

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

&

ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

Schedule Sl. No. 1 (a) (i): Mining Project

“B1” CATEGORY – -MINOR MINERAL – GOVERNMENT LAND –
EXISTING QUARRY

M/s. TANCEM STONEWARE PIPE FACTORY FIRECLAY QUARRY

Cluster Extent – 6.59.0 Ha

Project Proponent

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai,
Nandanam, Chennai,
Tamil Nadu – 600 035.

Mining period – 5 Years

PROJECT LOCATION	PROPOSED PRODUCTION
S.F.Nos. 133/1A,134/2,134/3 etc., Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State. Extent: 6.59.0Ha	ROM = 2,16,091 Ts Fire Clay Recovery @100% = 2,16,091 Ts Proposed Depth =5.5m BGL (1.5m Topsoil + 4m Fire clay)
ToR obtained vide File No: 12749 ToR Identification No: TO25B0108TN5192834N Dated: 24.11.2025	
Environmental Consultant GEO EXPLORATION AND MINING SOLUTIONS Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Cat ‘A’, sector 31 & 38 Cat ‘B’ Certificate No : NABET/EIA/25-28/RA 0424 Valid Till: 06.08.2028 Phone: 0427-2431989, Email: ifthiahmed@gmail.com, geothangam@gmail.com Web: www.gemssalem.com	Laboratory ENVIRONMENTAL LAB CHENNAI METTEX LAB PRIVATE LIMITED (Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD) Jothi Complex, 83, M.K.N Road, Guindy, Chennai – 600 032
Baseline Monitoring Period OCTOBER TO DECEMBER 2025 JANUARY 2026	

UNDERTAKING

I, T.Ravichandran (Unit Head)– M/s.TANCEM Stoneware Pipe Factory given undertaking that this EIA & EMP report prepared for our Fire clay Quarry situated in S.F. Nos: 133/1A, 134/2, 134/3, 134/4, 134/5,134/6,134/7, 134/8,134/9,134/12,135/3, 135/5,135/6, 135/7,135/8,135/9,135/10,135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State.based on the ToR issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide File No: 12749 ToR Identification No: TO25B0108TN5192834N Dated: 24.11.2025

I hereby assured that the Data's submitted and information given by me is true and correct to the best of my knowledge.

Signature of the Project Proponent

T.Ravichandran – Unit Head



M/s.TANCEM Stoneware Pipe Factory

Place: Cuddalore

Dated:

DECLARATION

I, Dr. M. Ifthikhar Ahmed – EIA Co Ordinator declare that this EIA & EMP report for the Fireclay Quarry situated in S.F. Nos: 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared by Geo Exploration and Mining Solutions, Salem, Tamil Nadu.

The Data's provided in the EIA report are true and correct to the best of my knowledge.

Signature of the EIA Co-ordinator



Dr. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place: Salem

Dated:

TABLE OF CONTENTS

CHAPTER – 1: INTRODUCTION.....	13
1.0 PREAMBLE.....	13
1.1 PURPOSE OF THE REPORT	14
1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT.....	1
1.3 BRIEF DESCRIPTION OF THE PROJECT.....	1
1.4 ENVIRONMENTAL CLEARANCE.....	7
1.5 TERMS OF REFERENCE (ToR)	8
1.6 POST ENVIRONMENT CLEARANCE MONITORING	27
1.7 GENERIC STRUCTURE OF EIA DOCUMENT.....	27
1.8 SCOPE OF THE STUDY.....	28
CHAPTER – 2: PROJECT DESCRIPTION	30
2.0 GENERAL	30
2.1 DESCRIPTION OF THE PROJECT	30
2.2 LOCATION OF THE PROJECT	30
2.3 GEOLOGY.....	41
2.4 QUALITY OF RESERVE	46
2.5 RESERVE ESTIMATION AND PRODUCTION	46
2.6 METHOD OF MINING	51
2.7 PROJECT REQUIREMENT	53
2.8 PROJECT IMPLEMENTATION SCHEDULE.....	55
CHAPTER – 3: DESCRIPTION OF ENVIRONMENT.....	56
3.0 GENERAL	56
3.1 LAND ENVIRONMENT.....	58
3.2 WATER ENVIRONMENT.....	67
3.3 Hydrology and Hydrogeological Studies.....	74
3.4 AIR ENVIRONMENT	82
3.5 NOISE ENVIRONMENT.....	94
3.6 BIOLOGICAL ENVIRONMENT	2
3.7 SOCIO ECONOMIC ENVIRONMENT.....	22
3.8 SUMMARY OF THE BASELINE STATUS:.....	36

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND	37
MITIGATION MEASURES.....	37
4.0 INTRODUCTION: -	37
4.1 LAND ENVIRONMENT.....	37
4.2 WATER ENVIRONMENT.....	38
4.3 AIR ENVIRONMENT	39
4.4 AERMOD Dispersion Model and Framework of Computation –.....	40
4.5 NOISE ENVIRONMENT.....	46
4.6 BIOLOGICAL ENVIRONMENT	47
4.7 SOCIO ECONOMIC ENVIRONMENT.....	51
4.8 OCCUPATIONAL HEALTH RISKS	51
CHAPTER – 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)	53
5.0 INTRODUCTION:	53
5.1 ANALYSIS OF ALTERNATIVE TECHNOLOGY.....	53
CHAPTER – 6: ENVIRONMENTAL MONITORING PROGRAMME	54
6.0 INTRODUCTION	54
6.1 MEASUREMENT & METHODOLOGIES	54
6.2 MONITORING SCHEDULE AND FREQUENCY.....	54
6.3 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES	55
6.4 ENVIRONMENTAL MONITORING CELL	55
6.5 ENVIRONMENTAL POLICY OF THE PROPONENT.....	57
6.6 BUDGETARY PROVISION FOR ENVIRONMENTAL MONITORING	58
7. ADDITIONAL STUDIES	59
7.0 GENERAL	59
7.1 PUBLIC CONSULTATION:	59
7.2 RISK ASSESSMENT	59
7.2 DISASTER MANAGEMENT PLAN	62
7.3 RECLAMATION AND REHABILITATION	65
7.4 OPEN PIT SLOPE STABILITY ANALYSIS.....	66
7.5 CUMULATIVE IMPACT STUDY.....	66
7.6 WILDLIFE CONSERVATION AND MANAGEMENT PLAN	69
CHAPTER – 8: PROJECT BENEFITS	72
8.0 INTRODUCTION	72

8.1	PROJECT BENEFITS	72
8.2	BENEFITS TO LOCAL AND REGIONAL ECONOMY.....	73
8.3	EMPLOYMENT POTENTIAL	73
8.4	TANGIBLE SOCIAL BENEFITS	73
CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS.....		75
CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN		76
10.0	GENERAL	76
10.1	AIR POLLUTION MANAGEMENT AND CONTROL	76
10.2	NOISE AND VIBRATION MITIGATION:	77
10.3	WATER MANAGEMENT & POLLUTION CONTROL	77
10.4	LAND RECLAMATION AND WASTE MANAGEMENT	78
10.5	BIOLOGICAL ENVIRONMENT	78
10.5	OCCUPATIONAL HEALTH & SAFETY:.....	79
CHAPTER – 11: SUMMARY AND CONCLUSIONS		85
11.0	GENERAL	85
11.1	SCOPE OF THE PROJECT.....	85
11.2	PROJECT DESCRIPTION	85
11.3	DESCRIPTION OF THE ENVIRONMENT.....	87
11.4	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.....	88
11.5	ANALYSIS OF ALTERNATIVES	92
11.6	ENVIRONMENTAL MONITORING PROGRAMME	93
11.7	PROJECT BENEFITS.....	94
11.8	CONCLUSION	95
11.9	EMP BUDGET:.....	95
12.0 DISCLOSURE OF CONSULTANTS		96

LIST OF TABLES

Table 1.1: Salient features of the project site.....	1
Table 1.2: Resources and Reserves.....	3
Table 1.3: Compliance of ToR Conditions.....	8
Table 1.4: Structure of the EIA report	27
Table 1.5: Environment attributes.....	28
Table 2.1: Salient Features around the project area.....	30
Table 2.2: Boundary Co-Ordinates	31
Table 2.3: Land use pattern (core zone).....	40
Table 2.4: External infrastructures.....	40
Table 2.5: Mining details	41
Table 2.6: Resources and Reserves.....	46
Table 2.7: Year wise Production details	47
Table 2.8: Year Wise Proposal for top Soil	50
Table 2.9: Lists of Machineries Proposed.....	51
Table 2.10: Man power requirement.....	51
TABLE.2.11: TRAFFIC SURVEY LOCATIONS	52
TABLE 2.12: EXISTING TRAFFIC VOLUME.....	52
TABLE 2.13: FIRECLAY HOURLY TRANSPORTATION REQUIREMENT	52
TABLE 2.14: SUMMARY OF TRAFFIC VOLUME	53
Table 2.15: Water Requirements	54
Table 2.16 Project cost.....	54
Table 2.17 Expected time schedule for the project.....	55
Table 3.1: Environmental monitoring attributes and frequency of monitoring.....	57

Table 3.2: LAND USE / LAND COVER TABLE 10 Km RADIUS	58
TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE.....	62
TABLE 3.5: SOIL SAMPLING LOCATIONS.....	62
TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION.....	63
TABLE 3.8: WATER SAMPLING LOCATIONS	68
TABLE 3.9: GROUND WATER SAMPLING RESULTS	70
TABLE 3.10: SURFACE WATER SAMPLING RESULTS.....	73
TABLE 3.11: POST MONSOON WATER LEVEL OF OPEN WELLS 1 KM RADIUS	75
TABLE 3.12: POST MONSOON WATER LEVEL OF BOREWELLS 1 KM RADIUS	75
TABLE 3.13: RAINFALL DATA.....	83
TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE	83
TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS	86
TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS	86
TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS.....	87
TABLE 3.18: SUMMARY OF AAQ – 1 to AAQ – 7	89
TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DATA.....	90
TABLE 3.20: DETAILS OF SURFACE NOISE MONITORING LOCATIONS.....	94
TABLE 3.21: AMBIENT NOISE QUALITY RESULT.....	1
TABLE 3.22: PANIKANKUPPAM VILLAGE POPULATION FACTS	23
TABLE 3.23: PANIKANKUPPAM VILLAGE CENSUS DATA	24
TABLE 3.24: PANIKANKUPPAM WORKING POPULATION	24
TABLE 3.25: POPULATION DATA OF STUDY AREA	25
TABLE 3.25: Communication & Transport Facilities in the Study Area	31
TABLE 3.25: Water & Drainage Facilities in the Study Area	32

