in major health problems. Smaller the particle size (less than PM<sub>2.5</sub>) higher is the chemical and biological reactivity. These smaller particles reach the deepest portion of the lungs. These micron sized particles, once air-borne, are extremely difficult to be collected or trapped. Lung functions are impaired due to both respirable and non-respirable dust particles. Chronic exposure leads to respiratory illnesses like asthma, emphysema, severe dyspnoea (shortness of breath), and bronchitis and in extreme cases pneumoconiosis or the black- lung disease of miners. The effect of dust may be harmful to the human health.

#### **4.3.4 MITIGATION MEASURES IMPACT ON AIR QUALITY**

Mitigate measures suggested for air pollution controls are based on the baseline ambient air quality of the area. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that air quality is monitored on a regular basis to check compliance of standards as prescribed by regulatory authorities. In case of non-compliance, appropriate mitigative measures need to be checked.

#### **4.3.5 MEASURES TO PREVENT GENERATION AND DISPERSAL OF DUST**

Dust particles, which are normally generated during mining operations, become air borne, thus leading to increase in particulate matter level in the ambient air. In the proposed mining activity adequate control measures will be adopted during both, mining operations as well as transportation of rough stone within the area.

Water sprinkling system already provided throughout the mine area especially on the mine roads carrying overburden dumpers. Presently tankers used for the dust suppression. The control measures already adopted are given below:

- Regular cleaning and removal of spillage from the roads are done regularly.
- Water spraying on haul roads, service roads and overburden dumps will help in reducing considerable dust pollution.
- Proper and regular maintenance of mining equipment.
- The treated mine water can be utilized for dust suppression in and around mine areas.
- Comprehensive green belt around overburden dumps has to be carried out to reduce to fugitive dust emissions in order to create clean and healthy environment.
- Land reclamation may be carried out for dumps where mining activities have been completed.
- The following additional measures will also be adopted such as,
- Dust generation will be reduced by using sharp teeth of shovels.
- Wet drilling will be carried out to control the dust.

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- Controlled blasting techniques will be adopted.
- Charge per hole and charge per round will be optimized.
- Cabins for shovel and dumpers and dust masks to workmen will be provided.
- Information on wind direction and meteorology will be considered while planning, so that pollutants, which cannot be fully suppressed by engineering technique, will be prevented from reaching the residential areas.
- A good housekeeping and proper maintenance will be practiced which will help in controlling pollution.

The objective of the system is to eliminate the air borne dust or suppress the dust at its source. The system involves confinement of the dust within the dust producing area by a curtain of moisture and wetting the dust by direct contact between the particles and droplets of water. Adequate number of precision anti-clog nozzles will be installed at suitable locations for suppressing dust by spraying water mixed with suppressant. Suitable control for dust suppression will be provided and the system will be so inter-locked that it functions only when the conveyor system is operating, or the loading operation is on.

#### **4.3.6 GREENBELT**

Even with the various dust suppression measures in place, dust generated from mine faces, fine dust produced during blasting operations are difficult to control. Therefore, in addition to the above mitigative measures, it is proposed to have dense green belt in and around the mine site.

#### **4.3.7 OCCUPATIONAL HEALTH & SAFETY MEASURES TO CONTROL DUST INHALATION**

All the above precautions will be adopted to minimize dust generation at site and prevent dispersion in the outside environment. However, for the safety of workers at site, engaged at the strategic locations/dust generation points like drills, loading & unloading points, crushing etc., dust masks will be provided. Dust masks will prevent inhalation of RPM thereby reducing the risk of respiratory disorders. Regular health check-up of workers and nearby villagers in the impacted area (1 km from the core zone) should be carried out by the contractor and regular occupational health assessment of employees should be carried out as per the Factories Act.

### **4.4 IMPACT OF NOISE / VIBRATIONS & MITIGATION MEASURES**

#### **4.4.1 Noise Impact Due to Working Environment**

High noise levels pose a major health risk to the mine workers. When noise in the form of waves impinges the eardrum, it begins to vibrate, stimulating other delicate tissues and organs in the ear. If the magnitude of noise exceeds the tolerance limits, it is manifested in the form of discomfort leading to annoyance and in extreme cases to loss of hearing. Detrimental effects of noise pollution are not only related to sound pressure level and frequency, but also on the total duration of exposure and the age of the person. The adverse effects of high noise levels on exposed workers may result in:

- Annoyance;
- Fatigue;

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- Temporary shift of threshold limit of hearing;
- Permanent loss of hearing; and
- Hypertension and high blood cholesterol, etc.
- The following are the sources of noise in the Rough Stone and Gravel mine:
- Drilling & Blasting;
- Loading & unloading;
- Vehicular Movement.

The likely generation of noise levels, due to various mining activities will be as given in following **Table 4.4.**

**Table 4-4 EXPECTED NOISE LEVELS FROM MINING OPERATIONS**

<b>Equipment's</b>	<b>Expected Noise Levels dB(A)</b>
Drilling	80-90
Shovel	75-85
Tippers (2)	65-75
Compressor	75-85

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities. Predictions have been carried out to compute the noise level at various distances around the different quarries within the 500 m radius. For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using model based on first principle.

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) - Ae_{1, 2}$$

Where:

$Lp_1$  &  $Lp_2$  are sound levels at points located at distances  $r_1$  &  $r_2$  from the source.

$Ae_{1, 2}$  is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$Lp_{total} = 10 \log \{10^{(Lp1/10)} + 10^{(Lp2/10)} + 10^{(Lp3/10)} + \dots\}$$

Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are: Source data has been computed taking into account of all the machinery and activities used in the mining process. The predicted noise level is shown in Table 4.5.

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**Table 4-5 PREDICTED NOISE INCREMENTAL VALUE**

Equipment with Highest Noise Level	Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Drilling 90 dB(A)	N2 Nathaka- daaiyur Village, 2.89 Km	48.6	15.9	48.6	55
Shovel 85 dB(A)		48.6	10.9	48.6	
Tipper 75 dB(A)		48.6	0.9	48.6	
Compressor 85 dB(A)		48.6	10.9	48.6	
Excavator 102 dB(A)		48.6	27.9	48.6	

The Existing mines are already part of monitored baseline data.

The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone)

**4.4.2 Impacts Due to Ground Vibration and Fly Rocks**

As per the approved Mining Plan Controlled blasting will be carried out with the help of delayed detonators.

Ground vibration due to mining activities in the area are anticipated due to operation of mining machines like excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from this mine is blasting. The major impact of the ground vibrations can be observed on the domestic houses located in the villages surrounding the mine lease area. The kachha houses are more prone to cracks and damage due to the vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agriculture fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest major habitation from the mine lease area is Nathakadaiyur - 3.0km - SW. The ground vibrations at Kuttapalayam Village due to the blasting in Rough Stone and Gravel Mines are calculated using the empirical equation: It is proposed to use about **114 Kg /day** explosives for blasting for obtaining the desired stone production.

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The empirical equation used for assessment of peak particle velocity (PPV) is:

$$V = 417.8 \{D/(Q^{0.5})\}^{-1.265}$$

Where

V= Peak particle velocity in mm/s

D= Distance between location of blast and gauge point in m

Q=Quantity of explosive per blasting in kg

**Table 4-6 ESTIMATED PEAK PARTICLE VELOCITY FOR DIFFERENT EXPLOSIVE CHARGES**

Distance from blasting site (D) (m)	Quantity of Explosive/Blast (Q) (Kg)	PPV (mm/s)
50	114	59.3
100	114	24.7
200	114	10.3
300	114	6.1
400	114	4.3
500	114	3.2
600	114	2.6
700	114	2.1
800	114	1.8
900	114	1.5
1000	114	1.3

Note: The empirical formula does not take into account the delay factor in blasting due to use of Delay Detonators.

The standards for safe limit of PPV are established by Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. Permissible standards of Ground vibration due to blasting as per guidelines of Director General of Mines Safety (DGMS), Dhanbad are given in **Table 4.6**

**Table 4-7 PERMISSIBLE PEAK PARTICLE VELOCITY (mm/s)**

Type of Structure	Dominant Excitation Frequency, Hz		
	<8 Hz	8 - 25 Hz	>25 Hz
<b>A] Buildings/structures not belonging to the 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] Buildings belonging to owner with limited span of life</b>			
Domestic houses/structures (Kuchha brick and cement)	10	15	25
Industrial buildings (RCC& framed structures)	15	25	50



**Source: DGMS Circular No. 7 dated 29/08/1997**

From the above table, the blasting will not cause any significant ground vibrations in the area. The ground vibrations at nearest habitation will be well within the permissible limits recommended by DGMS. However, additional control measures need to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting

#### **4.4.3 MEASURES FOR MINIMIZING IMPACTS NOISE CONTROL MEASURES**

The following control measures will be adopted to keep the ambient noise levels well below the limits. The same will be continued and strengthened in proposed expansion project:

- Drilling will be carried out with sharp drill bits which help in reducing noise.
- Secondary blasting will be totally avoided and Hydraulic rock breaker/jack hammer drills will be used for breaking boulders.
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
- The blasting will be carried out during favorable atmospheric condition and between 12.00 Noon to 2.00 PM when there is less human activity.
- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
- Provision of sound insulated chambers for the workers deployed on machines producing higher levels of noise.
- Green Belt/Plantation will be developed around the mining activity area and along haul roads.
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators and
- Periodical monitoring of noise will be done.

#### **4.4.4 MEASURES TO CONTROL GROUND VIBRATION & FLY ROCKS**

The blasting operations in the mine are carried out by deep hole drilling and blasting using delay detonators, which reduce the ground vibrations. The measures that are generally followed and currently proposed for abatement of ground vibration and fly rocks are detailed below:

- Proper quantity of explosive, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting.
- Proper blast design will be made to control ground vibration and fly rocks.
- Adequate safe distance from blasting will be maintained.
- The charge per delay will be minimized and preferably a greater number of delays will be used per blasts;
- During blasting, other activities in the immediate vicinity will be temporarily stopped;
- Drilling parameters like burden, depth, diameter and spacing will be properly designed to give proper blast.

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- Muffle blasting using wire mesh and sand bags will be conducted at mine working near ML boundary towards habitation.

### **4.5 IMPACT ON WATER ENVIRONMENT & MITIGATION MEASURES**

#### **4.5.1 IMPACT ON IMPACT ON SURFACE WATER**

There is no seasonal stream or nallah flowing through the mining area.

The changed topography will alter the drainage within the mining lease area. However, there will not be any changes in the topography or drainage pattern outside the mining lease area. At the end of mining activities after reserves are exhausted, the area will be restored to an acceptable level of self-sustaining eco-system, green belt will be developed in safety zone and upper benches of mine area. No surface water will be utilized for mining operation. Moreover, there would not be any discharge from mine into the surface water body as no process waste water generation in the mine and allied activities. Hence there would not be any impact on surface water.

Only domestic effluent will be generated from the mine office and rest shelter. The domestic effluent is discharged in septic tank followed by soak pit. Besides, there will be no toxic element in the mined-out material, which may contaminate ground/ surface water. It is, therefore, apparent that there will be negligible impact of mining on the surface water regime.

#### **4.5.2 IMPACT ON GROUND WATER**

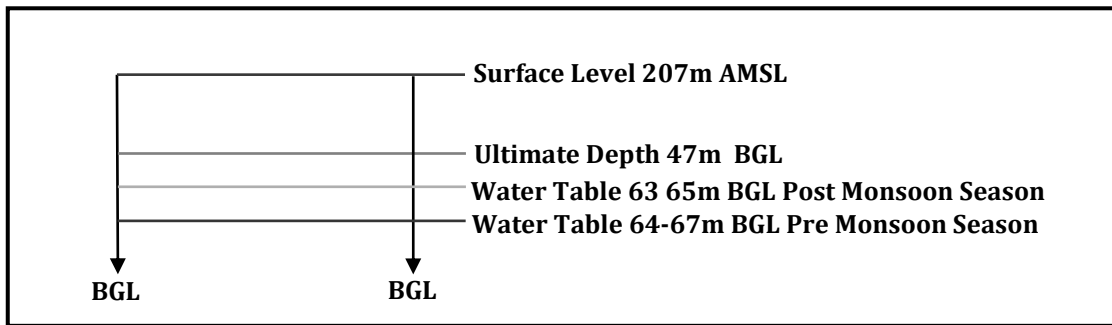
The Rough stone and Gravel and associated soil in the area does not contain any toxic material. Rough stone and Gravel constitute of inert and chemically non-reactive ingredients. Also, there is no use of chemicals or hazardous substances in the mining process. Thus, ground water pollution is not envisaged due to the mining operations.

The water in the area is 64 to 67 in summer season and 63 to 65m in rainy season which is observed from the nearby bore wells and data obtained from existing private boreholes The lease area is fully covered by Massive Charnokite formation. Hence the Ground water problem will not arise.

Thus, the mining activities will not intersect ground water. The ground water may seep into the working mine pits. This water will be collected in mine sump created in the lower most part and will be allowed to accumulate. This water will be used for dust suppression and plantation. Considering small scale of mining operations, only small quantity of seepage water is expected. Thus, there will not be any significant impact in terms of lowering of ground water table in the nearby villages

Based on the experience in the nearby quarries, pumping of seepage water from the mine pit is not required due to small seepage potential. After completion of mining, the mined-out pit will be developed into a reservoir by accumulating rainwater into it. Thus, this will help in improving ground water table in the area.

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**Figure 4.6 SCHEMATIC DIAGRAM OF MINE WORKINGS W.R.T. GROUND WATER TABLE**

### **4.5.3 MITIGATION MEASURES FOR WATER ENVIRONMENT**

- No wastewater will be generated during mining operation.
- Septic tanks and soak pits will be provided for the disposal of domestic wastewater generated from mine office.
- Garland drains will be provided to prevent the entry of rainwater into the mining pit.
- Construction of settling tanks at points to arrest silt.
- Rainwater falling in the mining pit will be collected in lower benches & will be used for dust suppression & plantation.
- Regular monitoring of ground water quality will be carried out.

### **4.5.4 ARTIFICIAL RECHARGE AND RAINWATER HARVESTING**

The mine management will Roof top harvesting structures in the public buildings in nearby villages with prior consent from local gram panchayats to collect rainwater and charge to ground through available dug well/ tube well. Also, the reservoir/dam in the nearby area will act as an additional source of water to the nearby villagers and will also help in recharging ground water table of the area. The cluster area has potential to harvest rainwater water will be harvested in mining area in nonworking mining pits and will be utilized for dust suppression and plantation.

### **4.6 IMPACT ON LAND ENVIRONMENT& MITIGATION MEASURES**

The land environment comprises of Geology, land use and soil the impact and mitigation of land all land environment component is given below.