TABLE 3.25: Other Facilities in the study Area	33
TABLE 3.25: Educational Facilities in the study Area	34
TABLE 3.25: Medical Facilities in the Study Area.....	35
Table 4.1: Water Requirements	38
Table 4.3: Predominant Source of Air Pollution	40
TABLE 4.2: ESTIMATED EMISSION RATE FOR PM ₁₀	42
TABLE 4.3: ESTIMATED EMISSION RATE FOR SO ₂	42
TABLE 4.4: ESTIMATED EMISSION RATE FOR NO _x	42
TABLE 4.5: INCREMENTAL & RESULTANT GLC OF PM ₁₀	44
TABLE 4.6: INCREMENTAL & RESULTANT GLC OF PM _{2.5}	45
TABLE 4.7: INCREMENTAL & RESULTANT GLC OF SO ₂	45
TABLE 4.8: INCREMENTAL & RESULTANT GLC OF NO _x	45
TABLE 4.10: PREDICTED NOISE INCREMENTAL VALUES	47
Table 6.3: Environment Monitoring Budget.....	58
Table 7.1: Risk Management Team - Proposed.....	62
Table 7.2: Duties and Responsibilities of Risk Management Team	62
Table 7.3: List of quarries within 500m Radius	66
Since P2 and P3 quarries have applied for lease and only the precise area letter was communicated, they will be included for calculating the total extent of the cluster but not considered for cumulative impact assessment.....	67
Table 7.4: Salient features of proposal “P1”	67
Table 10.1: Air pollution management and control	76
Table 10.2: Noise and Vibration Mitigation	77
Table 10.3: Recommended Species to Plant in the Greenbelt	78
Table 10.4: Year Wise Greenbelt development plan (Mining Plan Period)	79

TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT	81
Table 11.1: Project Profile and Salient Features.....	85
Table 11.3: Environmental Settings of the Project	87
Table 11.5: Water Requirement Table.....	89

LIST OF FIGURES

FIGURE 1.1: SATELLITE IMAGERY CLUSTER QUARRIES	15
Figure 1.2: Key Map - Location of the Project Site.....	4
FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA	32
FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA.....	33
FIGURE 2.3: QUARRY LEASE PLAN	34
FIGURE 2.4: SURFACE PLAN.....	35
FIGURE 2.5: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE	36
FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS	37
FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 5 KM RADIUS	38
FIGURE 2.8: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS	39
FIGURE 2.9: REGIONAL GEOLOGY MAP.....	44
FIGURE 2.10: GEOMORPHOLOGY MAP.....	45
Figure 2.11: Year-wise Production Plan.....	48
Figure 2.12: Year-wise production cross section.....	49
FIGURE 2.13: CLOSURE PLAN AND SECTIONS	50
FIGURE.2.14: MINERAL TRANSPORTATION ROUTE MAP.....	53
FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS.....	61
Figure 3.4: Soil Sampling Locations around 10 km radius	64
Figure 3.5: Soil Map of the study area	65
Figure 3.6: Photographs of Water Sampling.....	68
Figure 3.7: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS	69
FIGURE 3.8: OPEN WELL CONTOUR MAP –Oct-2025 CONTOUR MAP – Nov-2025	FIGURE 3.9: OPEN WELL 76
FIGURE 3.10: OPEN WELL CONTOUR MAP – Dec 2025	77

FIGURE 3.11: BOREWELL CONTOUR MAP – Oct 2025 CONTOUR MAP – Nov 2025	FIGURE 3.12: BOREWELL 78
FIGURE 3.13: BOREWELL CONTOUR MAP – Dec-2025	78
FIGURE 3.14: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE	79
FIGURE 3.15: GROUND WATER PROSPECT MAP	80
FIGURE 3.18: WINDROSE DIAGRAM.....	85
Figure 3.19: Photographs of Ambient Air Quality Monitoring	87
Figure 3.20: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS	88
FIGURE 3.21: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7	91
FIGURE 3.22: BAR DIAGRAM OF PARTICULATE MATTER PM _{2.5}	91
FIGURE 3.23: BAR DIAGRAM OF PARTICULATE MATTER PM ₁₀	92
FIGURE 3.24: BAR DIAGRAM OF SO ₂	93
FIGURE 3.25: BAR DIAGRAM OF NO _x	93
Figure 3.26: Photographs of Noise Monitoring	95
Figure 3.27: NOISE MONITORING STATIONS AROUND 10 KM RADIUS.....	96
FIGURE 3.28: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE.....	1
FIGURE 3.29: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE.....	2
Figure 4.1 Flow Chart of AERMOD	40
FIGURE 4.1: AERMOD TERRAIN MAP.....	42
FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM ₁₀	43
FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM _{2.5}	43
FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF SO ₂	43
FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF NO _x	44
FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST	44

CHAPTER – 1: INTRODUCTION

1.0 PREAMBLE

The proponent M/s.TANCEM Stoneware Pipe Factory applied for Fireclay Mining lease over an extent of 6.59.0 ha of Government land in S.F. Nos: 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 at Panikankuppam village of Panruti Taluk, Cuddalore District, Tamil Nadu State.

- Proponent applied for Fire clay Quarry lease on 05.02.2018
- Precise area communication letter was issued by the District Collector vide letter no.3354387/MMC.2/2022-1, Dated: 18.01.2023
- The Mining plan has been prepared by the Qualified person and got approved by the Additional Director vide letter no.Rc.No.3952/MM7/2020 Dated: 23.11.2023
- Proponent applied for Terms of Reference vide Proposal No. SIA/TN/MIN/551953/2025, Dated: 18.09.2025 and the ToR was Granted vide File No: 12749 ToR Identification No: TO25B0108TN5192834N Dated. 24.11.2025
- Based on the ToR Baseline Monitoring study has been carried out for one season (Retreating Monsoon) i.e., **October 2025 to December 2025** and this EIA/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) to minimize those adverse impacts.

Previous History

Previous Lessee	G.O	S.F.No	Extent	Lease Period
M/s. TANCEM Stoneware Pipe Factory	G.O.Ms.No.409, Dated: 12.10.1993	133/1A, 134/1, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11	6.61.5 Ha	20 Years (12.10.1993 to 10.04.2014)

Fireclay is the major requirements for Ceramic industries for manufacturing of porcelain tiles, ceramic tiles and stone ware pipes. This EIA report is prepared by considering Cumulative load of all proposed & existing quarries falls in the cluster “B1” consisting of three Proposed and one Existing quarry with total extent of Cluster of 6.59.0 ha in Panikankuppam village of Panruti Taluk, Cuddalore District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting

community participation, information, decision makers, and helps in developing the base for environmentally sound project.

1.1 PURPOSE OF THE REPORT

The EIA/EMP report is for the proposed fire clay mining project for the production of 98,611 Ts (56,349 m³) of ROM, 98,611 Ts (56,349 m³)Ts of Fire clay @ 100% Recovery from ROM.

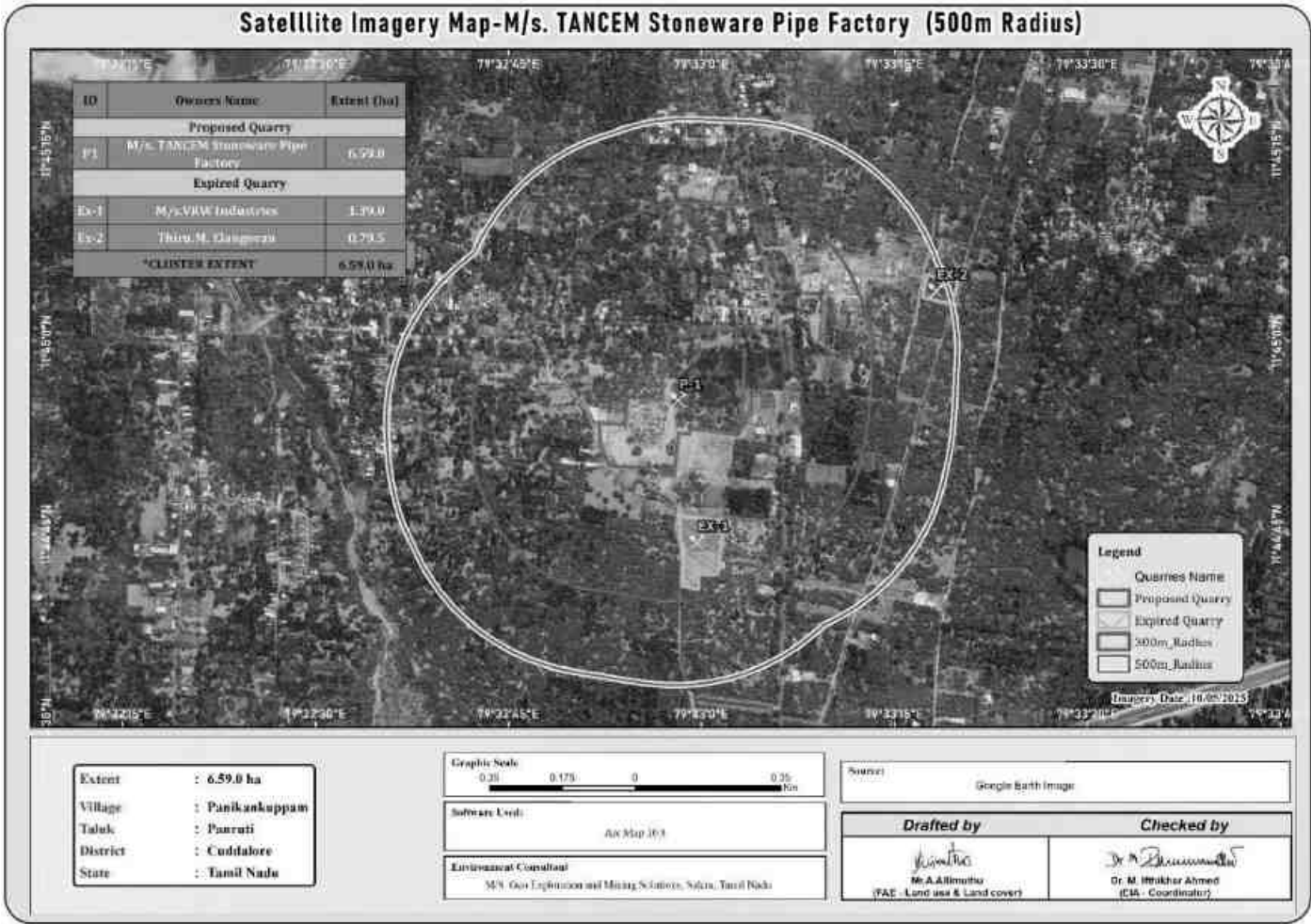
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14th August 2018, Mining Projects are classified under two categories i.e., A (> 100 Ha) and B (≤ 100 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix–XI.

Now, 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 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B- 1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

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

FIGURE 1.1: SATELLITE IMAGERY CLUSTER QUARRIES



1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of Project & Project PropONENT

Name and Location of the project	Project proponent address
M/s. TANCEM Stoneware Pipe Factory S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu	M/s. TANCEM Stoneware Pipe Factory, 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

1.3 BRIEF DESCRIPTION OF THE PROJECT

Table 1.1: Salient features of the project site

DESCRIPTION	DETAILS
Name of the project	M/s. TANCEM Stoneware Pipe Factory
Name of Mineral	Fire Clay.
S.F. Nos and Village	S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 Panikankuppam Village, Panruti Taluk, Cuddalore District.
Extent	6.59.0 ha
Classification of Land	It is a government land, which is not fit for vegetation/Cultivation. The applicant (TANCEM) have surface right over the applied area for grant of mining lease and relevant record of A register and adangal Copy.
Village	Panikankuppam
Taluk	Panruti
District	Cuddalore
State	Tamil Nadu
Latitude Between	11° 44' 49.52"N to 11° 45' 01.01"N
Longitude Between	79° 32' 52.03"E to 79° 33' 03.38"E
Toposheet No	58- M/09
Topography of the area	The area is almost a Undulated terrain.
Geological Resources	3,54,625.25 Ts of ROM, 3,54,625.25 Ts of Fire clay (100 % Recovery),

	1,39,293 Ts of Topsoil
Mineable Reserves	2,16,091 Tonnes of ROM 2,16,091 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Yearwise Production	98,611 Tonnes of ROM 98,611 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Proposed Peak production	24,224 Tonnes of ROM 24,244 Tonnes of Fire clay @ 100% recovery and 21,798 Ts of Topsoil
Life of Mine	11 years
Mining Plan Period	5 years
Mining Method	Opencast Mechanized Method of Mining without Drilling and Blasting
Ultimate Depth of Mining	5.5m BGL (at the end of mining plan period)
Employees Required	14 Nos
Ground Water Level	50 m BGL
Drainage Pattern	There is no perennial surface water body within the project area. The drainage pattern of the area is dendritic.
Water Requirement & Source	Total water requirement for dust suppression, plantation and drinking is 2 KLD. Water will be sourced from nearby villages/ quarry pit water and drinking water will be sourced from approved water vendors.
Power Requirement	No electricity is proposed for quarrying activities. Diesel operating machineries will be deployed for quarrying operation. For the mine office and rest shelters solar power is proposed.
500 m Cluster Details	As per the MoEF & CC Notification 2269 (E) Dated 1 st July 2016 one Existing quarry and Three proposed quarries falls in the cluster category Total Extent of the cluster is 6.59.0 Ha
Project Cost	Fixed asset Cost = Rs 8,75,000/- Operational Cost = Rs 17,70,000/- EMP Cost = Rs 3,80,000/- Total Project Cost = Rs 30,25,000/-

Source: Approved Mining Plan

1.3.1 Nature and Size of the Project

The Fire clay deposit is proposed to be excavated by deploying Hydraulic Excavator. No drilling and Blasting are involved in this quarry operation, since the deposit is soft and fragile in nature. The quarrying operations involve removal of Topsoil and Fire clay using hydraulic excavator by opencast mechanized mining method.

Fire Clay will be transported by 20 Tonnes capacity to the needy customers, Mineral Rejects @ 30% will be dumped separately in the West side of the area. Top soil will be dumped on the North west side of the area and later will be used for plantation purpose.

Resources and Reserves are calculated in Cross Section method after leaving necessary safety distance and bench loss.

Table 1.2: Resources and Reserves

Description	ROM in Tonnes	Fireclay @ 100% Recovery in Tonnes	Top soil Tonnes
Geological Resources	3,54,625.25	3,54,625.25	1,39,293
Mineable Reserves	2,16,091	2,16,091	94,977
Year-wise production (1 st Five Years Mining Plan Period)	98,611	98,611	94,977

Source: Approved Mining Plan

1.3.2 Need for the Project

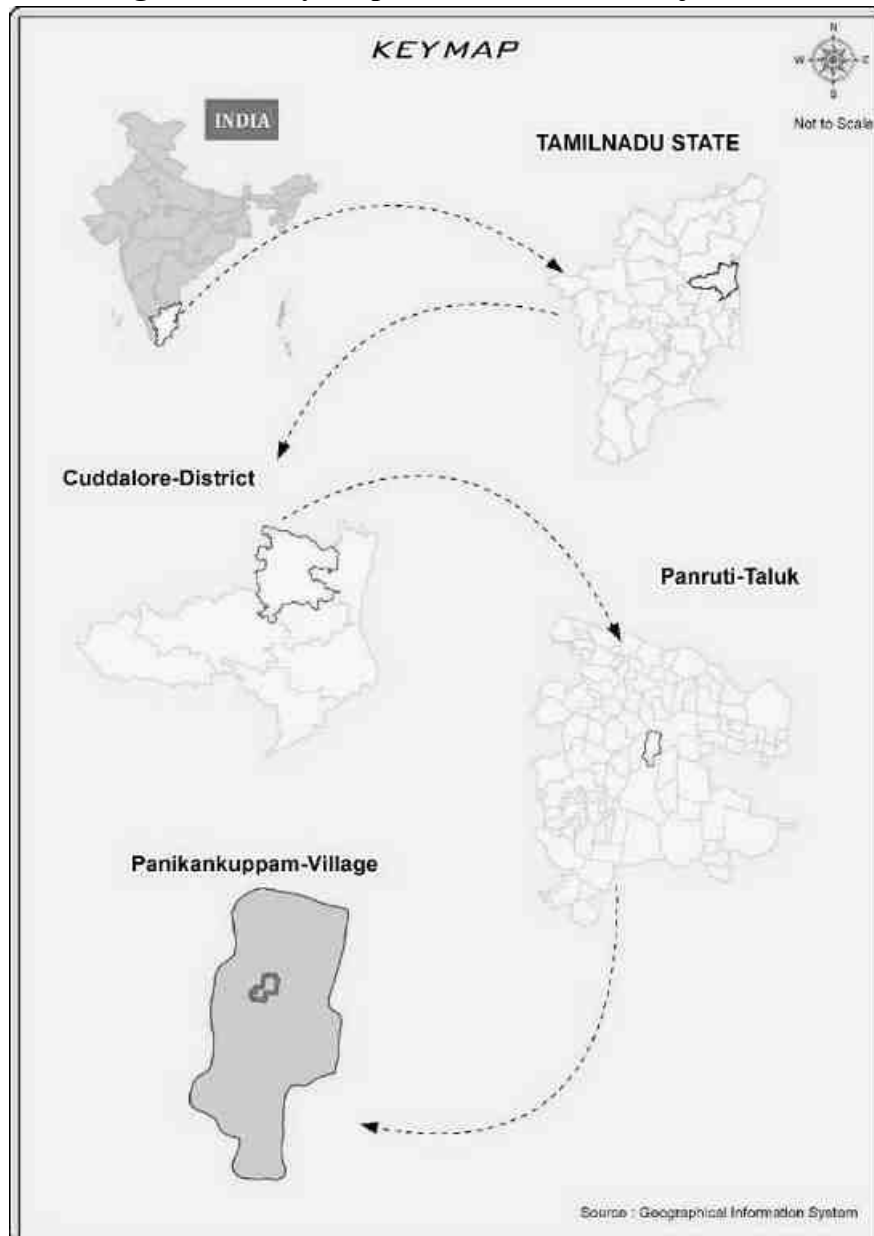
- * Fire clay is used in ceramic industries for manufacturing of Porcelain tiles, ceramic tiles and Stone ware pipes
- * The demand for the Fire clay is increasing due to the usage of Tiles and Ceramic materials

Importance for the Region (Study Area)

- * The standard of the local villages enhance and employment opportunity will be generated to local community. The project provides direct employment opportunities to about 13 employees and indirectly shall create secondary employment opportunity for local people in mineral transport, service sectors, garages, shops/canteen, etc.,
- * There is a great demand for Fireclay mineral to ceramic industries, to meet the Demand – Supply for manufacturing of Ceramic tiles.
- * Government will get seigniorage fees, Royalty, DMF (District Mineral Foundation), NMET (National Mineral Exploration Trust), GST etc.,

1.3.3 Location of the Project

- The project sites located in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State.
- The lease applied area is located about 2km Southwest side of Panikankuppam Village, 2km Southwest side of Panruti town and 100m western side of Villupuram to Kumbakonam National Highway Road.