#### **4.6.1 IMPACT ON GEOLOGY**

Mining is the extraction of valuable minerals or other geological materials from the earth. Mining activity is hence exploitation of Geology. Mining will lead to change in geological setting of the area. Mining will also change the geomorphology of the area i.e. the flat land topography of the area will change to undulating topography with pits. If mining is not done systematically, it may also generate hazards such as landslides i.e. dump failure in terms of mining. The impact of mining activity on geology will be limited to only cluster area of 7.34.5 Ha. The area is structurally with no occurrence of fault and no karst topography observed in area.

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**4.6.2 IMPACT ON LANDUSE**

The Rough stone and Gravel mining activity will slightly change the present landscape of the ML area. The land use of the area at the time of lease grant was patta Land for which LOI issued by Deputy Director, Department of Geology and Mining, Tiruppur District. Any change in land use will lead to land degradation as the ecosystem of the area gets disturbed. The present topography of the ML area will be affected mainly due to Rough stone and Gravel Mine and allied activities i.e. mineral transport and manual crushing.

The potential adverse impact of opencast Rough Stone and Gravel mining will be in the form of change in land use pattern. So, reclamation of mined out land will be given due importance as a step for sound land resource management in the form of reclaimed land and water body. The land use of mine lease area at present, at the end of mining plan period and at the end of mine life as per closure plan will be as follows:

**Table 4-8 LAND USE OF LEASE AREA**

S. No.	Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
1	Area under quarry	2.03.5	3.23.7
2	Dump	0.64.1	Nil
3	Infrastructure	Nil	0.01.0
4	Roads	0.01.0	0.03.0
5	Green Belt	Nil	0.35.6
6	Unutilized Land	2.28.4	1.33.7
<b>Total</b>		<b>4.97.0</b>	<b>4.97.0</b>

No adverse impact is anticipated on land use of buffer zone associated due to the Rough Stone and Gravel mining, as all the activities will be confined within the project site only. Mined out Rough Stone and Gravel will be and will be further transported to the consuming industries to nearby consumers

**4.6.3 IMPACT ON SOIL**

Overburden in the form of gravel formation, the gravel will be directly loaded into tippers for the filling and low-lying areas. 100% ROM is saleable. The soil will be properly preserved in safety zone and will be utilized for plantation purpose. The silt may get carried to the nearby seasonal streams with the surface runoff during rains and may cause siltation of the seasonal water bodies located outside the mining area.

**Sub-grade material** there is no overburden available in the lease which can be readily available for backfilling. There is no O/B or waste material available in the lease or nearby areas.

#### **4.6.4 MITIGATION MEASURES FOR LAND ENVIRONMENT**

- Mining activity will be carried out in planned manner as per approved mine plan.
- Mining bench dimension will be maintained for stability of area.
- Land reclamation will be carried out as per approved progressive mine closure plan.
- Thick Plantation will be carried out in safety zone in order to maintain the eco system of area which will be disturbed due to land degradation.
- Construction of Garland drains around mine lease area connected to settling tank will control soil erosion.
- Development of green belt around mine lease area and grasses plantation to control soil erosion.

#### **4.7 SOCIO - ECONOMIC ENVIRONMENT**

It is obvious to assume that the activities of the mining operations will improve the socio-economic levels in the study area. The anticipated impact of this project on various aspects is described in the following sections

##### **4.7.1 IMPACT ON HUMAN SETTLEMENT**

There is no human settlement in or adjacent to the cluster area of Rough stone and Gravel Mine. Nearest human settlement from cluster area is Nathakadaiyur - 3.0km - SW, there will not be any impact on the human settlement in the area. The operation of the Rough stone and Gravel mine and associated activities will improve the economic development, civic amenities, and educational facilities in the project vicinity. Overall, due to employment generation and economic progress, there will be positive changes in the socio-economic condition of the people residing in the vicinity of the project site.

##### **4.7.2 EMPLOYMENT**

This is a Rough stone and Gravel mining project. The mine will provide manpower for 36 nos of persons for mine management and another for activities such as excavation, transportation etc. Mostly local persons will be employed in the mine. Additional manpower requirement in the mine will be employed from the nearby villages. Thus, there will not be any population growth in the area due to the Rough stone and Gravel mining project.

##### **4.7.3 IMPACT ON CIVIC AMENITIES**

The existing infrastructure facilities are sufficient to cater the needs of the Rough stone and Gravel mine. However, the mine management will take efforts as a part of CER for improvement in civic amenities like sanitation, drinking water facilities, transport road, etc. in the nearby villages.

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**4.7.4 IMPACT ON HEALTH CARE FACILITIES**

There are primary health care facilities in the nearby villages and hospital is available in Karur town. Mine management will also conduct periodic medical camps in the nearby villages as a part of CER.

**4.7.5 IMPACT ON ECONOMIC ASPECTS**

The mine will have fulltime (36 nos.) for mine management such as excavation, transportation etc. Mostly local persons will be employed in the mine. The local population will be given preference in employment. The employment potential will improve economic conditions of these families directly and provide employment to many other families indirectly who are involved in business and service-oriented activities. This will, in-turn improve the quality of life in the region.

**4.8 OCCUPATIONAL HEALTH & SAFETY**

**4.8.1 IDENTIFICATION OF WORK-RELATED HEALTH HAZARDS**

Details of the principle environmental and occupational risks that are likely to be created are given in **Table 4.8**.

**Table 4-9 WORK RELATED HEALTH HAZARDS**

Sr. No.	Hazardous Activities	Type of Hazards	Severity of Injury
1	Drilling	Exposed to high level of Noise	Hearing impairment
		Exposed to dusty environment	Respiratory diseases
2	Blasting	Struck by fly rock	Serious Physical injury
		Exposed to dusty environment	Respiratory diseases
		Exposed to high level noise	Hearing impairment
		Exposed to excessive vibration	Cracks to permanent structures
3	Loading	Struck by rolling big boulders	Serious injury and equipment damage
		Struck by fall of objects	Serious Physical injury
4	Transportation	Accidental runaway of vehicle	Serious injury, and equipment damage
		Fall of vehicle from height while reversing	
		Exposed to high level noise	Hearing impairment
		Fire in engine due to over heating	Serious Physical injury
5	Storage of oil, lubricant	Leaks and spills	Fire & vigorous chemical reaction
6	Battery maintenance handling	Acid spillage	Acid burns
7		High pressure operation	Physical injury

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Sr. No.	Hazardous Activities	Type of Hazards	Severity of Injury
	Use/repair of hydraulic jacks & pumps	Oil spillage Rupture of hydraulic hoses	

The mine management takes full responsibility for the protection of the workers against sickness, disease and injury arising out of their employment and have adopted certain principles about occupational health services, like establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work.

The following occupational health measures shall also be adopted:

1. Identification and assessment of the risks from health hazards in the workplace;
2. Surveillance of the factors in the working environment and working practices which may affect workers health, including sanitary installations and canteens; and
3. Planning and organization of work, including the design of workplaces, choice, maintenance and condition of machinery and other equipment and substances used in work.

**4.8.2 MEDICAL SURVEILLANCE AND EXAMINATIONS**

To evaluate the impacts from Rough stone and Gravel mining project activities on health of workers, baseline health studies will be conducted on every worker before joining their duties.

- Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline status for determining changes in health
- Evaluating the effect of dust and noise on workers
- Enabling corrective action to be taken when necessary
- providing health education and awareness
- The medical surveillance program will consist of the following:
- Pre-employment medical examinations
- Periodic medical examinations
- Health & Safety awareness and training
- Record keeping

**4.8.2.1 HISTORY**

The initial medical and occupational history cover previous exposure to dust, personal habits (e.g. smoking, etc.) and history of present or past respiratory disorders (particularly tuberculosis).

**4.8.2.2 OCCUPATIONAL HEALTH MONITORING**

All the employees in the mine will be subjected to pre-employment & periodic medical examination to assess the occupational health impacts. The tests will be conducted as per Form O as given in the Mines Rules, 1955 for the following parameters:

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1. Height & Weight	9. Skin
2. Eyes	10. Hydrocele
3. Ears	11. Hernia
4. Respiratory Systems	12. Any other abnormality
5. Circulatory Systems	13. Urine tests
6. Abdomen	14. Skiagram of chest
7. Nervous systems	15. Complete Blood picture
8. Locomotory systems	16. Any other test considered by the Doctor

Based on the medical findings, the worker will be placed for appropriate jobs and necessary safety training will be provided.

**4.8.2.3 AWARENESS AND TRAINING PROGRAM**

All workers will be subjected to pre-employment and periodic awareness program on health and safety issues of mining and related activities. They would also be imparted with proper training and would be made to understand the health impacts of inhaling high concentration of dust laden air. All the workers will also be provided training in first aid.

- Holders of first aid certificate will be given refresher training once in two years
- Rescue trained person will acquire highest standards of proficiency in first aid
- Ambulance van will be provided fully equipped with lifesaving drugs, medicines and appliances needed in emergency

➤ **RECORD KEEPING**

A Registered Medical Practitioner (Doctor) will be appointed for examining the workers. All the health records of the workers will be maintained in separate file in site office and the records will be regularly updated.

➤ **IMPLEMENTATION OF OH&S**

For implementation of Occupational Health & Safety in the mining project, a safety committee will be formed. The hierarchy of the committee and responsibilities of individual members will be as shown in **Table 4.10**.

**Table 4-10 OH&S COMMITTEE & ITS RESPONSIBILITIES**

Sr. No.	Designation	Responsibility
1.	Mines Manager	Overall responsibility of Occupational Health & Safety in the Mines
2.	Mining Engineer / Foreman	Adherence to OH&S guidelines and provision of training and conducting awareness programs
3.	EH&S Manager	Assisting mines manager in ensuring Occupational Health, Safety and environmental compliance
4.	Doctor	Pre-employment and periodic examination / health checkup and updating the records, provision of first aid training.



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**4.8.3 PUBLIC HEALTH IMPLICATIONS OF THE PROJECT**

There is no human settlement in or adjacent to the cluster area of Rough stone and Gravel Mine. Nearest human settlement from cluster area as Nathakadaiyur - 3.0km - SW direction. As observed from the modeling results, the dust emissions and noise from the mining project will not cause any significant impact on the ambient air quality and ambient noise levels in the surrounding villages. The mine will be operated during day time only. Thus, there will not be any disturbance to the nearby habitations during night. The mineral transportation will be carried out through existing mines road from mines. Thus, there will not be any disturbance to the normal traffic of the area. Also, the mine management will conduct periodic medical camps in the nearby villages to provide medical facilities to the villagers. Thus, no significant impact is envisaged on the public health due to the project.

**4.9 IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE I.E. TRAFFIC STUDY**

SH83A - Kangayam - Erode - 2.57 km-W The total production from cluster is 394606 m<sup>3</sup> of rough stone and 52191 m<sup>3</sup> of gravel will be handled per day for proposed mining project. The excavated Rough stone and Gravel will be dispatched to the consuming industries through 20 tonne capacity trucks/Dumpers to consumers from mine site. Considering 300 days of mine working in a year. About approx. 10 trips of 20 tonne capacity trucks will be required for transportation of Rough stone and Gravel to user consuming industry. The Rough stone and Gravel will be transported through the existing roads network.

Traffic study measurements were performed at one location at confluence SH83A - Kangayam - Erode - 2.57 km-W direction to assess impact on local transport infrastructure due to this mining project. The mineral from the proposed mining project will be loaded and transported through at SH83A - Kangayam - Erode - 2.57 km-W direction. Excavated Rough stone will be dispatched as accordingly mentioned in **Table 4.11**.

**Table 4-11 TRANSPORT ROAD DETAILS**

Name of Road	Direction		Distance from project site
	Up	Down	
Highway (SH 83A)	Kangayam	Erode	2.57 km-W direction

Traffic data was collected continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on each of the two directions for counting the traffic. Counted data sheet is provided in **Table 4.12** and PCU is calculated in **Table 4.13**. At the end of each hour, fresh counting and recording was undertaken.

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**Table 4-12 TRAFFIC VOLUME COUNT SURVEY (HOURLY)**

S.No.	Vehicle Distribution	No. of Vehicles/Day		Total Number of Vehicle in PCU/Day		
		Towards Kangayam	Towards Erode	Equivalent Factor	Towards Kangayam	Towards karur
1.	Two Wheelers	143	173	0.5	70	82
2.	Three Wheelers	53	54	1	49	53
3.	Cars	167	132	1	132	133
4.	Bus	63	34	3	85	89
5.	Tractor	24	24	4	89	87
6.	Trucks	68	79	3	230	254
<b>TOTAL</b>		<b>518</b>	<b>496</b>	<b>-</b>	<b>655</b>	<b>698</b>



**FIGURE 4.7 ROAD CONNECTIVITY MAP WITH FOR TRAFFIC MONITORING**

**Table 4-13 EXISTING TRAFFIC SCENARIO AND LOS**

Road	Total V (Volume in PCU/day)	C (Capacity in PCU/day.)	Existing V/C Ratio	LOS
Highway (SH 83A)	2367	3600	0.65	D

V = Volume in PCU's /hr, C= Capacity PCU's /hr, LOS = Level of Service

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good

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0.4 – 0.6	C	Good
0.6 – 0.8	D	Fair/ Average
0.8 – 1.0	E	Poor
1.0 & Above	F	Very Poor

Note: IRC is accepting the fact that, in Indian roads the real congestion starts when V/C ratio is >1, i.e. for forced flow. Till this limit the road is free for traffic movement without any impediments. Hence it is acceptable as normal up to V/C = 1 and the performance will be taken as good only.

**During Mine Operation**

Total Capacity of cluster mine	4,46,797 Cum
No. of working days	300
Extraction and Transportation of mineral	14889/day
Working hours per day	8
Dumpers Capacity	20
Frequency of trucks/Dumpers deployed/day	10 Trips per day approx.

**Table 4-14 MODIFIED TRAFFIC SCENARIO AND LOS**

Road	Increased Volume in PCU/day	Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
Highway (SH 83A)	10	2367+10=2377	3600	0.66	D

As per PCU value there is not much impact on local transport.

The LOS value from the proposed mining project will not change; the performance is Average. The existing roads network will be sufficient to cater the transport needs of the mine. However, mine management will periodically maintain the transport road in proper condition to avoid any impacts on traffic infrastructure. Rough stone and Gravel will be transported in trucks covered with tarpaulin. Major part of transportation will comprise of local or state highway which will be periodically maintained.

**4.10 IMPACT ON BIOLOGICAL ENVIRONMENT**

**IMPACT ON TERRESTRIAL FLORA**

Dust deposition on leaf lamina observed on nearby local plant species which may results in decline the rate of photosynthesis and retards the plant growth.

**MEASURES FOR MINIMIZING IMPACT ON FLORA**

- Dust issues are mainly raised in the area due to unpaved road, cumulative fugitive dust emissions by various mining activities.
- To mitigate the impact regular water sprinkling will be carried out within the mine lease area as well as approach road.
- Stabilization of soil/waste dumps by grass cover shall be done.

### **IMPACT ON WILDLIFE**

- There is no Wildlife Sanctuary and Biosphere Reserve within 10 km radius of the project site.
- No rare, endemic & endangered species are reported in the buffer zone. However, during mining, the management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- Fencing around the mine lease area to restrict the entry of stray animals
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

### **MEASURES FOR MINIMIZING IMPACT ON FAUNA**

Following measures will be adopted to minimize the impact of mining on faunal environment of the area.

- Measures will be taken to curb pollution due to mining activities on air, water, land & noise environment. Plantation around mine area will help in creating habitats for small faunal species and to create better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

### **STUDY OF IMPACT ON AQUATIC ECOLOGY**

- Mining activities will not disturb the existing aquatic ecology as there is no effluent discharge proposed from the Rough stone and Gravel mine.
- Mining activity may increase sediment load and total dissolved solids in streams due to, surface run off, erosion activity of loosened soil especially during rainy season and may affect water quality of natural water body and stream within mine lease area.

#### **4.10.1 MITIGATION MEASURES**

- Periodic maintenance of mineral transport road.
- Covered Transport of stone mine to consuming industry.
- Development of thick plantation around mine lease area
- Monitoring of dust fall at agriculture land located nearby the mining area

#### **4.11 GREENBELT DEVELOPMENT & PLANTATION PROGRAMME**

##### **Proposed Greenbelt Development & Plantation Programme**

It is proposed to develop plantation at 2 m x 2 m spacing, the rate of survival is aimed at 70 to 80% by regular watering & fencing to keep plants safe from animal grazing. Local species will be planted in consultation with local horticulturist. Diseased plants will be replaced by planting new saplings.

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The basic approach towards the development of green belt /plantation in the lease area is with a view to provide an aesthetic look, eliminating fugitive emissions and for controlling the impact of noise, etc. A Green Belt will be developed based on the following principles:

- Plants that grow fast will be preferred.
- Preference for high canopy covers plants with local varieties
- Perennial and evergreen plants will be preferred.
- Plants having a high Air Pollution Tolerance Index (APTI) will be preferred.
  
- The development of green belt is an important aspect for any project because:
- It improves the ambient air quality by controlling Suspended Particulate Matter in air.
- It helps in noise attenuation for the surrounding area.
- It helps in attracting new birds and insects as their habitation.
- It maintains the ecological balance.
- It increases the aesthetic value of site.

#### **Plantation along the Safety Zone**

Thick plantation will be carried out on the safety barrier and undisturbed area within the mine lease. Also, plantation will be developed around temporary waste dumps. Soil generated during mining will be separately stacked and will be used for plantation.

**Table 4-15 PROPOSED AFFORESTATION PROGRAM**

Year	No. of Sapling
1 <sup>st</sup>	1000
<b>Total</b>	<b>1000</b>

**Table 4-16 SELECTION OF PLANT SPECIES WITH SPECIAL REFERENCE**

S. No.	Plant species	Common Tamil Name	Purpose of plantation of species
1.	<i>Aegle marmelos</i>	Vilvamaram	Pollution Tolerant Plants Automobile
2.	<i>Albizia lebbeck</i>	Vaagai	
3.	<i>Ficus benghalensis</i>	Banyan	Best dust filtering capacity Plants
4.	<i>Ficus religiosa</i>	Peepal	
5.	<i>Cassia fistula</i>	Konnai	Exhaust pollution Control Plants
6.	<i>Delonix regia</i>	<i>Delonix regia</i>	
7.	<i>Phyllanthus emblica</i>	Amla	Medicinal value Plants
8.	<i>Terminalia cattapa</i>	Badam	
9.	<i>Azadiracta indica</i>	Neem	
10.	<i>Tectona grandis</i>	Teak	Economic value Plants
11.	<i>Pongamia pinnata</i>	Pungan	
12.	<i>Shorea robusta</i>	Kungiliyam	

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<b>S. No.</b>	<b>Plant species</b>	<b>Common Tamil Name</b>	<b>Purpose of plantation of species</b>
13.	<i>Cymbopogon martini</i>	Palma Rosa	Soil Conservation Plants
14.	<i>Ziziphus jujube</i>	Ilanthai	Fruit bearing Plants
15.	<i>Psidium guava</i>	Guava	
16.	<i>Syzygium cumini</i>	Naval	
17.	<i>Mangifera indica</i>	Mango	
18.	<i>Dalbergiasisso</i>	Eetti	Nitrogen Assimilation Plants
19.	<i>Cassia siamea</i>	Manjal Konnai	
20.	<i>Polyalthia longifolia</i>	Nettilingam	Aesthetic beautification Plants

## **5. ANALYSIS OF ALTERNATIVES**

### **5.1 SITE ALTERNATIVES**

A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environment friendly and cost-effective options. Every mine needs to be planned in away that the mineral is extracted to the maximum extent without causing severe irreversible environmental damages. The mine plan and mine closure plan has been approved by the competent Authority prior to submission of the Form-1 and PFR. The site has been selected based on following conditions as:

- The site has been selected based on geological investigation and exploration as below:
- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.
- The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

### **5.2 ANALYSIS OF ALTERNATIVE TECHNOLOGY**

#### **5.2.1 Choice of Method of Mining**

The mechanized method will be adopted because of the following reasons:

- Mining operations is proposed to be carried out by opencast mechanized method by deploying drilling and blasting method, loader and tipper/dumper combination.
- Overburden in the form of gravel formation
- The mineral i.e. Rough stone and Gravel is available at surface.
- The mining by opencast method is highly productive & economical as compared to underground method; and
- Underground mining is not economical and practically not feasible in the present case.

Hence, conventional open cast mechanized method of mining involving excavation through drilling and blasting method will be done with excavated material will be loaded with into tipper and transported to consumer.

## **6. ENVIRONMENTAL MONITORING PROGRAMME**

### **6.1 INTRODUCTION**

Post Environmental Clearance Monitoring is an essential part to check the impact of project related activity. Hence monitoring of various environmental parameters will be carried out on a regular basis to ascertain the following as:

- Status of Pollution within the mine site and in its vicinity.
- Generate data for predictive or corrective purpose in respect of pollution.
- Examine the efficiency of pollution control system adopted at the site.
- To assess environmental impacts.

Monitoring will be carried out at the site as per the norms of CPCB. Environmental Monitoring Programme has been/will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by SPCB.

Six monthly compliance reports will be submitted to SPCB/MOEF for the periods of January to June and July to December will be submitted on regular basis on 1<sup>st</sup> June and 1<sup>st</sup> December of each calendar year. Quarterly compliance Report for conditions stipulated in Consent to Operate will be submitted to SPCB on regular basis.

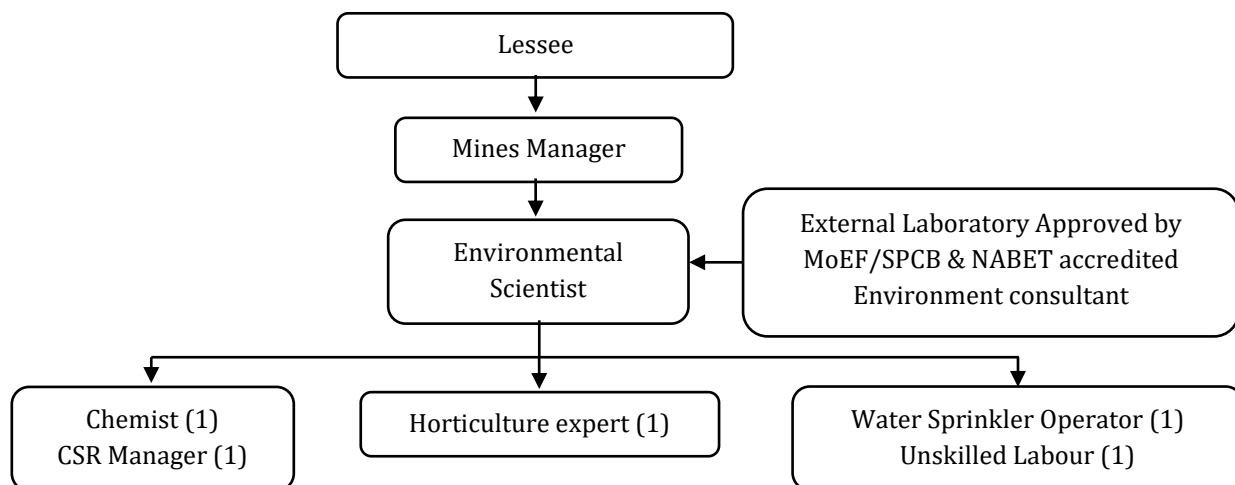
### **6.2 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)**

Monitoring is as important as that of control of pollution since the efficacy of pollution control measures adopted can only be determined by monitoring. An Environmental Management Cell will be established for implementing the Environmental Management Plan and conducting periodic environmental monitoring of important and crucial environmental parameters to assess the status of environment regularly during mine operations. With the knowledge of baseline conditions, the monitoring program will serve as an indicator for any deterioration in environmental conditions due to operation of the mine and so that suitable additional mitigation steps could be taken in time to safeguard the environment. The organizational chart of Environment Management Cell is as given in **Figure 6.1**.

### **6.3 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES**

The mitigation measures suggested in **Chapter-4** will be implemented to reduce the impact on environment due to the operations of the Rough stone and Gravel mining projects. To facilitate easy implementation of mitigation measures, these are phased as per the priority implementation as given in **Table-6.1**.





**FIGURE 6.1: ORGANIZATION CHART OF ENVIRONMENTAL MANAGEMENT CELL (EMC)**

### 6.3.1 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:

- A. Environmental monitoring of the core and buffer zone.
- B. Commissioning of pollution control equipment.
- C. Specification and regulation of maintenance schedules for pollution control equipment.
- D. Ensuring that standards are maintained.
- E. Developing the green belt.
- F. Ensuring optimum water usage.
- G. Carrying out the Environmental Management Plan.
- H. Organizing meetings of the Environmental Management Committee and reporting to the committee.

**Table 6-1 IMPLEMENTATION SCHEDULE**

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution control measures	Will be further improved at the time of start of mine after grant of EC and lease renewal.	Immediate
2	Water pollution control measures	Will be further improved at the time of start of mine after grant of EC.	Immediate
3	Noise control measures	Will be further improved at the time of start of mine after grant of EC.	Immediate
4	Ecological preservation and upgrade	May be started before grant of EC and will be continued in phase-wise manner till life of the mine.	Immediate & Progressive

## **6.4 MEASUREMENT METHODOLOGIES**

### **6.4.1 INSTRUMENTS TO BE USED**

The following instruments are being used for data collection work in the monitoring schedule:

1. Respirable Dust Sampler (RDS)
2. Fine Particulate Sampler (FPS)
3. Dry and Wet Bulb Thermometer.
4. Sound Level Meter
5. Micro Meteorological Station
6. Water Level Indicator
7. Global Positioning System (GPS)

In addition to the above instruments, the data on land use, vegetation and agricultural crops will be collected by the field team by meeting with many local inhabitants in the study area and different government departments /agencies.

### **6.4.2 MONITORING PROGRAMME**

The environmental monitoring for the Rough stone and Gravel mine operations will be conducted for following aspects:

- Ambient Air quality
- Water table depth
- Surface and ground water quality
- Ambient Noise Levels
- Soil Quality
- Green belt & Plantation
- CSR Activities

The Objective of Monitoring -

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

The following routine monitoring program will be implemented under the post-project monitoring. Environmental monitoring of ambient air quality, surface and ground water quality, ambient noise levels, etc. will be carried out through MOEF accredited agencies regularly and reports will be submitted to SPCB/MoEF.

#### ***Air Pollution***

The ambient air quality will be monitored as per EC Conditions/Central Pollution Control Board guidelines at one location in mine lease area and four locations in nearby villages.

**Water Table Depth**

The depth of ground water table in the area will be monitored regularly in the wells/ borewell located in four nearby villages. The water table depth at Pre-monsoon (May month) and Pre-Monsoon (November Month) will be measured and records will be maintained.

**Water quality**

Ground water samples from four villages surrounding the project area will be analyzed. The water quality monitoring will be carried out once during every season. Surface water sample will be collected from mine pit, when available.

**Ambient Noise Levels**

Noise levels in the core zone and in surrounding villages will be monitored regularly. Ambient noise level monitoring will be carried out at 1 location in mine lease area and in locations in nearby villages. Noise level monitoring will be conducted once in each season.

**Soil quality**

Soil quality monitoring will be carried out in the plantation area within the mine lease area and in the agricultural fields located nearby the mine lease area. Sample from core zone in mine lease and samples from nearby villages will be collected and analyzed, once in a year, preferably during dry season.

**CSR Activities**

Social welfare activities conducted in nearby villages will be regularly monitored for their effectiveness and accordingly new activities will be planned.

**6.4.2.1 MONITORING SCHEDULE**

The proposed environmental monitoring schedule is given in **Table 6.2**.

**Table 6-2 PROPOSED ENVIRONMENTAL MONITORING SCHEDULE**

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms

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## **Chapter 6: Environmental Monitoring Programme**

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

### **6.5 ENVIRONMENTAL POLICY**

#### **6.5.1 Environmental Policy of the Company**

The Environmental Policy of lessees is provided as **Annexure VIII**.

#### **6.5.2 Organization Set-up**

The company has clearly defined duties and responsibilities for the employees. Organizational setup for environment management is shown in **Figure 6.1**.

#### **6.5.3 Environmental Management Cell**

An Environmental Management Cell (EMC) will be established in the mine under the control of Mines Manager. The EMC will be headed by an Environmental scientist having adequate qualification and experience in the field of environmental management. The responsibilities of EMC will be as follows:

1. Implementation of pollution control measures as suggested in Environmental Management Plan and recommended in EC
2. Conducting environmental monitoring as per EMP and EC stipulation through external laboratories approved by MoEF/SPCB and NABL
3. Ensuring compliance with other conditions stipulated in Environmental Clearance for the project.
4. Ensuring compliance with the conditions stipulated in 'Consent to Operate' for the project.
5. Timely submission of compliance status to MoEF/ SPCB
6. Seeking experts' guidance, as and when required.
7. Conducting CSR activities in nearby villages.
8. Co-ordination of the environment related activities within the project as well as with outside agencies

9. Collection of health statistics of the workers and population of the surrounding villages
10. Green belt development
11. Monitoring the progress of implementation of the environmental monitoring programme
12. Monitoring of the water/ waste water quality, air quality and solid waste generated
13. Analysis of the water and air samples collected through external laboratory
14. Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc
15. Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

#### **6.5.4 Audit & Review**

Review and audit is essentially a management tool. However, its application is crucial at the operational level for verification and feedback on the effectiveness of organization system and environmental performance. Basically, auditing involves in the following items:

- Line management system
- Awareness and training
- Procedures: standards, targets
- Plans: Waste, contingency, pollution control compliance
- Verify environmental impact assessment
- Verify mitigation
- Reporting and communication
- Documentation
- Feedback

#### **Internal Audit:**

A system of auditing will be undertaken for mining operations and includes the use of trained internal and external auditors. In addition, auditing should be undertaken to ensure compliance with all the applicable legislations.