Figure 1.2: Key Map - Location of the Project Site

Source: ARC GIS

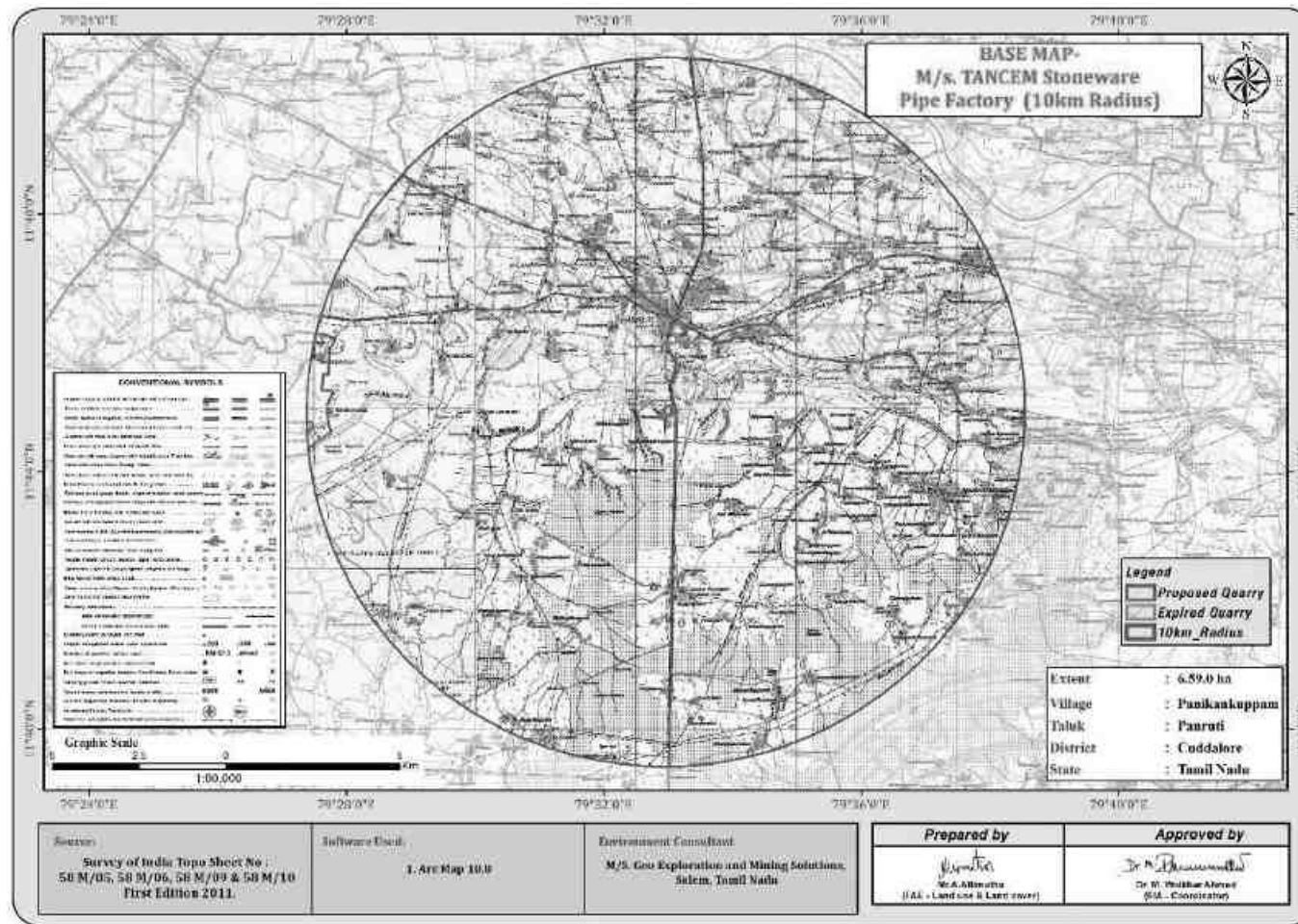
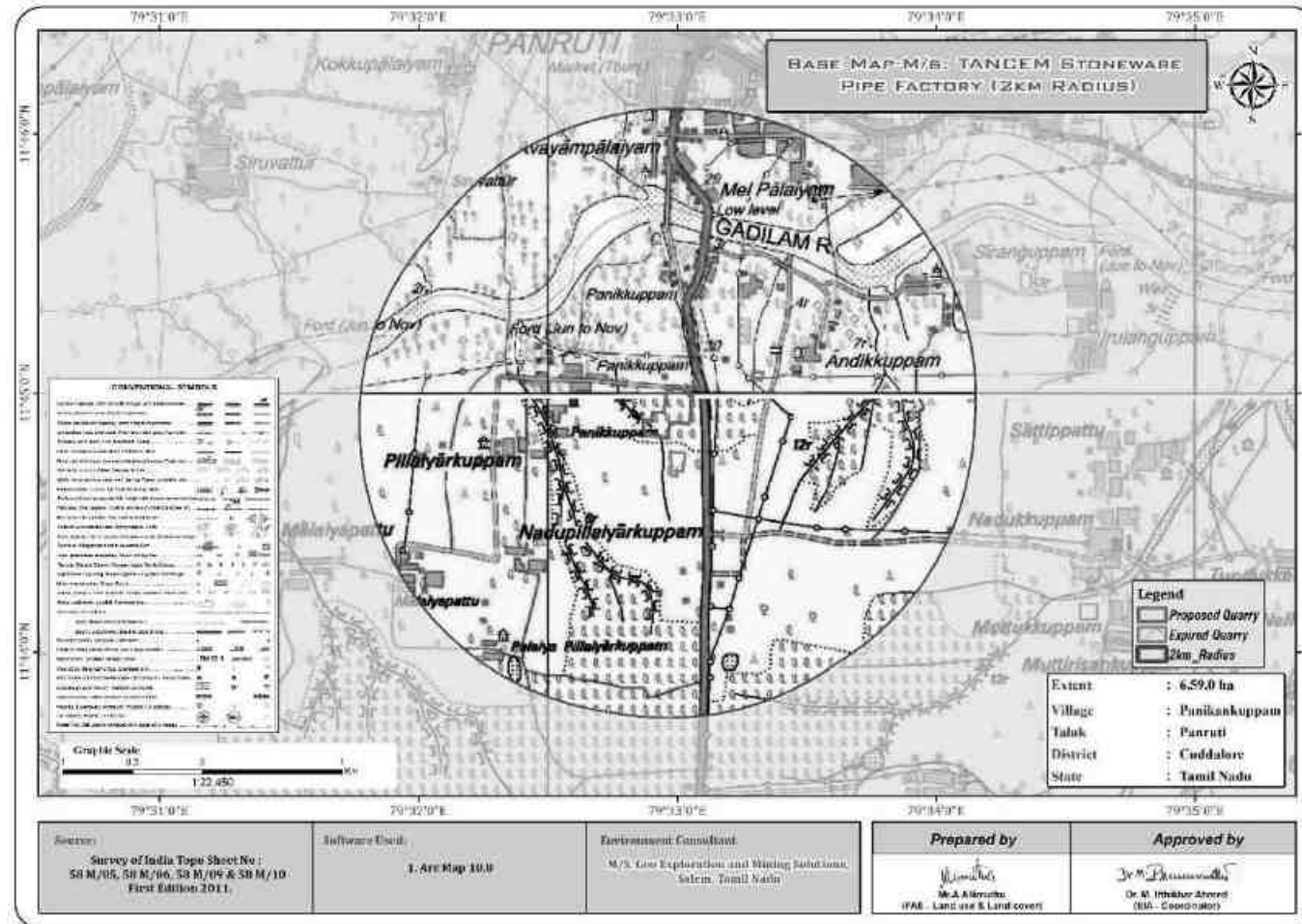
Figure 1.3: Toposheet showing Location of the Project Site & 10km Radius

Figure 1.4: Toposheet showing Location of the Project Site & 2km Radius

1.4 ENVIRONMENTAL CLEARANCE

M/s. TANCEM Stoneware Pipe Factory applied for ToR for Prior Environmental Clearance vide online Proposal No. SIA/TN/MIN/551953/2025, Dated: 18.09.2025

The Environmental Clearance process for the project will comprise of four stages. These stages in sequential order are given below-

1. Screening,
2. Scoping
3. Public consultation &
4. Appraisal

Screening: -

- * The company applied for Fire clay Quarry Lease Dated: 05.02.2018
- * Precise Area Communication letter issued by Government of Tamil Nadu, Industries (MMC.2) Department, Secretariat, Chennai vide Letter No. 3354387/MMC.2/2022-1 Dated: 18.01.2023 for preparation of Mining Plan and for Obtaining Prior-Environmental Clearance.
- * The Mining Plan was prepared under Rule 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the Mining Plan was approved by Joint Director of Geology and Mining, Dept., of Geology & Mining, Guindy, Chennai vide Letter No: 3952/MM7/2020, Dated: 23.11.2023
- * The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- * The proponent applied for ToR for Prior Environmental Clearance vide online Proposal No. SIA/TN/MIN/551953/2025 Dated: 18.09.2025

Scoping: -

- * The proposal was placed in 634th SEAC meeting held on 27.10.2025 and the committee recommended for issue of ToR
- * The proposal was considered in 916th SEIAA meeting held on 17.11.2025 and issued ToR vide File No.12749 TOR Identification No. TO25B0108TN5192834N Dated 24.11.2025

Public Consultation: -

Application to The Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with Draft EIA/ EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP Report.

Appraisal: -

Appraisal means the detailed scrutiny by the State Expert Appraisal Committee (SEAC) of the application and other documents like the final EIA & EMP report, outcome of the public consultations including public hearing proceedings, submitted by the company to the regulatory authority concerned for grant of environmental clearance. The report has been prepared using the following references:

- * EIA Notification, 14th September, 2006
- * Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, 2010
- * Environment Protection Act, 1986.
- * ToR Letter No. FileNo.12749 TOR Identification No. TO25B0108TN5192834N Dated.24.11.2025
- * Approved Mining Plan vide letter No. 3952/MM7/2020 Dated.23.11.2023 In addition, other relevant standards for individual activities such as sampling and testing of environmental attributes have been followed.

1.5 TERMS OF REFERENCE (ToR)

“ToR issued vide FileNo.12749 TOR Identification No. TO25B0108TN5192834N Dated 24.11.2025”

Table 1.3: Compliance of ToR Conditions

SEAC CONDITIONS – SITE SPECIFIC		
1.1	1. The PP shall submit compliance report for the conditions imposed in the precise area communication letter	Noted & agreed. The Project Proponent will submit a detailed compliance report addressing all conditions mentioned in the precise area communication letter.
	2. PP should submit affidavit that there will not be any drilling and blasting and only low-capacity equipment will be used for excavating the material.	Noted & agreed. The Project Proponent will submit an affidavit confirming that no drilling or blasting activities will be carried out during the mining operation. The affidavit will also state that only low-capacity and environmentally compliant equipment will be used for excavation.
	3. The PP shall ensure the installation of CCTV at the proposed quarry site and ensure its inclusion during the EIA presentation	Noted & agreed. The Project Proponent agreed to the installation of CCTV cameras to facilitate ongoing monitoring of mining operations. The photographic and video evidence produced by the surveillance system will be methodically documented and submitted during the appraisal meeting.
SEAC STANDARD CONDITIONS		
2.1	1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the	Noted & agreed Lessee: M/s.TANCEM Stoneware Pipe Factory Lease Period: 12.10.1993 to 10.04.2014 District Collector's & Proceeding No- G.O.Ms.No.409, Dated: 12.10.1993 Existing Pit Dimension Pit I- 102m(L) * 117m(W)* 5m(D)

benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	
2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.	Noted and Agreed Project Proponent obtained VAO certificate and there is no approved habitation within the radius of 300m & enclosed in Annexure.
3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.	Noted & agreed The enumeration of structure detailed in chapter 3 in Socio Economic Environment
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Noted and agreed. The Hydrogeological study has been carried out in the project site considering the water bodies located within the radius of 1km. The hydrogeological study (Resistivity survey) is detailed in the EIA report, Chapter No.3, Page No. 54.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.	Noted and agreed The Bio diversity study has been conducted by the Functional Area Expert approved by the NABET. The same has been detailed in the Chapter No. 3
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	Noted and agreed Nearest Reserve Forest: Kangiruppu RF – 6.7km – South West Nearest Sanctuary: Oussudu Lake Bird Sanctuary – 30.0km – North East
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	Noted and Agreed It is an existing quarry the maximum depth of the mining reached up to 5m. For this mining plan period it is proposed 5.5m bgl. The slope stability study will be conducted after the lease is executed, once the depth reaches 30 m, and the report will be submitted along with the Half-Yearly Compliance Report.
8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth	Noted and Agreed It is an existing quarry the maximum depth of the mining reached up to 5m. For this mining plan period it is proposed 5.5m bgl. The

of the working is extended beyond 30 m below ground level	slope stability study will be conducted after the lease is executed, once the depth reaches 30 m, and the report will be submitted along with the Half-Yearly Compliance Report.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.	Not Applicable The Project Proponent will submit an affidavit confirming that no drilling or blasting activities will be carried out during the mining operation. The affidavit will also state that only low-capacity and environmentally compliant equipment will be used for excavation
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	Not Applicable The Project Proponent will submit an affidavit confirming that no drilling or blasting activities will be carried out during the mining operation. The affidavit will also state that only low-capacity and environmentally compliant equipment will be used for excavation
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	Noted & agreed Lessee: M/s.TANCEM Stoneware Pipe Factory Lease Period: 12.10.1993 to 10.04.2014 District Collector's & Proceeding No- G.O.Ms.No.409, Dated: 12.10.1993 Existing Pit Dimension Pit I- 110m(L) * 103m(W)* 5m(D)
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,	
13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	
14. Quantity of minerals mined out. · Highest production achieved in any one year · Detail of approved depth of mining. · Actual depth of the mining achieved earlier. · Name of the person already mined in that leases area. · If EC and CTO already obtained, the copy of the same shall be submitted. · Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project area boundary coordinates superimposed on Toposheet Chapter-1, Figure. No. 2.2, Page No. 13. Surface Features around the project area covering 10km radius Chapter-2, Figure. No. 2.5, Page No. 16. Geology map of the project area covering 10km radius Chapter-2, Figure. No. 2.8, Page No. 23 Geomorphology Map of the Study Area covering 10 km radius Chapter-2, Figure. No. 2.9, Page No. 24.
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	Noted & agreed It will be submitted on final EIA appraisal.