#### **Audit Type Frequency:**

- Internal: - From other site in-charge every 6 months
- External - independent expert Every 12 months

The company shall depute internal / external auditors who are trained and certified as competent EMS auditors by an independent and external standard organization. The results of monitoring and auditing shall be regularly reported through the senior management team to ensure that action items are addressed.

### **6.5.5 Non-conformity, Corrective Action and Preventive Action**

As per the Environmental Policy of the company, non-conformities, corrective actions, and preventive actions shall be managed in accordance with *Nonconformance, Preventive and Corrective Action Procedure*. This procedure, which relates to all projects of the company, details the processes to be utilized with respect to the identification of non-conformances, the application of appropriate corrective actions(s) to address non-conformances and the establishment of preventive actions to avoid non-conformances. The key elements of the process include:

- identification of Non-conformance and /or Non-compliances
- Recording of Non-conformance and/or Non-compliance
- Evaluation of the Non-conformance and/or Non-compliance to determine specific corrective and preventive actions
- Corrective and preventive actions to be assigned to responsible persons and
- Management Review of corrective actions to ensure the status and effectiveness of the actions

### **6.5.6 Management Review**

A comprehensive review of the objectives and targets associated with the individual project of the company shall be undertaken on an annual basis via the business planning (1 year outlook) and business strategy (5-year outlook) processes. These reviews, which include involvement from the senior site management and other key personnel, assess the performance of the mine over the previous year and develop goals and targets for the following period.

## **6.6 OCCUPATIONAL HEALTH AND SAFETY**

Occupational health and safety are very closely related to productivity and good employer-employee relationship. The main factors of occupational health in mine are fugitive dust and noise. Safety of employees during operation and maintenance of mining equipment and handling of explosive materials is to be taken care of as per the Mine Regulations, 1965 and circulars of DGMS. To avoid any adverse effects on the health of workers due to dust, heat, noise and vibration, sufficient measures are proposed in the EMP. These include:

- Provision of rest shelters for mine workers with amenities like drinking water, toilets etc.;
- Provision of personnel protection devices for the workers;
- Rotation of job for workers exposed to high noise areas;
- First-aid facilities.
- Occupational Health Survey of the employees will be carried out at regular intervals.

## **6.7 BUDGETARY ALLOCATION FOR ENVIRONMENTAL MONITORING**

The details of monitoring of pollution along with annual recurring cost are given in **Table-6.3**.

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**Chapter 6: Environmental Monitoring Programme**

**Table 6-3 COST OF ENVIRONMENTAL MONITORING PROGRAMME**

<b>S. No.</b>	<b>Description of item</b>	<b>Capital Cost (Rs.)</b>
1	Air Pollution Control - Water sprinkling on haul road & plantation	52,000
2	Water Pollution Control (Settling tank, Garland Drains, etc.)	18,000
3	Noise Level Monitoring	2,000
4	Ground Vibration Test	4,000
<b>Total EMP Cost</b>		<b>76,000</b>
<b>Total EMP Cost for five years</b>		<b>3,80,000</b>

## **7. ADDITIONAL STUDIES**

### **7.1 PUBLIC CONSULTATION**

Draft EIA/EMP for Proposed Rough stone & Gravel Mine of a cluster area 7.34.5 Ha, located in Survey Nos. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu is prepared as per the TOR issued by SEIAA, Tamil Nadu and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the issues raised and commitment of Project Proponent during the public hearing will be incorporated in the final EIA/EMP report. The following Additional Studies were/will be carried out in as per Terms of Reference: Risk Assessment & Disaster Management Plan.

### **7.2 RISK ASSESSMENT**

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. Hazard analysis involves the identification and quantification of various hazards (unsafe conditions) that exist in the mines. On the other hand, risk analysis deals with the identification and quantification of risks, mining equipment and personnel are exposed to, due to accidents resulting from the hazards present in the mine. Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to because of hazards present.

In the sections below, the identification of various hazards, probable risks, maximum credible accident analysis, and consequence analysis are addressed which gives a broad identification of risks involved. Based on the risk estimation disaster management plan must be prepared.

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



- Accident due to explosives;
- Accident due to heavy mining equipment; and
- To take care of above hazard/disasters, the following control measures will be adopted:
- All safety precautions and provisions of the Mine Act, 1952 and the Mines Rules, 1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- Firefighting and first-aid provisions in the mine office and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Training and refresher courses for all the employees working in hazardous premises; Under mines rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads;
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

### **7.2.1 Measures to Prevent Accidents due to Trucks and Dumpers**

- All transportation within the main cluster area would be carried out under the direct supervision and control of the management;
- The vehicles will be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs would be provided at each and every turning point specially for the guidance of the drivers;
- To avoid dangers while reversing the vehicles, all areas as far as possible, will be made man free and
- A statutory provision of the fence, constant education, training etc. will go a long way in reducing the incidence of such accidents.

### **7.2.2 POST COVID HEALTH MANAGEMENT PLAN**

COVID – 19 diseases caused by SARS-CoV-2 Coronavirus is relatively a new disease, with fresh information being known on a dynamic basis about the natural history of the disease, especially in terms of post-recovery events. After acute COVID-19 illness, recovered patients may continue to report wide variety of signs and symptoms including fatigue, body ache, cough, sore throat, difficulty in breathing, etc. As of now there is limited evidence of post-COVID sequelae and further research is required and is being actively pursued. A holistic approach is required for follow up care and well-being of all post COVID recovering patients

### **Post-COVID Follow Up Protocol**

- Continue COVID appropriate behavior (use of mask, hand & respiratory hygiene, physical distancing).
- Drink adequate amount of warm water (if not contra-indicated).
- Make sure your workplaces are clean and hygienic
- Surfaces (e.g. desks and tables) and objects (e.g. telephones, helmet) need to be wiped with disinfectant regularly

### **7.3 DISASTER MANAGEMENT PLAN**

The disaster management plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this order of priorities. The disaster/ emergency situations will be countered with an organizational chart entrusting responsibility to various mine personnel with their specific roles during emergency and will be updated from time to time. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

The composition of the disaster management team will be:-

1. Mines Manager
2. Site Supervisors/ Foremen
3. Personnel/Administrative Manager/Environmental Manager
4. First Aid Expert/ Medical Coordinator
5. Transport in-charge

For effective implementation of the disaster management plan, the following facilities would be widely circulated and personnel training through rehearsals/drills.

#### **Infrastructure at site**

##### **1. Emergency Control Room**

Site office will be used as Emergency Control Room. Following facilities will be kept ready at the site office for use in emergency conditions:

- a. Master plan of the mines.
- b. First aid boxes.

- c. Gas masks.
- d. Mobile phone with charging facility.
- e. Loud speakers
- f. Emergency lighting system.
- g. Stretchers.
- h. Transport facility.

➤ **Assembly Points**

Assembly points will be set up in the Mine lease at farthest from the location of likely hazardous events, where pre-designated persons from the works, contractors and visitors would assemble in case of emergency. Up-to-date list of pre-designated employees of various departments will be available at these points so that roll call could be taken. Pre-designated persons would take charge of these points and mark presence as the people come into it.

➤ **Communication System**

Different types of alarms to differentiate types of emergencies will be assigned and communicated. Alarms will be followed by an announcement over Public Address System. In case of failure of alarm system, communication will be made through Public Address System (loud speakers). If everything fails, a messenger will be used for sending the information.

➤ **Warning System and Control**

The Control Centres will be located at an area of minimum risk or vulnerability in the premises concerned, considering the wind direction, areas which might be affected by fire/explosion, toxic releases, etc. For promptness and efficiency, the premises/storage sites will be divided into number of zones, which will be clearly marked on the site plan.

➤ **Emergency Services**

This includes the fire-fighting system, first aid centre, ambulance etc. Alternate sources of power supply, communication with local bodies, fire brigade etc., will be identified and clearly demarcated at control room. Adequate number of external and internal telephone connections will be provided.

➤ **Fire Protection System**

The fire protection system in the proposed Rough stone and Gravel mine consist of portable fire extinguishers of suitable types and capacities to be placed in transport vehicles and additional fire extinguishers at site office. Water pumps will be used for supporting the firefighting arrangements.

## **7.4 CUMULATIVE IMPACT STUDY**

Cluster Details:

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 7: Additional Studies**

Code	Name of the lessee	S. F. Nos	Extent Area (Ha)	Period of lease
Existing				
E1	Tvl. R.P.P. Blue Metals	49	2.37.5	28.09.2018 to 27.09.2023
Proposed				
P1	Tvl. R.P.P. Blue Metals	46	4.97.0	-
<b>Total Extent</b>			<b>7.34.5</b>	

All existing and proposed projected area located in Kuttapalayam Rough Stone and Gravel Quarry Cluster located at Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Table 7-1 SALIENT FEATURES OF PROPOSED AND EXISTING MINES IN CLUSTER**

<b>PROPOSAL "P1"</b>		
Name of the Mine	Tvl. R.P.P. Blue Metals	
Survey Nos	46	
Land Type	Non-Forest Land / Patta Land	
Extent	4.97.0 Ha	
Mining Plan Period / Lease Period	5Years	
Ultimate Pit Dimension	197m (L) x 206m (W) x 47m (D) (BGL)	
Existing Pit Dimension	108m (L) x 188m (W) x 27m (D)	
Latitude between	11°05'36.42"N to 11°05'45.94"N	
Longitude between	77°41'22.94"E to 77°41'30.84"E	
Highest Elevation	207m AMSL	
Machinery Proposed	Jack Hammer (1.2m to 2.0m)	8
	Compressor (400 psi)	2
	Excavator bucket & Rock breaker attached	3
	Tippers (20 tonnes Capacity)	6
Proposed Blasting Method	Controlled Blasting Method	
Manpower Proposed	36 Nos	
Total Project Cost	Rs. 76,55,000/-	
<b>EXISTING "E1"</b>		
Name of the Mine	Tvl. R.P.P. Blue Metals	
Survey Nos	49	
Land Type	Non-Forest Patta land	
Extent	2.37.5 Ha	
Mining Plan/Lease Period	28.09.2018 to 27.09.2023	

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**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 7: Additional Studies**

Latitude between	11°05'37.27"N to 11°05'46.61"N	
Longitude between	77°41'20.14"E to 77°41'25.29"E	
Machinery Proposed	Jack Hammer (1.2m to 2.0m)	5
	Compressor (400 psi)	1
	Excavator bucket & Rock breaker attached	1
	Tippers (20 tonnes Capacity)	2
Ultimate Pit Dimension	205m(L) * 74m(W)*47m(D)	
Proposed Blasting Method	Controlled Blasting Method	
Manpower Proposed	23 Nos	
Total Project Cost	Rs. 70,68,312/-	

The Cumulative Impact is anticipated due to drilling & blasting and excavation and transportation activities from proposed mines within the 500-meter radius from the proposed mines and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. The current monitoring was done as existing quarry are working which gives the ambient or present condition of air quality as well as noise.

**Table 7-2 PREDICTED AIR INCREMENTAL VALUE**

S.No.	Locations	PM <sub>10</sub> (µg/m <sup>3</sup> )			PM <sub>2.5</sub> (µg/m <sup>3</sup> )			SO <sub>2</sub> (µg/m <sup>3</sup> )			NO <sub>2</sub> (µg/m <sup>3</sup> )		
		Inc	Max	Total	Inc	Max	Total	Inc	Max	Total	Inc	Max	Total
1	AAQ-1	2.5	70.35	72.85	1.6	41.41	43.01	1	13.72	14.72	1.2	31.82	33.02
2	AAQ-2	1.2	67.86	69.06	1	38.18	39.18	0.4	17.78	18.18	0.5	33.15	33.65
3	AAQ-3	1	65.26	66.26	0.7	35.8	36.5	0.5	15.29	15.79	0.6	33.63	34.23
4	AAQ-4	0.7	64.69	65.39	0.4	35.46	35.86	0.3	15.52	15.82	0.5	36.42	36.92
5	AAQ-5	2.7	67.52	70.22	1.4	39.31	40.71	1.1	16.65	17.75	1.3	35.09	36.39
6	AAQ-6	1.2	68.99	70.19	1	39.2	40.2	0.6	16.42	17.02	0.5	34.72	35.22
7	AAQ-7	3.2	68.88	72.08	2.3	39.2	41.5	1.2	13.14	14.34	1.4	33.39	34.79
8	AAQ-8	1	72.92	73.92	0.8	41.52	42.32	0.5	13.96	14.46	0.6	35.37	35.97
<b>NAAQS (µg/m<sup>3</sup>)</b>		100			60			80			80		

Existing Mines are part of Baseline Study.

**Table 7-3 MAXIMUM GROUND LEVEL CONCENTRATION**

S.No.	Pollutants	Max. GLC observed, (µg/m <sup>3</sup> )	Distance and Direction
1	PM <sub>10</sub>	12.5	1000, NE
2	PM <sub>2.5</sub>	7.1	1000, NE
3	SO <sub>2</sub>	5.3	1000, NE
4	NO <sub>2</sub>	6.3	1000, NE

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**Lessee Tvl. R.P.P. Blue Metals**

**Table 7-4 PREDICTED NOISE INCREMENTAL VALUE**

Equipment with Highest Noise Level	Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Drilling 90 dB(A)	N2 Nathaka-daaiyur Village, 2.89 Km	48.6	15.9	48.6	55
Shovel 85 dB(A)		48.6	10.9	48.6	
Tipper 75 dB(A)		48.6	0.9	48.6	
Compressor 85 dB(A)		48.6	10.9	48.6	
Excavator 102 dB(A)		48.6	27.9	48.6	

**Table 7-5 ANTICIPATED GROUND VIBRATIONS FROM CLUSTER**

Distance from blasting site (D) (m)	Quantity of Explosive/Blast (Q) (Kg)		PPV (mm/s)	
	P1	E1	P1	E1
50	114	101	59.3	56.3
100	114	101	24.7	22.4
200	114	101	10.3	10.7
300	114	101	6.1	5.8
400	114	101	4.3	4.1
500	114	101	3.2	2.9
600	114	101	2.6	2.3
700	114	101	2.1	2.0
800	114	101	1.8	1.6
900	114	101	1.5	1.3
1000	114	101	1.3	0.9

**Table 7-6 SOCIO ECONOMIC BENEFITS**

Code	Project Cost	CER
P1	Rs. 76,55,000/-	Rs.5,00,000/-
E1	Rs. 70,68,312/-	Rs.1,41,366/-

**Table 7-7 REQUIREMENT OF MANPOWER**

Code	No of employees
P1	36
E1	23
Total	59

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**Lessee Tvl. R.P.P. Blue Metals**

*Chapter 7: Additional Studies*

**Table 7-8 GREENBELT DEVELOPMENT BENEFITS**

<b>Code</b>	<b>No. of tress proposed to be planted</b>	<b>Survival %</b>	<b>Area to be covered sq.m</b>	<b>Name of the species</b>	<b>No. of trees expected to be grown</b>
P1	1000	80%	3560	Neem, Pongamia Pinnata, Casuarina, etc.,	800
E1	450	80%	2500	Neem, Pongamia Pinnata,	360
<b>Total</b>	<b>1450</b>		<b>6060</b>		<b>1160</b>

## **8. PROJECT BENEFITS**

### **8.1 NEED BASED ASSESSMENT**

Socio-economic survey conducted in the villages located within 10 km radius of the Rough stone and Gravel Mine cluster area 7.34.5 Ha, located in Survey Nos. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu brings out that villages are lacking in basic amenities like healthcare, transportation, treated drinking water, higher education and sanitation facilities etc. The survey also reveals that the literacy rate in the area is low and the people are mostly engaged in mining and agriculture related activities.

### **8.2 PROPOSED WELFARE MEASURES**

To address some of the expectations of local people and as a commitment towards the Corporate Social Responsibility, the project proponent through the mine management will adopt following socio-economic welfare measures in the nearby villages within 2.5 km distance. Further need will be assessed as per issues raised during public hearing.

#### **8.2.1 WELFARE ACTIVITIES**

Apart from direct and indirect employment opportunities, the mine management will carry out welfare activities in the surrounding two villages for improving the conditions of the villages.

### **8.3 EMPLOYMENT POTENTIAL**

The mine will provide fulltime employment for mine management to 36 nos. for activities such as excavation, transportation etc. Mostly local persons will be employed in the mine. The impact of mining on the economic aspects can be clearly anticipated. The employment potential will ameliorate economic conditions of these families directly and provide employment to many other families indirectly who are involved in business and service-oriented activities. The employment of local people in project will upgrade the prosperity of the region. These will in-turn marginally improve the socio-economic conditions of the area.

### **8.4 BUDGET FOR SOCIO-ECONOMIC WELFARE ACTIVITIES**

Considering this case greenfield project. As per Memorandum No:F NO 22-65/2017-IA-III dated 01/05/2018 the applicable CER is 2% in greenfield of project cost. The proposed utilization of the budget of CSR activities. Further CSR activities will be identified as per public comments during public hearing.



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 8: Project Benefits**

**Table 8-1 CER COSTING AND ACTIVITIES**

	<b>Activity</b>	<b>Cost</b>
1.	Installation of Paver Blocks in Palayakottai Village	2,00,000
2.	Construction for Separate Toilet for Girls and Boys in Palayakottai High School	1,00,000
3.	Painting of Class Room and School Campus	1,00,000
4.	Drilling of Borewells along with installation of motor in Palayakottai Govt School	1,00,000
	<b>Total</b>	<b>5,00,000</b>

**8.5 SUMMARY**

The project activity and the management will support the local Panchayat and provide other forms of assistance for the development of public facilities in this region. The mine management will recruit semi-skilled & unskilled workers from the nearby villages. The overall effect will improve the buying power of employees and thus a higher standard of living. Transport, medical, educational, and other civic amenities will get a boost in future. This is envisaged as a major positive benefit. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

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

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

*Lessee Tvl. R.P.P. Blue Metals*

*Chapter 9: Environmental Cost Benefit Analysis*

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## **9. ENVIRONMENTAL COST BENEFIT ANALYSIS**

### **9.0 ENVIRONMENTAL COST BENEFIT ANALYSIS**

As per EIA Notification dated 14<sup>th</sup> September, 2006; as amended from time to time, this Chapter on 'Environmental Cost Benefit Analysis' is applicable only if it is recommended at the Scoping stage.

Post, mining activities, the area under mining will be utilized as water reservoir after discontinuation of the mining activity.

In post-mining, the left-out voids of opencast mines behave as huge groundwater reservoirs and contain groundwater runoff. Thus, development of water reservoir will help in maintaining and conserving the groundwater levels of the area.

## **10. ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

### **10.1 INTRODUCTION**

The environmental management plan consists of following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.
- Waste generation and pollution.
- Judicious use of the present environmental management plan addresses, the components of environment, which are likely to be affected by the different operations in expansion project.

Environmental Management Plan, which will be implemented in the proposed project, is detailed under the following heads:

- Air Quality Management
- Noise Management
- Water Management
- Solid Waste Management
- Land Reclamation
- Greenbelt Development & Plantation

### **10.2 AIR QUALITY MANAGEMENT**

To minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, an Environmental Management Plan (EMP) has been prepared. This will help in resolving all environmental and ecological issues due to mining in the area

The environmental management plan includes all preventive as well as mitigation measures to minimize impact on environment along-with reclamation and rehabilitation measures for mined out land.

The individual operations which will generate particulate matter are excavation, loading, unloading and transportation etc. The general air pollution in case of mining operation includes dust, smoke, Sulphur dioxide, Nitrogen dioxide etc. These can have adverse effects on the human health conditions, depending upon the concentration, particle size and duration of exposure with

the above pollutants. However, proper precautions will help in minimizing the adverse impact due to air pollution.

### **10.2.1 PREVENTION AND CONTROL OF AIR POLLUTION**

#### **A. Dust Pollution**

The main pollutant in air is Particulate Matter (PM10), which is generated due to various mining activities. However, to reduce the impact of dust pollution the following steps will be taken during various mining activities.

##### **a) During drilling and blasting operations**

- Use of dust aprons on drilling equipment and adopting wet drilling methods.
- Avoiding blasting during adverse weather conditions.
- Use of controlled blasting practice

Thus, pollution generated will be minimized due to drilling & blasting.

##### **b) During loading and transportation operation**

- The ripped and fragmented Rough stone and Gravel would be raised using Hydraulic Excavator & Front End Loader and will be loaded to the tippers.
- Regular sprinkling of water on haul and access roads.
- Periodic maintenance of haul roads
- All tippers would be covered by tarpaulin sheets at top and avoid spillage.
- Regular maintenance of all equipment to minimize particulate matter and gaseous emissions from diesel engines.

##### **c) Monitoring of air pollution**

Periodic ambient air quality monitoring will be carried out to assess the quality and for timely corrective actions.

#### **B. Prevention and Control of Gaseous Pollution**

In mining activities, the only source of gaseous emissions is from diesel engines, other vehicles and equipment's.

The emissions from diesel engines of the machinery could be visible as smoke or invisible gases such as Sulphur Dioxide, Oxides of Nitrogen and un-burnt Hydrocarbons due to incomplete combustion of fuel. The reasons may be quality of fuel, improper operation of the engine, etc.

Proper maintenance of machines improves combustion process and brings the reduction in pollution. The effect of these gases will be limited to the surrounding of the equipment in operation only and will not affect the nearby community.

### **10.3 NOISE & GROUND VIBRATION MANAGEMENT**

#### **10.3.1 NOISE ABATEMENT AND CONTROL**

- Small scale blasting will be carried out.
- Charge per delay will be kept optimum.
- Blasting will be conducted during lunch (noon) time when no employees are present in mine working area.
- Periodic maintenance of all mining machinery and transport vehicles
- Provision of effective silencers to all mine machinery
- Provision of ear plugs/ear muffs to workers exposed to high noise generating operations
- Development of thick plantation around mine lease boundary to act as a noise screen.
- Regular noise monitoring will be carried-out.

#### **10.3.2 VIBRATION ABATEMENT**

- Even though there is no habitation in the vicinity of the lease, the blasting pattern would be designed to keep the ground vibrations & noise to a minimum.
- The frequency of blasting too would be optimized by adopting multi-row blasting using delay detonators.
- Fly rock control would be given high priority and the blasting pattern, stemming column, charge per hole, etc., as discussed earlier, are likely to control fly rock. In addition, the detonating cord trunk line would be covered with drill chips and cutting to keep the air blast to a minimum.

### **10.4 WATER MANAGEMENT**

#### **10.4.1 SURFACE WATER MANAGEMENT**

The changed topography will alter the drainage within the mining lease area. However, there will not be any changes in the topography or drainage pattern outside the mining lease area. At the end of mining activities after reserves are exhausted, the area will be restored to an acceptable level of self-sustaining eco-system, which will comprise of will be developed in upper benches and safety zone and at the end of lease period mining pits will be converted into water reservoir with suitable slope and fenced boundaries

No surface water will be utilized for mining operation. Moreover, there would not be any discharge from mine into the surface water body as no process waste water generation in the mine and allied activities. Hence there would not be any impact on surface water. Only domestic effluent will be generated from the mine office and rest shelter. The domestic effluent is discharged in septic tank followed by soak pit. Besides, there will be no toxic element in the mined-out material, which may contaminate ground/ surface water.

#### **10.4.2 GROUND WATER MANAGEMENT**

The water in the area is 67m in summer season and 62m in rainy season which is observed from the nearby bore wells and data obtained from existing private boreholes. The lease area is fully covered by Massive Charnokite Formation. Hence the Ground water problem will not arise. Thus, the mining activities will not intersect ground water.

#### **10.4.3 WASTE WATER MANAGEMENT**

- Septic tanks and soak pits will be provided for the disposal of domestic waste water generated from mine office.
- Garland drains will be provided to prevent the entry of rainwater into the mining pit.
- Construction of settling tanks at points to arrest silt.
- Rainwater falling in the mining pit will be collected in lower benches & will be used for dust suppression & plantation.
- Regular monitoring of ground water quality will be carried out.

#### **10.4.4 WATER CONSERVATION MEASURES**

##### **Optimum Utilization of Water**

Initially, water will be sourced which will be met from mine pit water (when available) and by tankers from nearby bore wells. Water for drinking purposes will be supplied from nearby borewell.

##### **Water Recycling**

No waste water generation envisaged. Septic tanks and soak pits will be provided for the disposal of domestic waste water generated from mine office while rainwater falling during rainy season i.e. Monsoon in the mining pit will be collected in lower benches & will be used for dust suppression & plantation

##### **Rain Water Harvesting**

The mine management will Roof top harvesting structures in the public buildings in nearby villages with prior consent from local gram panchayats to collect rain water and charge to ground through available dug well/ tube well. Also, the reservoir developed in mined out pit will act as an additional source of water to the nearby villagers and will also help in recharging ground water table of the area. The cluster has potential to harvest rain water to the tune of about 2600 m<sup>3</sup>/annum in non-mining pits and will be utilized for dust suppression and plantation.

#### **10.5 SOLID WASTE MANAGEMENT**

No top soil or subgrade present within lease area. The Total excavated ROM is saleable; therefore, recovery is 100%.

### **10.6 LAND RECLAMATION**

Land reclamation will be carried out as per approved progressive mine closure plan. Mined out area will be developed as water body, which will act as rain water harvesting structure help in increasing water level in nearby area. Plantation will be carried out all along the safety zone and upper benches.

### **10.7 GREEN BELT DEVELOPMENT**

Green belt & plantation has been/shall be carried out in the lease area with a view to provide green belt and to give an aesthetic look, for eliminating fugitive emissions and controlling impact of noise etc. At the conceptual stage, Greenbelt /plantation will be developed on safety zone and upper benches of pit having area of 0.356 Ha respectively. The trees will be planted 1000 Nos of trees in 1<sup>st</sup> year.

### **10.8 CORPORATE SOCIAL RESPONSIBILITY**

The mine management will support the local Panchayat and provide other forms of assistance for the development of public facilities in this region. The mine management will recruit semi-skilled & unskilled workers from the nearby villages. The overall effect will improve the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Transport, medical, educational and other civic amenities will get a boost in future. This is envisaged as a major positive benefit.

### **10.9 INDUSTRIAL HYGIENE, OCCUPATIONAL HAZARDS AND SAFETY**

The working conditions in the mines are governed by the enactments of the Director General of Mines Safety (DGMS). As per the guidelines of the Mines Act, the management will take all necessary precautions. Normal sanitary facilities will be provided within the lease area. The management will carry out periodic health checkup of workers.

Occupational hazards involved in mines are related to dust pollution, noise pollution, and injuries from moving belt conveyors, equipment and fall from high places. DGMS has given necessary guidelines for safety against these occupational hazards. The management will strictly follow these guidelines. All necessary first aid and medical facilities will be provided to the workers. The mine will be well equipped with proper fire protection and firefighting equipment. All operators and mechanics will be trained to handle fire-fighting equipment's. Further all the necessary protective equipment's such as helmets, reflective jackets, safety goggles, earplugs, earmuffs, etc. will be provided to persons working in risky areas.

### **10.10 BUDGETARY ALLOCATION FOR ENVIRONMENTAL MANAGEMENT PROGRAMME**

The details of Environmental Management Programme for different environmental protection and control activities along with capital and annual recurring cost are given in **Table 10.1**

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 10: Environmental Management Plan (EMP)**

**Table 10-1 BUDGET FOR IMPLEMENTATION OF EMP**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
Air Quality	Haul Road Dust Suppression	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road length @ 350/ Meter	75,000	20,000
		Fixed Water Sprinkling Arrangements + twice a day water sprinkling by own water tankers	Water @ Rs 100/- per tanker	400,000	60,000
		Air Quality will be regularly monitored as per norms within ML area & Ambient Area	Yearly Compliance as per CPCB norms	0	76,000
	Mine Pit Operations	Muffle blasting – to control fly rocks during blasting	Blasting face will be covered with sand bags/steel mesh / old tyres/ used conveyor belts	0	5,000
		Wet drilling procedure/ latest eco friendly drill machine with separate dust extractor unit	drill machine with separate dust extractor unit @ Rs. 25,000/- per unit	50,000	5,000
	Truck Loading	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5,000



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**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 10: Environmental Management Plan (EMP)**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
		Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10,000
		Enforcing speed limits of 20 km/hr within ML area	Manual Monitoring through Security guard	0	5,000
		Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	5,000
	Transportation over roads	Regular sweeping and maintenance of roads for at least about 350 m from quarry entrance	Provision for 3 labours @ Rs.20,000/labour (Contractual)	0	60,000
		Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50,000	20,000
	Noise Management	Mine Operations Pit	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0
Oiling & greasing of Transport vehicles and HEMM at regular interval will be done			Provision made in Operating Cost	0	0

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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Attribute	Activity	Mitigation measure	Provision Implementation for	Capital Cost INR	Recurring Cost INR Per annum
		Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
		It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
		Plantation along periphery of lease area will act as attenuation.	Provision made in Operating Cost	0	0
Vibrations	Drilling & Blasting	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
		Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Installation of Warning System	25,000	2,000
		Provision for Portable blaster shed	Installation of Portable blasting shelter	50,000	2,000
		NONEL blasting to control ground vibration and fly rocks	Only procurement of explosives and blasting under supervision of competent person	0	500,000

**Chapter 10: Environmental Management Plan (EMP)**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
<b>Surface Water</b>	Water collected during Monsoon period	During monsoon period surface runoff around the quarry will follow the garland drains/storm water drains as per natural drain pattern. Eroded sediments, through a garland drain will be entrapped before being discharged to the natural drainage system. Otherwise the water from garland drains shall be collected in temporary pit reservoirs, after settling and this collected water shall be used for a plantation and dust suppression.	Provision for garland drain drains @ Rs. 300/Running Meter (Provision for Peripheral Length 898m) + Recurring for maintenance	269,400	20,000
<b>Solid Waste</b>	Mine Pit Operations	Any domestic waste generated due to human activity will be collected and handed over to solid waste handling agency.	Provision for domestic waste collection and disposal through authorized agency ( Capital Cost Member ship fee + Recurring for collection /disposal charges)	5,000	20,000
		Provision for dust bins etc.	Installation of dust bins	10,000	1,000