17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	Noted & agreed Fencing & green belt photographs are enclosed in chapter 2. There are no trees in inside lease area.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.	Noted and Agreed Details of Geological Resources and Proposed reserves are discussed under Chapter No. 2, Table No.2.6 & 2.7, page No. 25
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Noted and agreed Organization chart for the Competent persons to be appointed as per the provisions of the Mines Act 1952 is given in the Chapter No.6
20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along 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.	Noted and agreed The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3. Page no.54
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	Noted and agreed Baseline Data were collected for Retreating monsoon season October to December 2025. Details in Chapter No. 3
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	Noted and agreed The Cumulative impact study due to mining operations are detailed in chapter 7
23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Noted and agreed The lower part of the mine pit will act as temporary

		rainwater harvesting structure, besides Rainwater harvesting structure will be constructed near the mine office and labour shed after commencement of mining operation.
24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.3	
25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not applicable There is no waste anticipated in this Fire Clay quarrying operation. The entire quarried out materials will be utilized (100%).	
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.	
27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Noted and agreed The lower part of the mine pit will be utilized as rain water harvesting structure (Temporary) and the water will be used for the water sprinkling on haul roads and Greenbelt development purpose. Rainwater harvesting structure will be constructed near the mine office.	
28. Impact on local transport infrastructure due to the Project should be indicated.	Noted and agreed Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Chapter No.2, Page No. 30.	
29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	Noted and agreed It was proposed 300 Nos of trees were planted as a part of greenbelt development programme all along the periphery of the lease applied area and approach roads and village roads.	
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Noted and agreed After the completion of mining operation, the quarried-out land will be utilized as temporary storage reservoir.	

		The details are given in the Chapter No.4
31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.		Noted and Agreed
32. The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the Appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.		Noted and agreed The varieties of plantations have been proposed as per the Appendix given in the ToR. It is a Proposed Lease. Around 300 trees are proposed to plant in the boundary area and in the village roads.
33. Taller/one-year-old Saplings raised in appropriate size of bags; preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner		Noted and Agreed
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.		Noted and Agreed Disaster management Plan details in Chapter-7
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.		Noted and Agreed A Risk Assessment and management Plan Chapter- 7
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.		Noted and Agreed Occupational Health impacts are given in the Chapter-10.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.		Noted and agreed. No Public Health Implications anticipated due to this project.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic		Noted and Agreed Details explained Socio economic and impacts studies regarding Chapter No. 3

	significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	
	39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	Noted and Agreed No Litigation is pending against the project.
	40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Noted and agreed The benefits of the project are given in the Chapter No 8. • Through this project around 300Nos of trees will be planted • The government will get revenue from the way of Seigniorage fee, royalty etc., Around 14 people will get direct employment through this project.
	41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	Noted & agreed Lessee: M/s.TANCEM Stoneware Pipe Factory Lease Period: 12.10.1993 to 10.04.2014 District Collector's & Proceeding No- G.O.Ms.No.409, Dated: 12.10.1993 Existing Pit Dimension Pit I- 110m(L) * 103m(W)* 5m(D)
	42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine	Noted and Agreed Details are discussed in chapter no 10, Table no 10.9, Page no. 153.
	43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and Agreed
SEIAA STANDARD CONDITION		
Cluster Management Committee		
1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Noted and agreed Cluster management committee detailed in chapter 7 Cluster management committee has been formed with mutual agreement with the proponents including Proposed quarry at present are framed.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development water sprinkling, tree plantation, blasting etc..	Noted and agreed. As per the committee agreement proponents will coordinates for the Greenbelt development, Water sprinkling and tree plantation activities combined.

3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	Noted and agreed. The formation of committee with list of members has been submitted to the AD mines office, Cuddalore and the same will be update in every year.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	As per the committee agreement the blasting frequency will be discussed and carryout by the Mines Manager appointed by the proponents and the same will be updated in the committee minutes. Transport details in chapter-2.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	The risk management plan and disaster management plan will be followed as per this EIA report.
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report.	Noted and agreed.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner	Noted and agreed A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity.	Noted and agreed.
Agriculture & Agro - Biodiversity		
9	Impact on surrounding agricultural fields around the proposed mining Area.	Noted and agreed As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
10	Impact on soil flora & vegetation around the project site.	Noted and agreed The vegetation details have been provided in chapter 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
11	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Noted and agreed The vegetation details have been provided in Chapter No 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no

		endangered red list species found in the study area.
12	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	Noted and agreed The EIA study has been carried out as per this ToR Condition. The details are given in the EIA report Chapter No.3
13	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Noted and agreed The Eco System of the area will be retained during the mining operation by the way of planting trees in the boundary barrier and un utilized areas. After completion of mining operation, the quarried-out pit will be facilitated to collect the rainwater to pit act as temporary reservoir.
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	Noted and agreed
Forests		
15	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	The nearest reserve forest, Kangiruppu RF is situated 6.7km – South West of the project site. The mining operation will not cause any significant impact to the Reserve Forest and Wild Life Sanctuaries. The DFO Letter will be submitted during the appraisal meeting.
16	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Details of flora and fauna studies given in the Chapter No.3
17	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Noted and agreed
18	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Noted and agreed
Water Environment		
19	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining any ecological fragile areas. activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	Hydro-geological study considering the open well and borewell within the radius of 1km along with water level contour map. The details are given in the Chapter No.3.
20	Erosion Control measures	Noted and agreed Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in

		Section 4.3 under Chapter 4.
21	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	Details in Chapter 3- Detailed EIA study has been carried out considering the impact to the water bodies and eco system of the area. Details are covered in the Chapter No.3 and 4.
22	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Noted & agreed Details discussed in Chapter 3 and 4 impact of bio diversity
23	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	Noted & agreed
24	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.	Noted & agreed. Details discussed under Chapter 3.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	Noted & agreed Details of impact on soil health, soil erosion, the soil, physical, chemical components and microbial components described in chapter-3.
26	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Noted & agreed
27	The EIA shall include the impact of mining activity on the following: a) Hydrothermal/Geothermal effect due to destruction in the Environment. b) Bio-geochemical processes and its foot prints including Environmental stress.	Noted & agreed
Energy		
28	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	The mitigation measures to control the Noise, Air, Water and dust is given in the Chapter No.4.
Climate Change		
29	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.	Details of carbon emission and mitigation activities are given int the Chapter No.4
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.	Noted & agreed
31	Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.	Noted & agreed
Mine Closure Plan		
32	Detailed Mine Closure Plan covering the entire	Details in Chapter 2 mine closure plan

	mine lease period as per precise area communication order issued and the scope for achieving SDGs.	
EMP		
33	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	The detailed Environmental Management plan has been prepared and given in the Chapter No.10
34	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan	Details in Green belt development in chapter 4
Risk Assessment		
35	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and its management plan for this project has been provided in Chapter No. 7.
Disaster Management Plan		
36	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	The disaster management plan for this project has been provided in Chapter No. 7.
Others		
37	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The Project Proponent have obtained VAO certificate and it will be attached in the annexure.
38	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 agreed
39	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.	Details of carbon emission and mitigation activities are given int the Chapter No.4

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.	Not applicable. This is Not a violation category project. This proposal falls under B1 Category (Cluster Condition)
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given	The applied land for quarrying is a Government Land. Document is enclosed along with Approved Mining Plan as Annexure Volume 1.
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	Noted & agreed.
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)	Map showing – Project area is superimposed on Satellite imagery is enclosed in Figure No. 2.4, page no. 15. Project area boundary coordinates superimposed on Toposheet – Figure No. 1.3, page no. 6. Surface Features around the project area covering 10km radius – Figure No. 2.5, page no. 16. Geology map of the project area covering 10km radius - Figure No. 2.8, page no. 23 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.9, page no. 24.
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	Map showing – Geology map of the project area covering 10km radius - Figure No. 2.8, page no. 23 Geomorphology Map of the Study Area covering 10 km radius – Figure No. 2.9, page no. 24.
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 was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
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	The proponent has framed their Environmental Policy and the same is discussed in the Chapter No 10, page no. 152.

	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	Noted and agreed.
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.	Noted & agreed. The study area considered for this study is 10 km radius and all data contained in the EIA report such as waste generation etc., is 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.	Land use and land cover of the study area is discussed in Chapter No. 3. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.3, page No 20.
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.	Not Applicable. There is no waste anticipated during this quarry operation. No Dumps is proposed outside the lease area.
12	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary, claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees	Not Applicable. There is no Forest Land involved in the proposed project area. The proposed project area is a Government Land. Approved Mining Plan is enclosed as Annexure Volume 1.
13	Status of forestry clearance for the broken-up area and virgin forest land involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be	Not Applicable. The proposed project area does not involve any Forest Land.

	indicated. A copy of the forestry clearance should also be furnished.	
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006.
15	The vegetation in the RF / PF areas in the study area, with necessary, details, should be given	No Reserve Forest within the Study 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	Not Applicable. There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
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.	Not Applicable. There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
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.	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3 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.
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	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.

	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).	Not Applicable. The project doesn't attract The C. R. Z. Notification, 2018.
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socioeconomic aspects should be discussed in the Report.	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.
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 predominant downwind direction. The mineralogical composition of PM ₁₀ , particularly for free silica, should be given.	Baseline Data were collected for One Season (Post Monsoon) October 2025 to December 2025 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. 3, Page no. 34.
23	Air quality modelling should be carried out for prediction of impact of the project on the air quality	Air Quality Modelling for prediction of incremental GLC's of pollutant was carried out using AERMOD

	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 modelling 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.	view 9.6.1 Model. Details in Chapter No. 4
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.	Total Water Requirement: 2.0KLD Discussed under Chapter 2, Table No 2.14, page no. 32.
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project, should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rain water harvesting proposed in the project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain will be used for greenbelt development and dust suppression. The Mine Closure Plan is prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
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 Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.
28	Based on actual monitored data, it may clearly be shown whether working will intersect. Ground water. 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.	Not Applicable. The ground water table inferred 50m below ground level. The ultimate depth of quarry is 5.5m bgl. This proposal of 5.5m bgl will not intersect the ground water table, which is inferred from the hydro-geological studies carried out at the project site. Discussed under Chapter 3.

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.	Not Applicable. There is no stream, seasonal or other water bodies passing within the project area. Therefore, no modification/ diversion of water bodies is anticipated.
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.	Noted and agreed. The ultimate depth of quarry is 5.5m bgl. Water level of the area is 50m BGL
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.	Greenbelt Development Plan is discussed under Chapter 4 & 7.
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.	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter 2.
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No. 2.
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	Discussed under Chapter 2, Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical	Occupational Health Impacts of the project and preventive measures are detailed under Chapter 4.

	examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No Public Health Implications anticipated due to this project. Details of CER and CSR are discussed under Chapter 8.
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.	No Negative Impact on Socio Economic Environment on the Study Area is anticipated and this project shall benefit the Socio-Economic Environment by ways of employment for 38 people directly and 50 people indirectly. Details in Chapter 4.
38	Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed Environment Management Plan for the project to mitigate the anticipated impacts described under Chapter 4 is discussed under Chapter 10.
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 outcome of public hearing will be updated in the final EIA/AMP report
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.	No litigation is pending in any court against this 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.	Project Cost is Rs. 30,25,000/- CER Cost is Rs.3,00,000/- The EMP budget detailed in chapter 10, table no. 10.9
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Details in Chapter 7.
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.	Details in Chapter 8.
44	Besides the above, the below mentioned general points are also to be followed: -	
a	Executive Summary of the EIA/EMP Report	Enclosed as separate booklet.
b	All documents to be properly referenced with index and continuous page numbering.	All the documents are 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.	List of Tables and source of the data collected are 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	Baseline monitoring reports are enclosed with This report in Chapter 3. Original Baseline monitoring reports will be submitted in the final EIA report.
e	Where the documents provided are in a language other than English, an English translation should be provided.	Not Applicable.
f	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Will be enclosed along with Final EIA EMP Report.
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-IAII(I) Dated: 4th August, 2009, which are available on the website of this Ministry, should be followed.	Noted & agreed. Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IAII (I) Dated: 4th August, 2009 are 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	Noted & agreed.
i	As per the circular no. J-11011/618/2010-IAII(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.	Not 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.	Surface Plan – Figure No. 2.5 – Page No. 16. Topography, Geological, Year-Wise Development Production Plan and Sections Plan - Figure No.2.10 – Page No. 26. Mine Closure Plan – Figure No.2.11 – Page No. 27.

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The company will carry out Compliance Monitoring Studies every six months once for Air, Water, Noise and other Environmental parameters as per the MoEF & CC and CPCB Guidelines & EC Conditions. The half-yearly compliance status reports will be submitted in respect of stipulated Environmental Clearance terms and conditions to MoEF & CC Regional Office & SEIAA after grant of EC on 30th June and 31st December of each calendar year.

1.7 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC. Brief descriptions of each Chapter are presented in Table No. 1.5.

Table 1.4: Structure of the EIA report

S. No	Chapters	Title	Particulars
1	Chapter 1	Introduction	Presents an Introduction along with Scope and Objective of this EIA/EMP Study
2	Chapter 2	Project Description	Presents the Technical Details of the Project
3	Chapter 3	Description of Environment	Presents the Baseline Status for various Environmental Parameters in the Study Area for One Season (3 Months)
4	Chapter 4	Anticipated Environmental Impacts and Mitigation Measures	Presents the Identification, Prediction and Evaluation of Environmental Impacts due to the Proposed Project Activities and presents Proposed Mitigation Measures
5	Chapter 5	Analysis of Alternatives (Technology & Site)	Presents Analysis of alternatives with respect to site
6	Chapter 6	Environment Monitoring Programme	Present details of post project environment monitoring
7	Chapter 7	Additional Studies	Presents Public Consultation, Risk Assessment and Disaster Management Plan
8	Chapter 8	Project Benefits	Presents project benefits as: Improvements in the Physical Infrastructure, Social Infrastructure Employment Potential – Skilled; Semi-Skilled and Unskilled etc.,
9	Chapter 9	Cost Benefit Analysis	Environmental Cost Benefit Analysis has not been recommended at Scoping Stage – thus no analysis carried out separately in this EIA/EMP Report

10	Chapter 10	Environmental Management Plan	Description of the administrative aspects to ensure the Mitigation Measures are implemented and their effectiveness monitored, after approval of the project
11	Chapter 11	Summary & Conclusion	Summary of the EIA Report
12	Chapter 12	Disclosure of Consultants Engaged	Disclosure of the Consultants

Source: EIA Notification, 2006, Appendix – III

1.8 SCOPE OF THE STUDY

The State Expert Appraisal Committee (SEAC) – Tamil Nadu considered the project during its meeting. Based on the information contained in the documents submitted and the presentation made, the SEIAA prescribed the Terms of Reference (ToR). The present EIA/EMP study has been prepared based on the ToR points as stipulated by SEAC / SEIAA.

This report contains information on the existing environmental attributes including Air, Water, Noise, Land Use, Solid Waste, Soil Quality, Ecology and Socio-Economics of the area. The report also evaluates the predicted impact of the proposed mining activities on the environment. It covers the various remedial measures considered by the mines authorities like Air pollution control systems, water conservation, Green belt development plans and other environmental management system, which are useful for controlling environmental degradation due to the proposed mining project. A detailed account of the emission sources, emissions control equipment, background air quality levels, meteorological measurements, dispersion model and all other aspects of pollution like effluent discharge, aquifer characteristics etc., have been provided in this report.

The baseline monitoring study has been carried out during post monsoon season (October to December, 2025) for various environmental components so as to assess the anticipated impacts of the proposed project on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project. (Refer Table 1.6).

Table 1.5: Environment attributes

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	24 hourly samples twice a week for three months at 6 locations
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station, Coimbatore
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 4 ground water and 3 surface water locations once during study period
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department

5	Noise levels	Noise levels in dB(A)	At 10 locations data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India Toposheet and satellite imagery and primary survey
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011
9	Hydrology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk Modeling done for the risk associated with mining

Source: Onsite monitoring/ sampling

The data has been collected as per the requirement of the ToR issued by SEIAA – TN. The compliance of the ToR has been given in Table 1.4.

1.8.1 Regulatory Compliance & Applicable Laws/Regulations

- * Submitted application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959
- * Obtained Precise Area Communication Letter for Preparation of Mining Plan and obtaining Prior – Environmental Clearance as per Sub-Rule 13 of Rule 19 A, Tamil Nadu Minor Mineral Concession Rules, 1959
- * The Mining Plan has been approved under Rule 43 (8) of Tamil Nadu Minor Mineral Concession Rules, 1959
- * Environment Protection act, 1986
- * EIA Notification, 2006
- * ToR – File no.12749 TOR Identification No.TO25B0108TN5192834N Dated.24.11.2025

CHAPTER – 2: PROJECT DESCRIPTION

2.0 GENERAL

This project is proposed to excavate 98611 Tonnes (56,349m³) (Mining Plan Period) of Fire clay by Opencast Mechanized Mining Method without drilling and blasting. The excavated Fire clay will be transported to the processing units by tippers/trucks for the blending purpose.

The ore deposit is soft and fragile in nature found about 5 to 20m thickness; the topsoil layer on the Fire clay about 1.5m thickness. The quarrying operation is proposed to carry out upto a depth of 5.5m.

2.1 DESCRIPTION OF THE PROJECT

M/s. TANCEM Stoneware Pipe Factory applied for grant of Fire clay mining lease dated 05.02.2018 over an extent of 6.59.0 ha. The State Government of Tamil Nadu, Industries (MMC.2) Department issued precise area communication letter vide letter no. 3354387/MMC.2/2022-1 Dated:18.01.2023 to prepare Mining Plan and obtain Prior Environmental Clearance from the SEIAA, Tamil Nadu.

The mining plan has been prepared and approved vide Rc.No.3952/MM7/2020 Dated: 23.11.2023 by Additional Director of Geology and Mining, Department of Geology and Mining, Guindy, Chennai.

The Fire clay Quarry is an existing quarry; opencast mechanized mining method is proposed by deploying heavy earth moving machineries like excavators coupled with tippers. The quarrying operation is proposed to carry out without involving drilling and blasting. The raw Fire clay produced will be transported and sold to nearby ceramic based industries located within 35Km from the quarry site.

The project area is dry barren land, no major vegetation and trees within the project area, except few numbers of Neem and velvel trees, the project is site specific and there is no additional area required for this project. No effluent generation/discharge from the proposed quarry.

2.2 LOCATION OF THE PROJECT

- The project sites located in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State.
- The lease applied area is located about 2km Southwest side of Panikankuppam Village, 2km Southwest side of Panruti town and 100m western side of Villupuram to Kumbakonam National Highway Road.

Table 2.1: Salient Features around the project area

Description	Details
Nearest Village/Habitation	Panikankuppam – 2km – SW (4205 Population)
Nearest Railway Station	Panruti– 2.6 km- NE
Nearest Airport	Puducherry Airport – 37.3km – North East
Nearest State Highway	Panruti to Cuddalore (SH-68) – 2.2km – North East

Nearest National Highway	Panayapuram to Thanjavur (NH-36) – 80m – East
Nearest Sea Port	Chennai – 167 km North East
Nearest Interstate boundary	Puducherry (Karaikal) Interstate boundary – 13.0 km – North East
Nearest Water bodies	Kedilam River – 1.0km-North West Thenpennai River –10.0km-North East Thiruvathigai Check Dam – 3.5km – North East
Nearest Reserve Forest	Kangiruppu RF – 6.7km – South West
Nearest Wildlife Sanctuary	Oussudu Lake Bird Sanctuary – 30.0km – North East

Source: Survey of India Toposheet

Table 2.2: Boundary Co-Ordinates

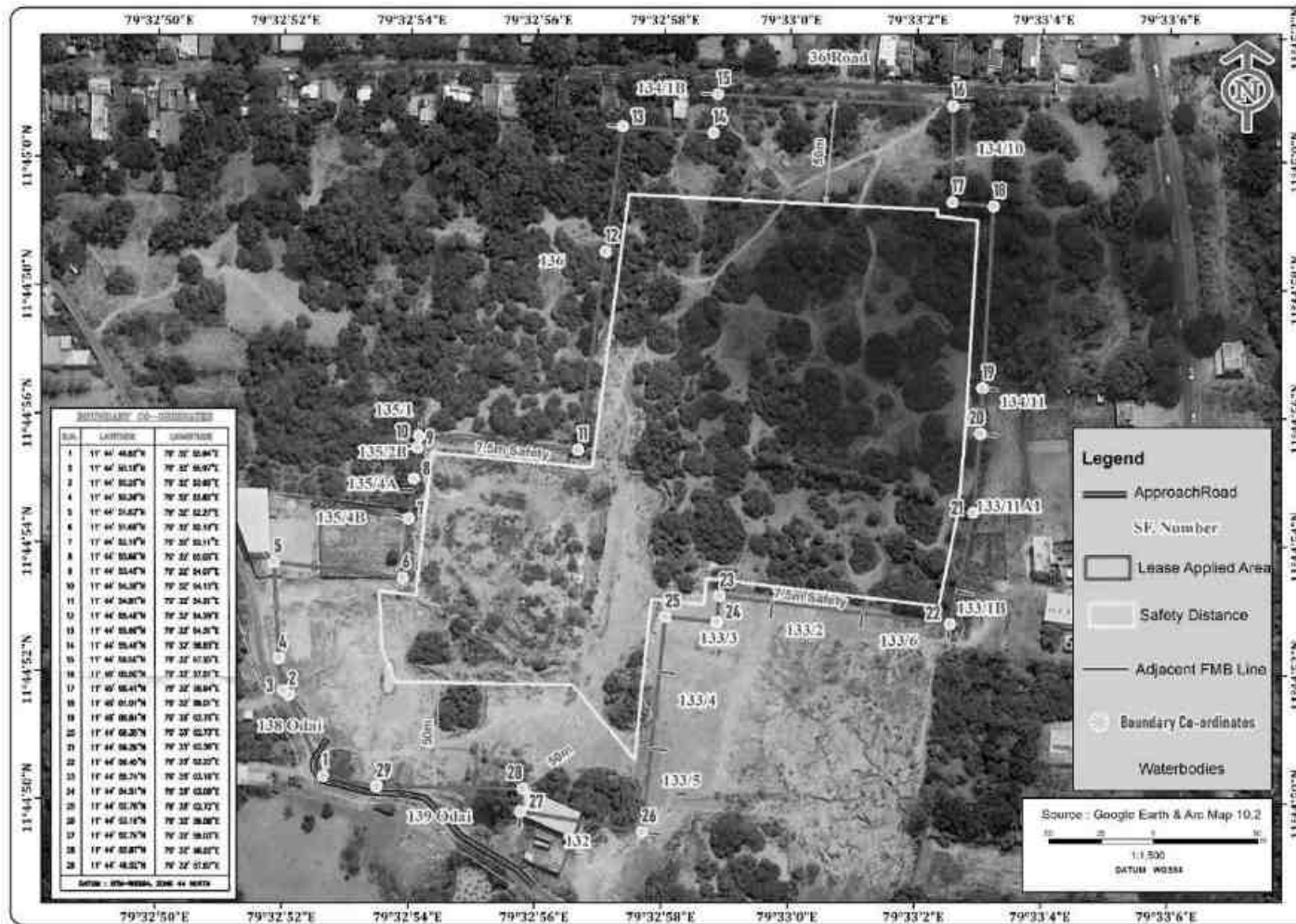
Sl No.	Latitude	Longitude
1	11°44'49.82"N	77°32'55.94"E
2	11°44'50.18"N	77°32'55.97"E
3	11°44'50.20"N	77°32'53.66"E
4	11°44'50.36"N	77°32'52.82"E
5	11°44'51.63"N	77°32'52.27"E
6	11°44'51.69"N	77°32'52.18"E
7	11°44'52.19"N	77°32'52.11"E
8	11°44'53.69"N	77°32'52.03"E
9	11°44'53.45"N	77°32'54.07"E
10	11°44'54.38"N	77°32'54.15"E
11	11°44'54.81"N	77°32'54.21"E
12	11°44'55.48"N	77°32'54.28"E
13	11°44'55.66"N	77°32'54.31"E
14	11°44'55.46"N	77°32'56.83"E
15	11°44'58.55"N	77°32'57.25"E