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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**Chapter 10: Environmental Management Plan (EMP)**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
<b>Toilets/ Sanitation</b>	Mine Pit Operations	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
<b>EC Condition</b>	Display Board	Size 6' X 5' with blue background and white letters as mentioned in MoM appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure	25,000	1,000
<b>Occupational Health and Safety</b>	Mine Pit Operations	Workers will be provided with Personal Protective Equipment's	Provision of 36 kits	0	88,200
		Health check up for workers will be provisioned	IME & PME Health check up	0	50,000
		First aid facility will be provided	Provision of 5 kits	0	20,000
		Mine will have safety precaution signages, boards.	Provision for signages and boards made	20,000	2,000
		Barbed Wire Fencing to quarry area will be provisioned.	Wire Fencing @ 300 per Meter for 898 m Provision of Capital in project cost	269,400	20,000

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**Lessee Tvl. R.P.P. Blue Metals**

**Chapter 10: Environmental Management Plan (EMP)**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
<b>Development of Green Belt</b>	Mine Pit Operations Transportation over roads	About 1000 trees along peripheral length within 7.5 m safety zone of quarry will be planted (Two Tier Plantation) and on transport road on both side.	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 200 per plant	200,000	30,000
<b>Mine Closure Activity</b>	Mine Pit Operations	Closure includes Greenbelt development, wire fencing, drains	Provision made in Closure Cost	633,000	0
<b>Traffic Management</b>	Mine Pit Operations Transportation over roads	No parking will be provided on the transport routes. Separate provision on the Southern part of ML will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags	75,000	10,000
<b>Monitoring System</b>	Mine pit, Operation & Vehicle movement	Installation of CCTV cameras in the mines and mine entrance	Camera 5 Nos, DVR, Monitor with internet facility	25,000	5,000
<b>Employment of Statutory / Competent Personnel</b>	Supervision of Quarrying activities	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 <sup>st</sup> Class / 2 <sup>nd</sup> Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and	0	780,000

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**Chapter 10: Environmental Management Plan (EMP)**

Attribute	Activity	Mitigation measure	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
			Mining Mate under regulation 116 of MMR,1961		
<b>EMP BUDGET</b>				2,181,800	1,822,200
1 <sup>st</sup>				4,004,000	
2 <sup>nd</sup>				1,913,310	
3 <sup>rd</sup>				2,008,976	
4 <sup>th</sup>				2,109,424	
5 <sup>th</sup>				2,214,895	
<b>Total EMP 1<sup>st</sup> to 5<sup>th</sup> year</b>				12,250,605	

Note: From Second year Only Recurring is considered with 5% cost inflation anticipated every year

**10.11 CONCLUSION**

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area would also be taken up as an effective pollution control technique, as well as to control the pollutants released due to mining.

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**Lessee Tvl. R.P.P. Blue Metals**

## **11. SUMMARY & CONCLUSION**

### **11.1 INTRODUCTION**

Rough Stone & Gravel is the major requirements for construction industry. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries of Kuttapalayam Rough Stone & Gravel Quarries Cluster Consisting of 1 Proposed and 1 Existing Quarry with total extent of Cluster of 7.34.5 Ha in Kuttapalayam Village, Kangayam Taluk, Tiruppur District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E), Dated 1st July 2016.

This EIA Report is prepared in compliance with ToR obtained vide –

- Letter No SEIAA-TN/F.No.8780/SEAC/ToR-1081/2021 dated 17.03.2022;

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

**“Draft EIA report prepared on the basis of ToR Issued & Standard ToR for carrying out Public Hearing for the Grant of Environmental Clearance from SEIAA, - Tamil Nadu”**

**Table 11-1 DETAILS OF PROJECT PROPONENT**

Name of the Project	Tvl. R.P.P. Blue Metals Rough stone and Gravel quarry
S.F. No.	46
Extent	4.97.0 ha
Land Type	Patta Land
Village Taluk and District	Kuttapalayam Village, Kangayam Taluk, Tiruppur District

**Table 11-2 QUARRY DETAILS WITHIN 500 M RADIUS**

S.No	Name of the lessee	S. F. Nos	Extent Area (Ha)	Period of lease
Existing				
1.	Tvl. R.P.P. Blue Metals	49	2.37.5	28.09.2018 to 27.09.2023
Proposed				
1.	Tvl. R.P.P. Blue Metals	46	4.97.0	-

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S.No	Name of the lessee	S. F. Nos	Extent Area (Ha)	Period of lease
<b>Total Extent</b>			<b>7.34.5</b>	

**Table 11-3 SALIENT FEATURES OF THE PROPOSAL**

S. No.	Particulars	Details	
1	Type of Project	Rough Stone and Gravel Quarry	
2	Quarry area applied	4.97.0 Ha	
3	Project Location	Survey Nos. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu.	
4	Quarry Location on WGS 1984 datum	<b>Latitude</b>	<b>Longitude</b>
		11°05'36.42"N to 11°05'45.94"N	77°41'22.94"E to 77°41'30.84"E
5	Topo sheet Number	58 E/12	
6	Geological Reserves	<b>Rough stone</b>	<b>Gravel</b>
		12,14,763 m <sup>3</sup>	74,047 m <sup>3</sup>
7	Mineable Reserves & Year-wise Production	<b>Rough stone</b>	<b>Gravel</b>
		3,94,606 m <sup>3</sup>	52,191 m <sup>3</sup>
8	Lease period	5 years	
9	Site elevation above Mean Sea Level	207m AMSL	
10	Land use at the proposed project site	Patta Land Land Cover: Barren Land which is not fit for vegetation/cultivation	
11	Site Topography	Sloping Towards Northeastern	
12	Ultimate depth of Mining	47m below ground level (2m Gravel + 45m Rough Stone) below ground level	
13	Existing Pit Dimension	108m (L) x 188m (W) x 27m (D)	
14	Ultimate Pit Dimension	197m (L) x 206m (W) x 47m (D) (BGL)	
15	Climatic Conditions	IMD Data, Tiruppur (1971-2000)	
		<ul style="list-style-type: none"> <li>• Avg. Ambient air temp – 46.6° C to 20.6° C</li> <li>• Annual rainfall - 793 mm</li> </ul>	



Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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16	Seismic zone	Seismically, this area is categorized under Zone-III as per IS-1893 (Part-1)-2002. Hence, seismically the site is High Damage Risk Zone. With MSK scale of VII.											
17	Nearest road	MDR 688 is present at a distance of 1.3 Km, South from Project Site											
18	Nearest State/National Highway	NH67 – Trichy – Coimbatore – 15.0km – S SH83A – Kangayam – Erode – 2.57 km-W											
19	Nearest Railway Station	Ingur Railway station at 18.24 Km, NW											
20	Nearest Air Port	Coimbatore Airport - 80.0km - W											
21	Nearest village/major town	Kangayam - 17.0km - SW											
22	Nearest Town, city, District Headquarters along with distance in kms.	Town: Kangayam - 17.0km - SW District: Tiruppur 38.24 Km, W Direction											
23	Ecologically sensitive zone	No wildlife sanctuary, national park or biosphere reserve within 10m radius of Quarry lease area.											
24	Reserved/Protected forests	Arachalur R.F. – 7.56 km, NW											
25	Historical/tourist places	None within 300m radius of Quarry lease area											
26	Nearest Hill	Arachalur Malai – 7.56 km, NW											
27	Nearest water bodies	<table border="1"> <thead> <tr> <th>Water bodies</th> <th>Distance (Km)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>Noyyal River</td> <td>0.01</td> <td>N</td> </tr> <tr> <td>Mettukattuvalasu Pond</td> <td>4</td> <td>SW</td> </tr> </tbody> </table>	Water bodies	Distance (Km)	Direction	Noyyal River	0.01	N	Mettukattuvalasu Pond	4	SW		
Water bodies	Distance (Km)	Direction											
Noyyal River	0.01	N											
Mettukattuvalasu Pond	4	SW											
28	Nearest Hospital	Government Hospital - Nathakadaiyur : 3.24 Km, SW Direction											
29	Details of other quarries for a radius of 500m around the quarry site	<p>There are following quarries located within the radius of 500m from the proposed project site.</p> <p>Details:</p> <p>Abandoned quarry – Nil</p> <p>Existing quarry – 1 No. (2.37.5 Ha)</p> <p>Proposed quarry – 1No (4.97.0Ha)</p> <p>The total extent of the Existing and proposed quarry within the radius of 500m is <b>7.34.5 Ha</b>. The project falls under the cluster situation.</p>											
30	Man power	Total Employees proposed for the quarry operation is <b>36 Nos.</b>											

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31	Water requirement & source	Total water requirement for 4.3 <b>KLD</b> from water vendors & nearby Bore well.
32	Overburden /Waste	The overburden in the form of Gravel formation
33	Cost of the project	<p><b>The Project Cost:</b></p> <p>Project cost = Rs. 76,55,000/-</p> <p>EMP cost = Rs. 1,22,50,605/-</p> <p>CER Cost = Rs. 5,00,000/-</p>

#### 11.1.1 STATUTORY DETAILS

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 16.12.2020.
- Precise Area Communication Letter was issued by the Deputy Director, Department of Geology and Mining Rc.No.1605/Mines/2020, Dated: 28.07.2021
- The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Geology and Mining, Tiruppur District, vide Rc.No.1605/Mines/2020, Dated: 03.08.2021
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide. online Proposal No. SEIAA/TN/MIN/67364/2021, Date:07.09.2021.
- Previously the applied area for quarrying lease as 1. Rc. No. 273/Mines/2013 Dated 21.09.2016 - Lease Period: 21.09.2016 to 20.09.2021 - 5 Years Operated by P.Selvasundaram over an extent of 4.97.0 Ha EC Obtained - Lr.No.SEIAA-TN/F.No.4385/1(a)/ EC.No.2884/2015 dated: 15.02.2016.

#### 11.1.2 PROJECT DESCRIPTION

The proposed projects are site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries. Method is mining is common for all the proposed quarries in the cluster. Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

**Table 11-4 SITE CONNECTIVITY TO THE PROJECT AREA**

Nearest Roadway	NH67 - Trichy - Coimbatore - 15.0km - S SH83A - Kangayam - Erode - 2.57 km-W
Nearest Village	Nathakadaiyur - 3.0km - SW

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Nearest Town	Kangayam - 17.0km - SW
Nearest Railway	Ingur Railway station at 18.24 Km, NW
Nearest Airport	Coimbatore Airport - 80.0km - W

**Table 11-5 LAND USE PATTERN OF THE LEASE APPLIED AREA**

S. No.	Description	Present area (Ha)	Area at the end of this quarrying period (Ha)
1.	Area under quarry	2.03.5	3.23.7
2.	Dump	0.64.1	Nil
3.	Infrastructure	Nil	0.01.0
4.	Roads	0.01.0	0.03.0
5.	Green Belt	Nil	0.35.6
6.	Unutilized Land	2.28.4	1.33.7
<b>Total</b>		<b>4.97.0</b>	<b>4.97.0</b>

**11.2 METHOD OF MINING**

Proposed Method of Mining is common for all the Proposed Projects – The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0 meter height bench with a bench width not less than the bench height. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

**Table 11-6 OPERATIONAL DETAILS OF LEASE APPLIED AREA**

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	Gravel (3 Years Plan period)
Geological Resources in m <sup>3</sup>	12,14,763 m <sup>3</sup>	74,047 m <sup>3</sup>
Mineable Reserves in m <sup>3</sup>	3,94,606 m <sup>3</sup>	52,191 m <sup>3</sup>
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m <sup>3</sup>	263	58
No of Lorry loads (6m <sup>3</sup> per load)	44	10
Total Depth of Mining	47m below ground level (2m Gravel + 45m Rough stone)	

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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**Table 11-7 YEAR-WISE PRODUCTION PLAN**

Year	Rough Stone (m <sup>3</sup> )	Gravel (m <sup>3</sup> )
I	79606	12636
II	78975	25800
III	72800	13755
IV	80950	-
V	82275	-
<b>TOTAL</b>	<b>3,94,606 m<sup>3</sup></b>	<b>52,191 m<sup>3</sup></b>

**Table 11-8 PROPOSED MACHINERY DEPLOYMENT**

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	8	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker Unit 4	3	300 HP	Diesel Drive
4	Tippers / Dumpers	6	20 Tonnes	Diesel Drive

**11.2.1 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN**

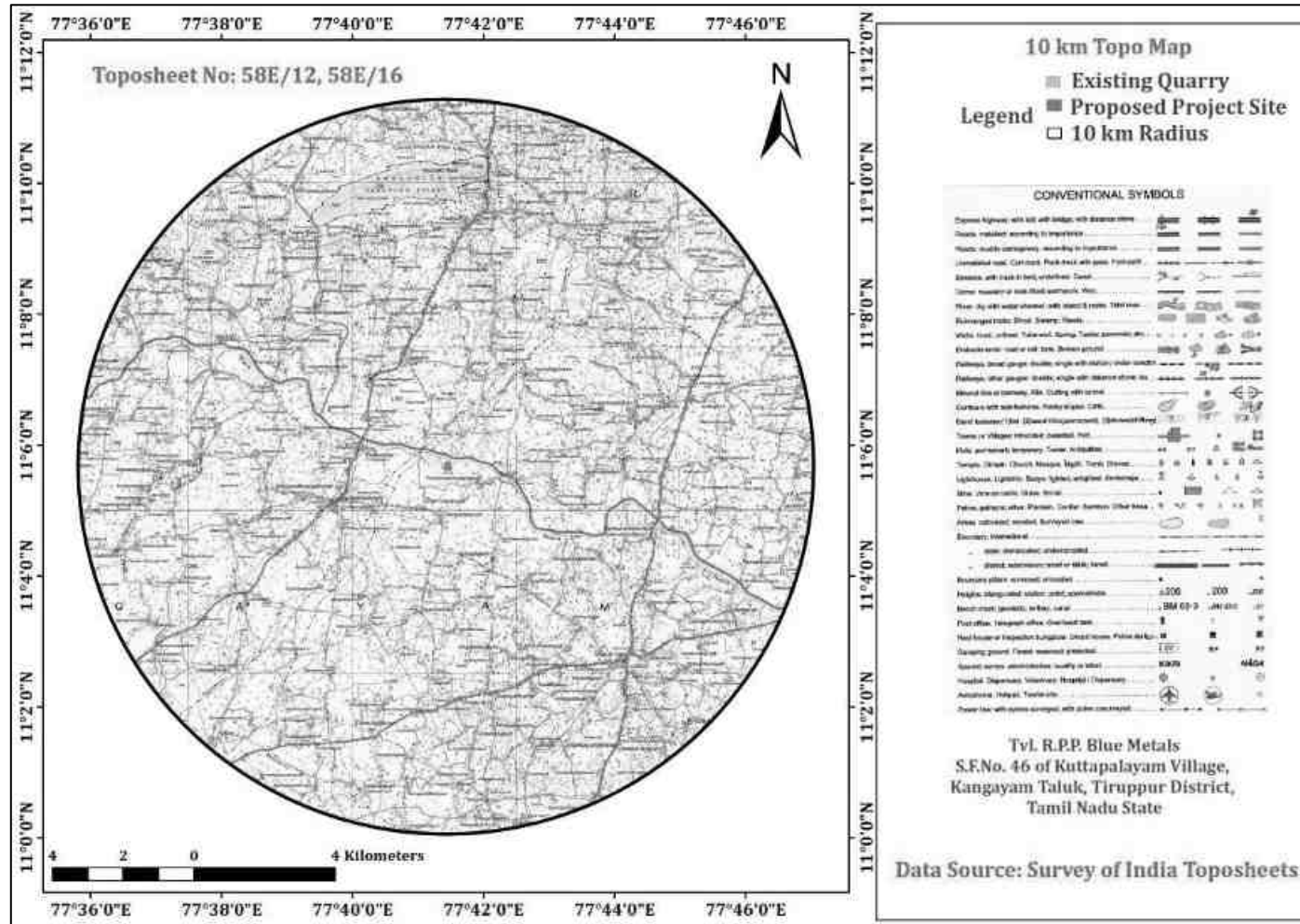
- At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem
- Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- The principle closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.



**FIGURE 11.1 GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA**

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.  
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**FIGURE 11.2 TOPOSHEET MAP COVERING 10 KM RADIUS**

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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**Table 11-9 ULTIMATE PIT DIMENSION**

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	197	206	47 m bgl

**11.3 DESCRIPTION OF THE ENVIRONMENT**

Field monitoring studies to evaluate the base line status of the project site were carried out during March to May 2022 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by Enviro Tech Services, Ghaziabad an NABL Certified & MoEF Notified Laboratory

**Table 11-10 ENVIRONMENT MONITORING ATTRIBUTES**

S. No.	Attributes	Parameters	Frequency
1	Ambient Air Quality	PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , & mineralogical composition of PM <sub>10</sub> , particularly for free silica	24 hourly samples, twice a week for three months at 8 locations.
2	Meteorology	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall	Continuous hourly recording (one season) at project site. Secondary data from the nearest IMD station.
3	Water quality	Physical and Chemical parameters.	Grab samples collected once during study period from 5 ground water and 2 surface water locations.
4	Soil Quality	Physical and Chemical parameters.	Grab samples collected once during study period from 6 locations.
5	Ecology	Existing terrestrial flora and fauna covering Core Zone (1.00.0 Ha) & Buffer Zone (10-Km radius). Existing aquatic ecological status in Buffer Zone (10-Km radius).	Through field studies once during study period. Secondary data also collected.
6	Noise levels	Noise levels in dB (A) Day and Night.	Hourly Noise levels in and around the project area for 24 hours at each location once during study period at 7 locations.
7	Land use	Current land use scenario	Once during study period based on recent satellite imagery and ground-truthing at site.
8	Geology	Geological details	Once during study period. Data collected from secondary sources
9	Hydrogeology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas, etc.	Based on primary and secondary sources, once during study period.

S. No.	Attributes	Parameters	Frequency
10	Socio-Economic aspects	Socio-economic aspects like demography, population dynamics, infrastructure resources, health status, economic resources, etc.	From primary and secondary sources (like census abstracts of census of India 2011) once during the study period.

### 11.3.1 LAND ENVIRONMENT

The cluster area of 7.34.5 Ha is part of 0.62 square km of mining land which contributes about 0.19% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

**Table 11-11 LAND USE FROM 10KM RADIUS**

S.No	Level I	Level -II	Area (Km <sup>2</sup> )	Percentage (%)
1	Built-up Land	Built-up Land	23.45	7.44
2	Forest	Reserve Forest	4.44	1.40
3	Agricultural Land	Coconut Plantation	55.9	17.74
		Crop Land	155.3	49.30
4	Waste Land	Scrub/Shrub	69.87	22.18
		Bare Land	4.61	1.46
5	Water Body	Water Body	0.78	0.24
6	Others	Mining Land	0.62	0.19
		<b>Total</b>	<b>314.97</b>	<b>100</b>

### 11.3.2 SOIL ENVIRONMENT

#### Physical Characteristics -

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 0.93 to 2.34 g/cc. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 29.89 to 47.79%.

#### Chemical Characteristics -

1. The nature of soil is slightly alkaline to strongly alkaline with pH range 7.25 to 8.52
2. The available Nitrogen content range between 123.6 to 175.61 mg/kg
3. The available Phosphorus content range between 40.94 to 59.13kg/ha
4. The available Potassium range between 140.2 to 260.7 mg/kg

### 11.3.3 WATER ENVIRONMENT

#### Surface Water



The pH of the water samples collected is 7.65 and 7.86 and is within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found is 764.4 and 1034.2 mg/l in all samples. The total hardness is 335.3 and 352.6 mg/l for all samples collected at 2 locations.

Iron is 0.26 and 0.35 mg/l, Nitrate is 0.86 and 1.05 mg/l, fluoride is 0.28 and 0.32 mg/l, chloride is 72.5 and 80.7 mg/l, Sulphate 88.1 and 110.5 mg/l, alkalinity 214.1 and 274.1 mg/l, calcium 128.3 and 140.2 mg/l and magnesium is 47.1 and 50.4 mg/l. The overall ground water quality was found to be good in most of the villages. The levels of heavy metals content were found to be within permissible limits.

### **Ground Water**

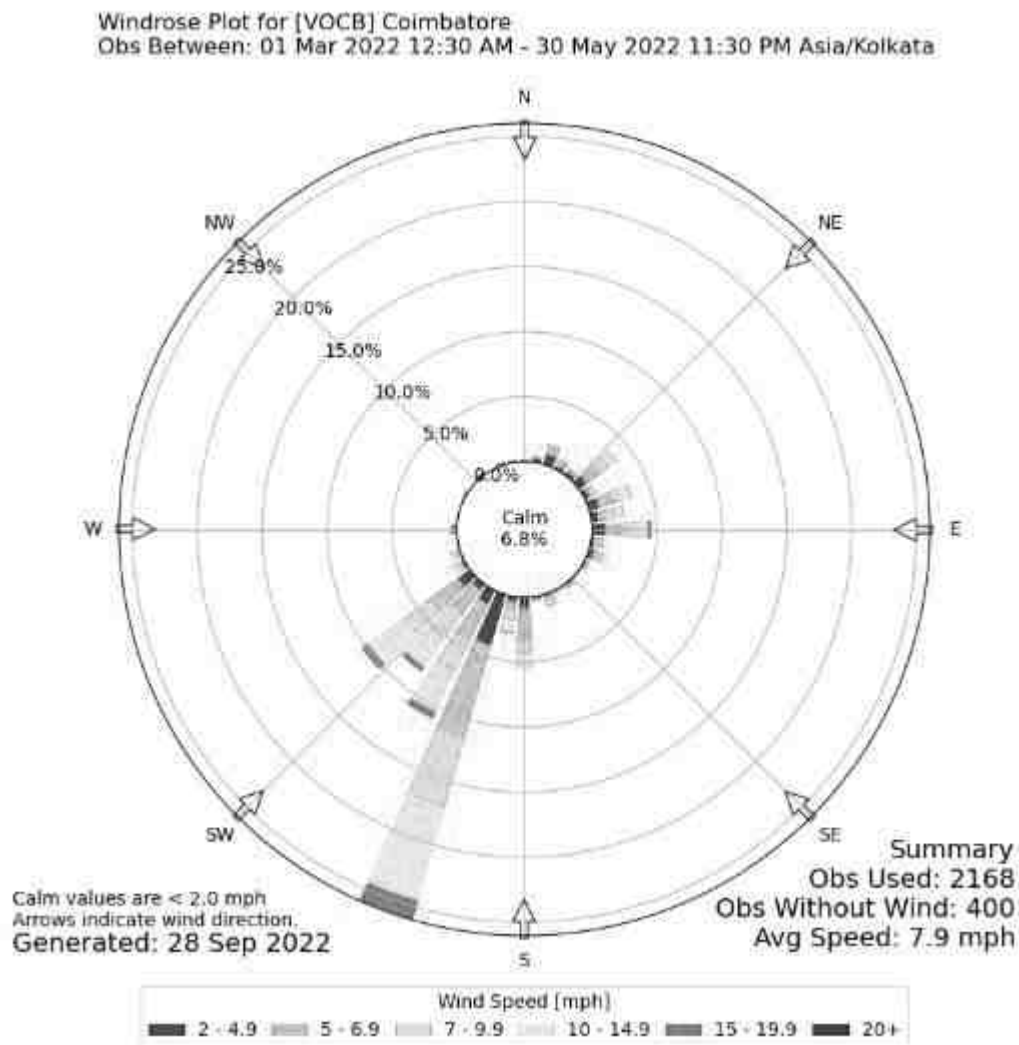
The physico-chemical characteristics of groundwater are presented in **Table 3.16** and are compared with the standards. The pH of the water samples collected ranged from 6.81 to 7.87 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found in the range of 321 to 418.8 mg/l in all samples. The total hardness varied between 121.2 to 272.5 mg/l for all samples collected at 7 locations.

In all samples, iron content is 0 to 0.3 mg/l, Nitrate is between 1.95 to 3.05 mg/l, fluoride varied between 0 to 0.1 mg/l, chloride varies from 41.3 to 72.6 mg/l, Sulphate varies from 29.1 to 38.1 mg/l, alkalinity varies from 137.7 to 170.3 mg/l, calcium varies from 36.5 to 54.1 mg/l and magnesium varies from 19.6 to 30.4 mg/l. The overall ground water quality was found to be good in most of the villages. The levels of heavy metals content were found to be within permissible limits.

### **11.3.4 AIR ENVIRONMENT**

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

The results of ambient air quality monitoring for the period (March to May 2022) are presented in the report. Data has been compiled for three months. As per monitoring data, PM<sub>10</sub> ranges from 57.54 to 70.35 µg/m<sup>3</sup>, PM<sub>2.5</sub> data ranges from 31.57 to 41.41 µg/m<sup>3</sup>, SO<sub>2</sub> ranges from 8.12 to 13.72 µg/m<sup>3</sup> and NO<sub>2</sub> data ranges from 24.8 to 31.82 µg/m<sup>3</sup>. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB



**FIGURE 11.3 WIND ROSE DIAGRAM**

### 11.3.5 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 40.1 to 55.3 dB (A) Leq and during night time were from 34.1 to 52.1 dB (A) Leq.

### 11.3.6 ECOLOGICAL ENVIRONMENT

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

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

### **11.3.7 SOCIO ECONOMIC ENVIRONMENT**

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project. The socio economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day to day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed projects will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

### **11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES – IN COMMON FOR ALL PROPOSED QUARRIES**

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

#### **11.4.1 LAND ENVIRONMENT:**

##### **ANTICIPATED IMPACT**

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

##### **MITIGATION MEASURES**

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area

- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

#### **11.4.2 WATER ENVIRONMENT**

##### **ANTICIPATED IMPACT**

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

##### **MITIGATION MEASURES**

- Garland drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.

- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic analysis of quarry pit water and ground water quality in nearby villages.
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring and analysing the quality of water in open well, bore wells and surface water

### **11.4.3 AIR ENVIRONMENT**

#### **ANTICIPATED IMPACT**

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

#### **MITIGATION MEASURES**

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

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

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

- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

#### **Blasting -**

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

#### **Haul Road & Transportation -**

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

#### **Green Belt -**

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

#### **Occupational Health -**

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

#### **11.4.4 NOISE ENVIRONMENT**

##### **ANTICIPATED IMPACT**

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

##### **MITIGATION MEASURES**

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

#### **11.4.5 BIOLOGICAL ENVIRONMENT**

##### **ANTICIPATED IMPACT**

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

##### **MITIGATION MEASURES**

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

#### **Table 11-12 GREENBELT DEVELOPMENT PLAN**

Year	No. of tress proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	1000	80%	3560	Neem, Pongamia Pinnata, Casuarina, etc.,	800

#### **11.4.6 SOCIO ECONOMIC ENVIRONMENT**

##### **ANTICIPATED IMPACT**

- Employment generation due to the project will provide direct employment for about 36 persons.

##### **MITIGATION MEASURES**

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

#### **11.5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**

- The site has been selected based on geological investigation and exploration as below:
- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.
- The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

#### **11.6 ENVIRONMENT MONITORING PROGRAM**

Usually an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to consider the changes in the Environment.

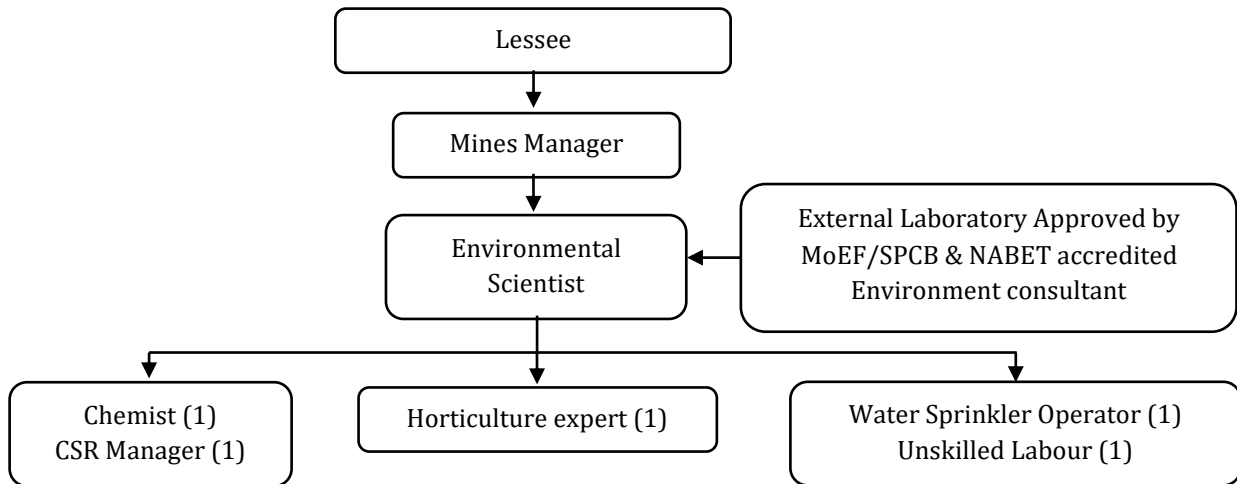
The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;



- To establish a data base for future impact assessment studies.

**11.6.1 ENVIRONMENTAL MONITORING CELL**



**TABLE 11-13 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE IN COMMON**

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly - 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

## **11.7 ADDITIONAL STUDIES**

### **11.7.1 RISK ASSESSMENT**

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

### **11.7.2 DISASTER MANAGEMENT PLAN**

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

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

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

Draft EIA/EMP for Kuttapalayam Rough Stone and Gravel Quarry Cluster over an area of 7.34.5 Ha of with new proposed area is of 4.97.0 Ha of Patta land in S.F.No. 46 of Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

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**11.7.3 CUMULATIVE IMPACT STUDY**

Cluster Details:

Code	Name of the lessee	S. F. Nos	Extent Area (Ha)	Period of lease
Existing				
E1	Tvl. R.P.P. Blue Metals	49	2.37.5	28.09.2018 to 27.09.2023
Proposed				
P1	Tvl. R.P.P. Blue Metals	46	4.97.0	-
<b>Total Extent</b>			<b>7.34.5</b>	

All existing and proposed projected area located in Kuttapalayam Rough Stone and Gravel Quarry Cluster located at Kuttapalayam Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State.

**Table 11-14 SALIENT FEATURES OF PROPOSED AND EXISTING MINES IN CLUSTER**

<b>PROPOSAL "P1"</b>		
Name of the Mine	Tvl. R.P.P. Blue Metals	
Survey Nos	46	
Land Type	Non-Forest Land / Patta Land	
Extent	4.97.0 Ha	
Mining Plan Period / Lease Period	5Years	
Ultimate Pit Dimension	197m (L) x 206m (W) x 47m (D) (BGL)	
Existing Pit Dimension	108m (L) x 188m (W) x 27m (D)	
Latitude between	11°05'36.42"N to 11°05'45.94"N	
Longitude between	77°41'22.94"E to 77°41'30.84"E	
Highest Elevation	207m AMSL	
Machinery Proposed	Jack Hammer (1.2m to 2.0m)	8
	Compressor (400 psi)	2
	Excavator bucket & Rock breaker attached	3
	Tippers (20 tonnes Capacity)	6
Proposed Blasting Method	Controlled Blasting Method	
Manpower Proposed	36 Nos	
Total Project Cost	Rs. 76,55,000/-	
<b>EXISTING "E1"</b>		
Name of the Mine	Tvl. R.P.P. Blue Metals	
Survey Nos	49	
Land Type	Non Forest Patta land	
Extent	2.37.5 Ha	
Mining Plan/Lease Period	28.09.2018 to 27.09.2023	

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Latitude between	11°05'37.27"N to 11°05'46.61"N	
Longitude between	77°41'20.14"E to 77°41'25.29"E	
Machinery Proposed	Jack Hammer (1.2m to 2.0m)	5
	Compressor (400 psi)	1
	Excavator bucket & Rock breaker attached	1
	Tippers (20 tonnes Capacity)	2
Ultimate Pit Dimension	205m(L) * 74m(W)*47m(D)	
Proposed Blasting Method	Controlled Blasting Method	
Manpower Proposed	23 Nos	
Total Project Cost	Rs. 70,68,312/-	

The Cumulative Impact is anticipated due to drilling & blasting and excavation and transportation activities from proposed mines within the 500-meter radius from the proposed mines and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. The current monitoring was done as existing quarry are working which gives the ambient or present condition of air quality as well as noise.

**Table 11-15 PREDICTED AIR INCREMENTAL VALUE**

S.No.	Locations	PM <sub>10</sub> (µg/m <sup>3</sup> )			PM <sub>2.5</sub> (µg/m <sup>3</sup> )			SO <sub>2</sub> (µg/m <sup>3</sup> )			NO <sub>2</sub> (µg/m <sup>3</sup> )		
		Inc	Max	Total	Inc	Max	Total	Inc	Max	Total	Inc	Max	Total
1	AAQ-1	2.5	70.35	72.85	1.6	41.41	43.01	1	13.72	14.72	1.2	31.82	33.02
2	AAQ-2	1.2	67.86	69.06	1	38.18	39.18	0.4	17.78	18.18	0.5	33.15	33.65
3	AAQ-3	1	65.26	66.26	0.7	35.8	36.5	0.5	15.29	15.79	0.6	33.63	34.23
4	AAQ-4	0.7	64.69	65.39	0.4	35.46	35.86	0.3	15.52	15.82	0.5	36.42	36.92
5	AAQ-5	2.7	67.52	70.22	1.4	39.31	40.71	1.1	16.65	17.75	1.3	35.09	36.39
6	AAQ-6	1.2	68.99	70.19	1	39.2	40.2	0.6	16.42	17.02	0.5	34.72	35.22
7	AAQ-7	3.2	68.88	72.08	2.3	39.2	41.5	1.2	13.14	14.34	1.4	33.39	34.79
8	AAQ-8	1	72.92	73.92	0.8	41.52	42.32	0.5	13.96	14.46	0.6	35.37	35.97
<b>NAAQS (µg/m<sup>3</sup>)</b>		100			60			80			80		

Existing Mines are part of Baseline Study.

**Table 11-16 MAXIMUM GROUND LEVEL CONCENTRATION**

S.No.	Pollutants	Max. GLC observed, (µg/m <sup>3</sup> )	Distance and Direction
1	PM <sub>10</sub>	12.5	1000, NE
2	PM <sub>2.5</sub>	7.1	1000, NE
3	SO <sub>2</sub>	5.3	1000, NE
4	NO <sub>2</sub>	6.3	1000, NE

**Table 11-17 PREDICTED NOISE INCREMENTAL VALUE**

Equipment with Highest Noise Level	Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Drilling 90 dB(A)	N2 Nathaka-daaiyur Village, 2.89 Km	48.6	15.9	48.6	55
Shovel 85 dB(A)		48.6	10.9	48.6	
Tipper 75 dB(A)		48.6	0.9	48.6	
Compressor 85 dB(A)		48.6	10.9	48.6	
Excavator 102 dB(A)		48.6	27.9	48.6	

**Table 11-18 ANTICIPATED GROUND VIBRATIONS FROM CLUSTER**

Distance from blasting site (D) (m)	Quantity of Explosive/Blast (Q) (Kg)		PPV (mm/s)	
	P1	E1	P1	E1
50	114	101	59.3	56.3
100	114	101	24.7	22.4
200	114	101	10.3	10.7
300	114	101	6.1	5.8
400	114	101	4.3	4.1
500	114	101	3.2	2.9
600	114	101	2.6	2.3
700	114	101	2.1	2.0
800	114	101	1.8	1.6
900	114	101	1.5	1.3
1000	114	101	1.3	0.9

**Table 11-19 SOCIO ECONOMIC BENEFITS**

Code	Project Cost	CER
P1	Rs. 76,55,000/-	Rs.5,00,000/-
E1	Rs. 70,68,312/-	Rs.1,41,366/-

**Table 11-20 REQUIREMENT OF MANPOWER**

Code	No of employees
P1	36
E1	23
Total	59

**Table 11-21 GREENBELT DEVELOPMENT BENEFITS**

Code	No. of tress proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
P1	1000	80%	3560	Neem, Pongamia Pinnata, etc.,	800
E1	450	80%	2500	Neem, Pongamia Pinnata, etc.,	360
Total	<b>1450</b>		<b>6060</b>		<b>1160</b>

### 11.8 PROJECT BENEFITS

The Proposed Projects for Quarrying Rough Stone at Kuttapalayam Village aims to produce cumulatively 394606 m<sup>3</sup> Rough Stone, 52191 m<sup>3</sup> of Gravel over a period of 5 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

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

**Table 11-22 CER COSTING AND ACTIVITIES**

	Activity	Cost
1.	Installation of Paver Blocks in Palayakottai Village	2,00,000
2.	Construction for Separate Toilet for Girls and Boys In Palayakottai High School	1,00,000
3.	Painting of Class Room and School Campus	1,00,000
4.	Drilling of Borewells along with installation of motor in Palayakottai Govt School	1,00,000
	<b>Total</b>	<b>5,00,000</b>

### 11.9 ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.

- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

**Table 11-23 EMP Cost**

<b>Year</b>	<b>Cost in Rs.</b>
1 <sup>st</sup>	4,004,000
2 <sup>nd</sup>	1,913,310
3 <sup>rd</sup>	2,008,976
4 <sup>th</sup>	2,109,424
5 <sup>th</sup>	2,214,895
<b>Total EMP 1<sup>st</sup> to 5<sup>th</sup> year</b>	<b>12,250,605</b>

Note: From Second year Only Recurring is considered with 5% cost inflation anticipated every year

### **11.10 CONCLUSION**

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.

## **12. DISCLOSURE OF CONSULTANTS**

### **12.1 DISCLOSURE OF CONSULTANT**

**M/s Enviro Resources** is a NABET Accredited EIA consultant as per NABET Certificate: NABET/EIA/1922/SA0133. The registered office of Enviro Resources is at E-604, Crystal Plaza, New Link Road, Andheri (W), Mumbai 400 053, Maharashtra.

NABET Certificate is provided in **Figure 12.1**.

**M/s Enviro Resources** is engaged in providing following environmental consultancy services to their valuable clients:

- 1** Obtaining **Environmental Clearance** from Department of Environment of State Govt. and MoEF & CC, GOI
- 2** Environmental Impact Assessment (**EIA**) studies and Environmental Management Plan (**EMP**)
- 3** Environmental Due Diligence Services
- 4** Consent to Establish, Operate, Renewal & its amendments from State Pollution Control Board
- 5** **CRZ Clearance** from Central & State CZMA (Coastal Zone Management Authority)
- 6** **Forest Clearance** from MoEF & CC, GOI
- 7** Environmental **Compliance Report** preparation for Environmental Clearances, Consent to Establish and Consent to Operate
- 8** Designing and Commissioning of **ETP, STP, WTP** & Zero Liquid Discharge (**ZLD**) Plant
- 9** Preparation of Quantitative Risk Analysis (**QRA**), **HAZOP, HAZID**, Disaster Management Plan (**DMP**) Reports.
- 10** Preparation of On-site & Off-site Emergency Preparedness Plan
- 11** Reply for legal directions & Revocation of closure.



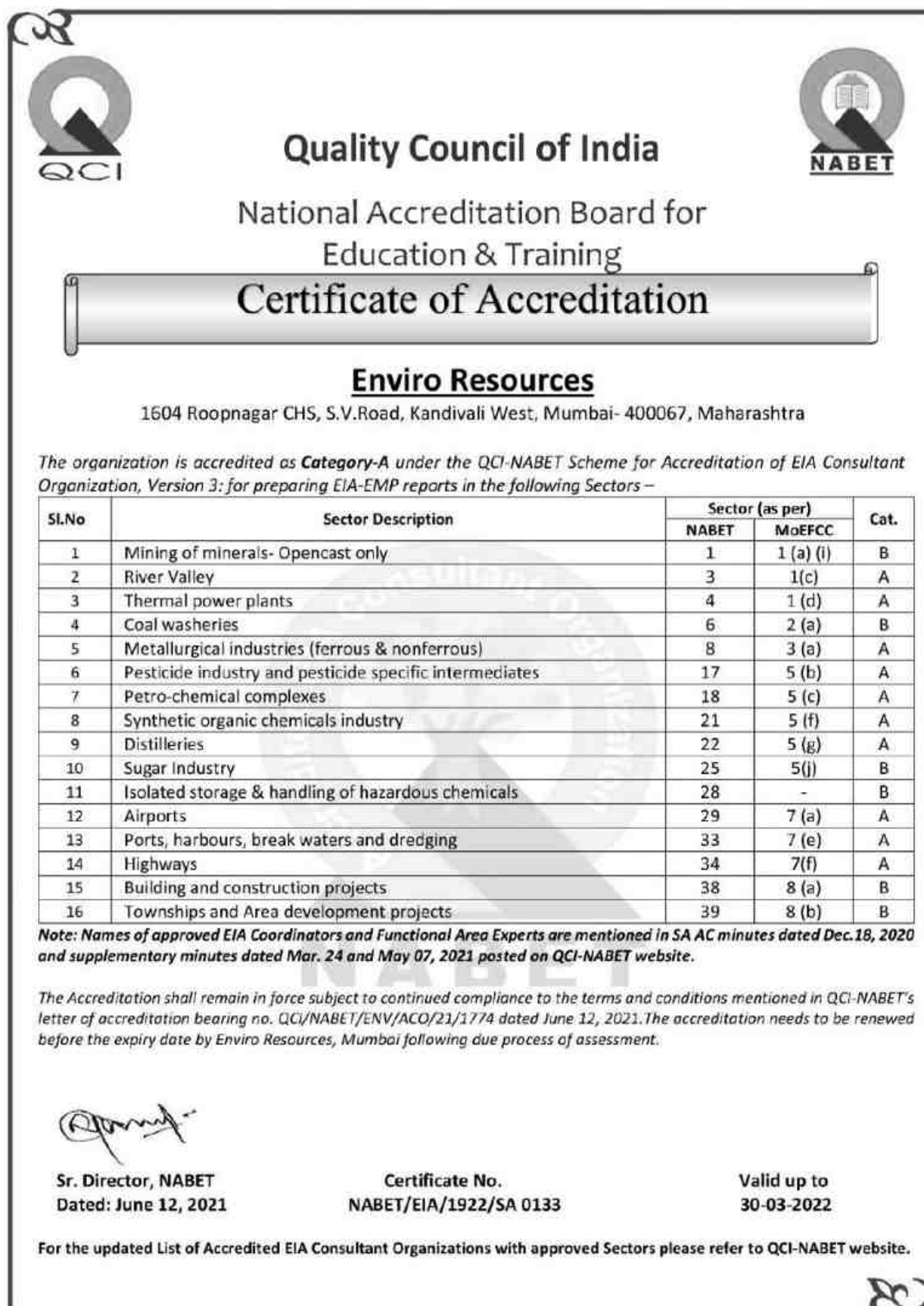


FIGURE 12.1 NABET CERTIFICATE



**National Accreditation Board  
for Education and Training**

(Member - International Accreditation Forum & Pacific Accreditation Cooperation)



QC/NABET/ENV/ACO/22/2533

Sept 27, 2022

To

Enviro Resources  
1604 Roopnagar CHS, S.V.Road, Kandivali West,  
Mumbai -400067, Maharashtra

Sub.: Extension of Validity of Accreditation till Dec 28, 2022 – regarding  
Ref.: Certificate no. NABET/EIA/1922/SA0133

Dear Sir/Madam

This has reference to the accreditation of your organization under the QC-NABET EIA Scheme, the validity of **Enviro Resources** is hereby extended till Dec 28, 2022, or completion of the assessment process, whichever is earlier.

The above extension is subject to the submitted documents/required information with respect to your application and timely submission and closure of NC/Obs during the process of assessment.

You are requested not to use this letter after the expiry of the above-stated date.

With best regards,

(A.K. Jha)  
Sr. Director, NABET

**FIGURE 12.2 NABET EXTENSION LETTER**