16	11°44'00.50"N	77°32'57.51"E
17	11°44'00.41"N	77°32'58.94"E
18	11°44'01.01"N	77°32'59.01"E
19	11°44'00.84"N	77°32'02.73"E
20	11°44'59.35"N	77°32'02.73"E
21	11°44'59.28"N	77°32'03.38"E
22	11°44'56.45"N	77°32'03.22"E
23	11°44'55.74"N	77°32'03.19"E
24	11°44'54.51"N	77°32'03.08"E
25	11°44'52.78"N	77°32'02.72"E
26	11°44'53.19"N	77°32'59.08"E
27	11°44'52.79"N	77°32'59.03"E
28	11°44'52.87"N	77°32'58.22"E
29	11°44'49.52"N	77°32'57.87"E

Source: Quarry Lease Plan

FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA

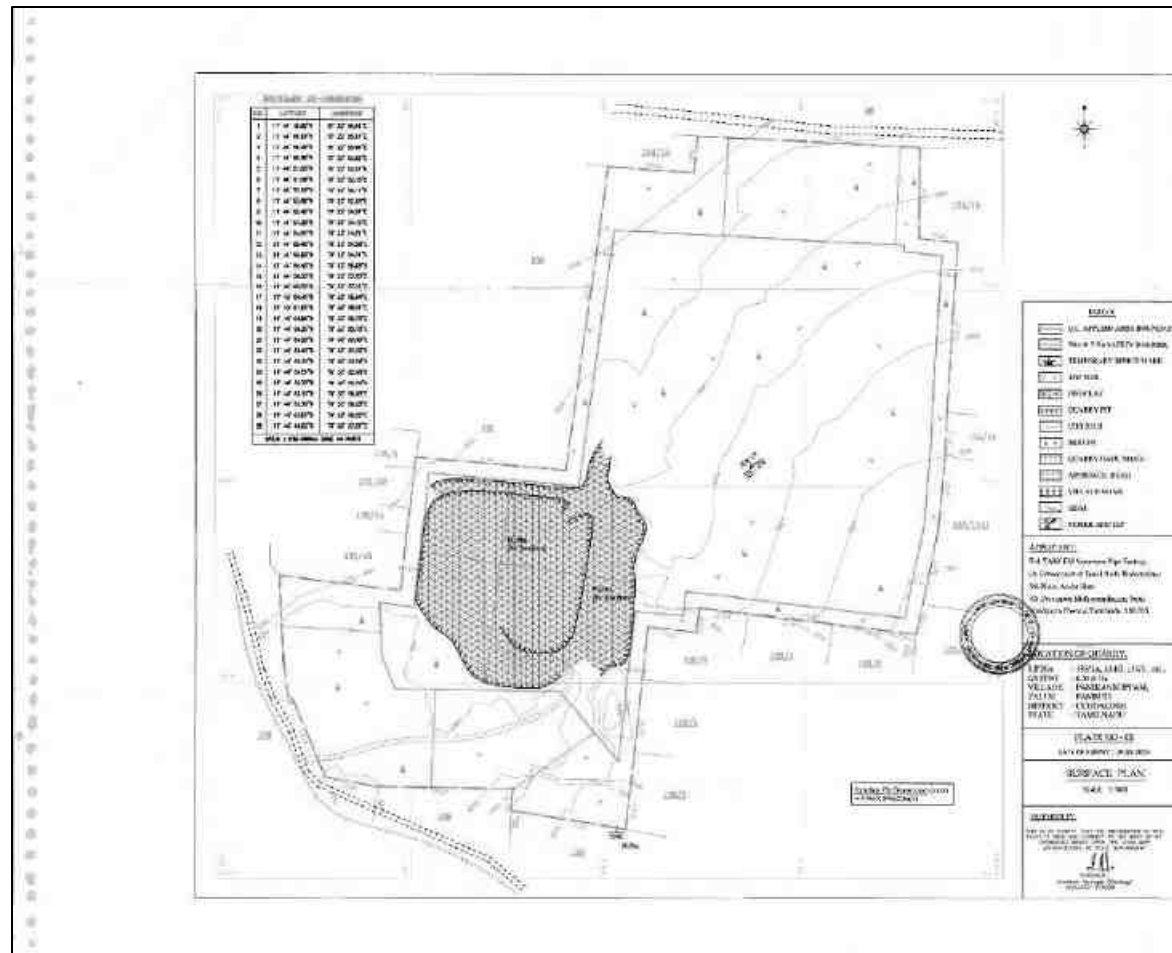


FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA

Source: Google Earth Imagery

Source: Approved Mining Plan

FIGURE 2.4: SURFACE PLAN



Source: Approved Mining Plan

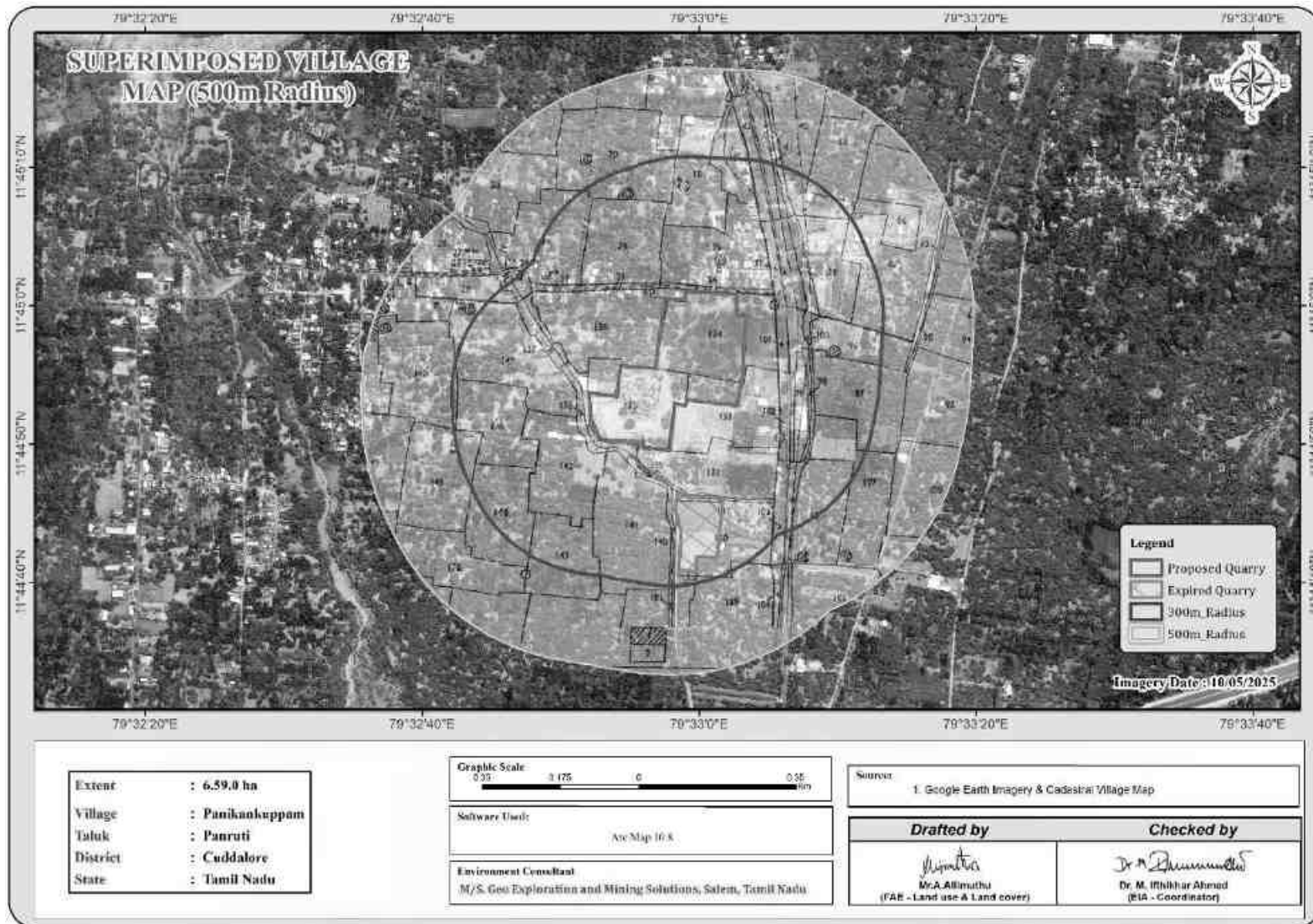
FIGURE 2.5: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE

FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

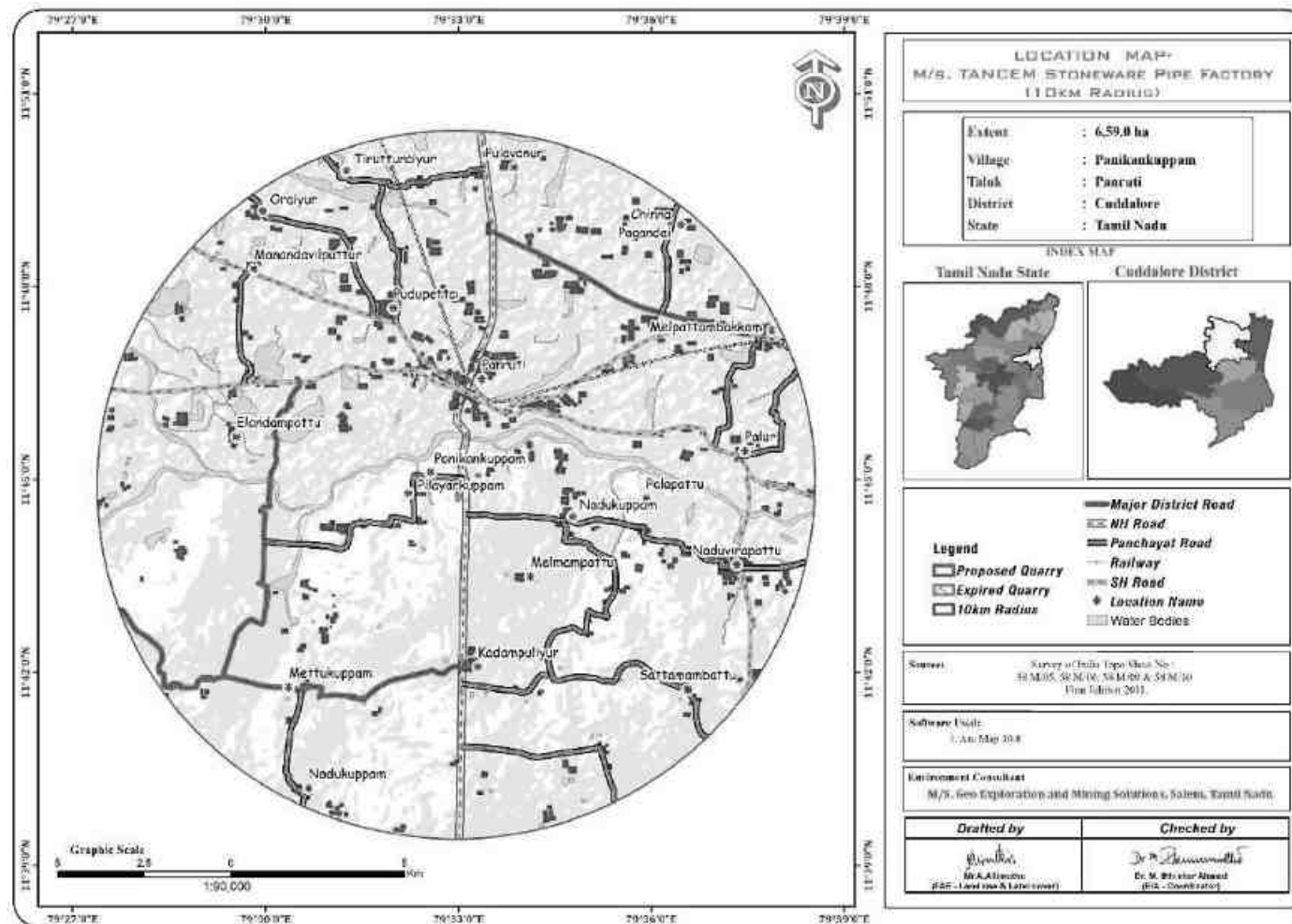


FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 5 KM RADIUS

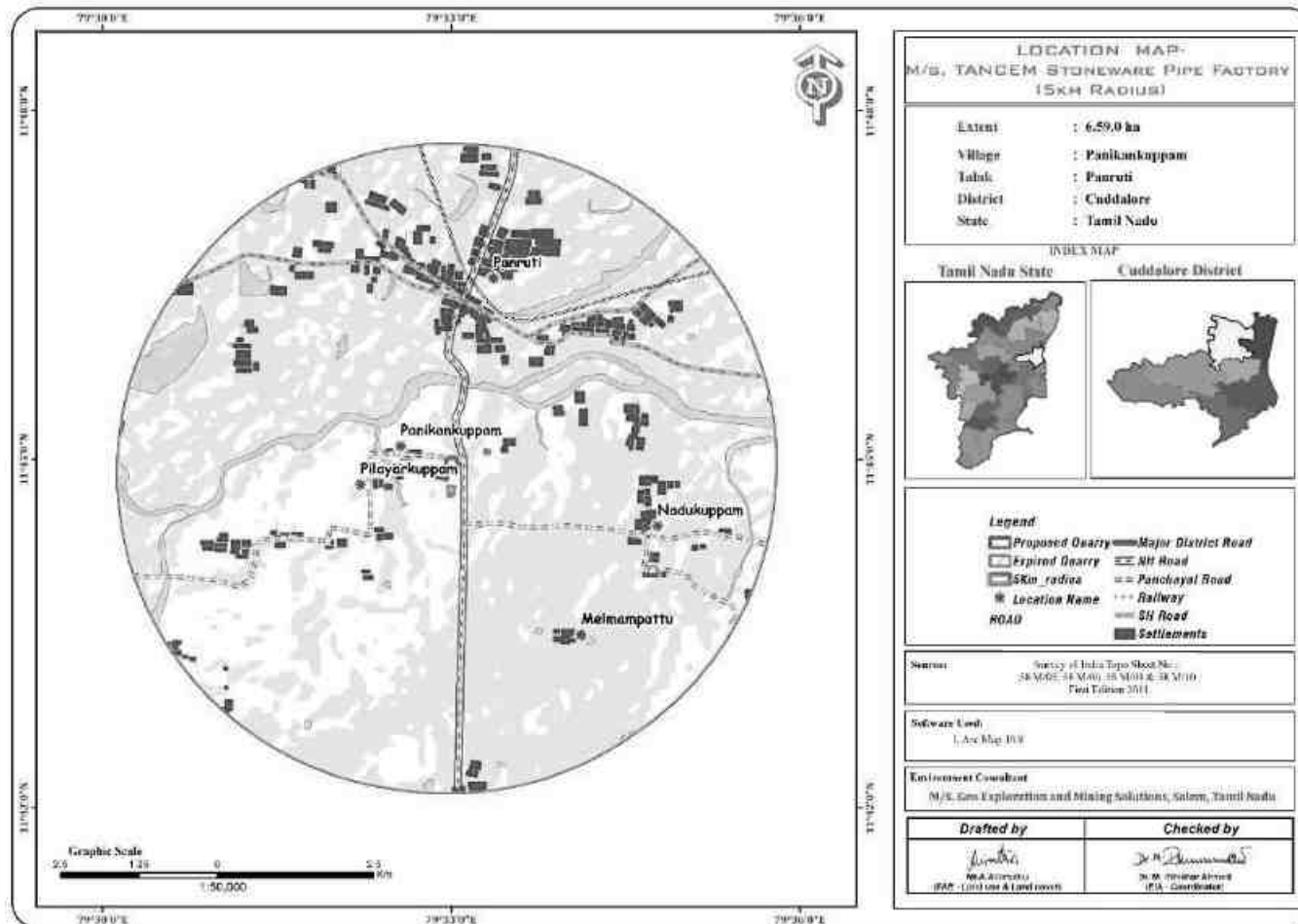
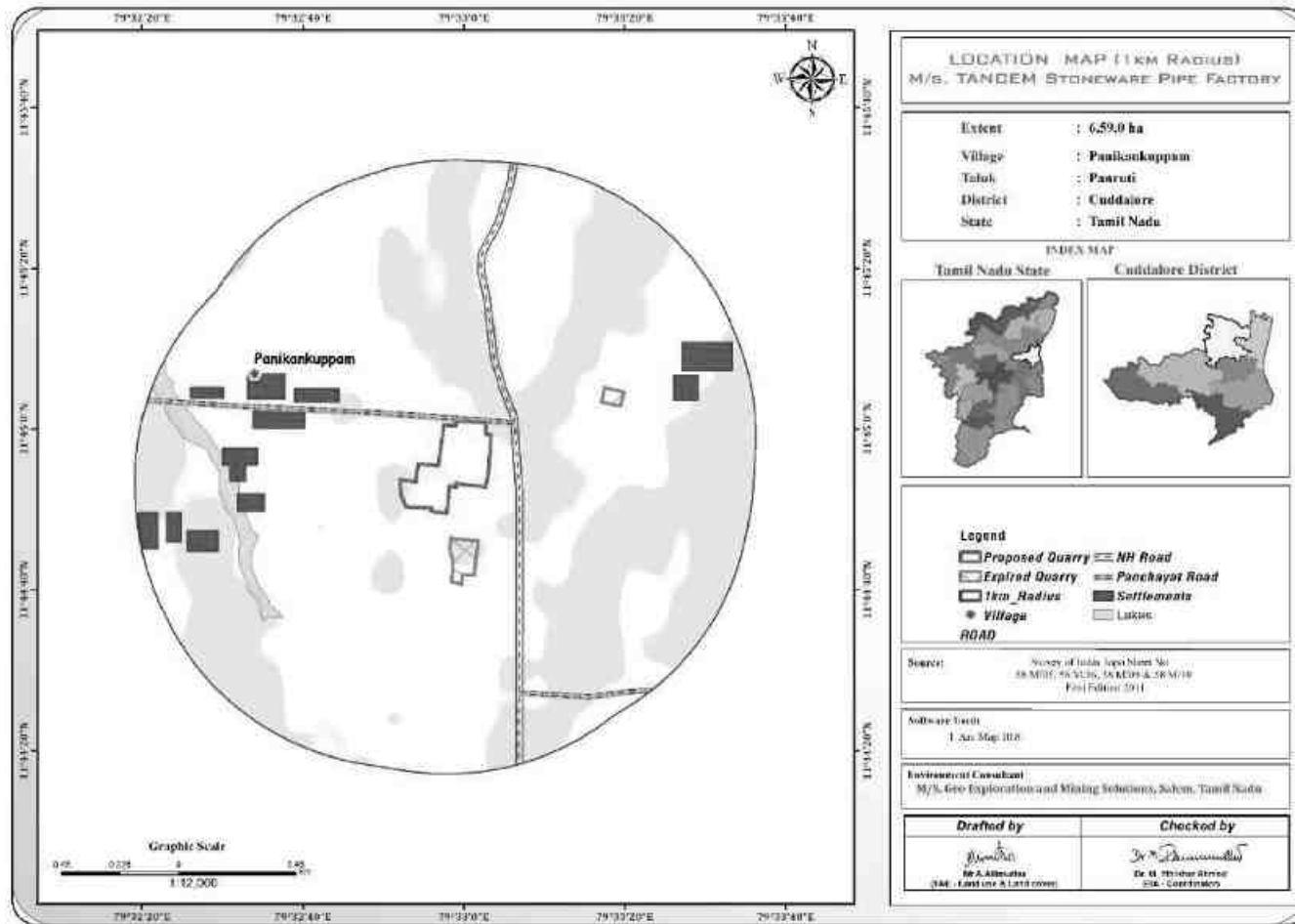


FIGURE 2.8: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS

2.2.1 Project Area

- * The lease applied area is a fresh land, proposed for Fire Clay quarrying which is site specific, non-captive use
- * No beneficiation or mineral processing is proposed within the project area.
- * The area is devoid of major vegetation and plantation except few neem and velvel trees.
- * There is no perennial river, odai and any other water bodies passing through the project area.
- * There are 1 Proposed quarry within the radius of 500m from the proposed project site

2.2.2 Land Use Pattern of the Core Zone

The project area is almost an undulated terrain. The general drainage pattern of the area is dendritic pattern. Only mining activity is being carried out in and around the area. The main crops being millet, paddy, pulses etc., are grown seasonal crops. There is no forest or animal sanctuaries near the area. The existing land use pattern and the land use pattern at the end of plan period is given below.

Table 2.3: Land use pattern (core zone)

Description	Present Land use (Ha)	Area to be reclaimed at the end of present mining plan period (Ha)	Area at the end of life of quarry (Ha)
Area under mining	1.02.5	3.27.3	4.29.8
Dumps	Nil	*Nil	Nil
Site services	Nil	0.01.0	0.01.0
Roads	0.03.0	0.02.0	0.05.0
Greenbelt	Nil	0.20.0	0.40.0
Unutilized area	5.53.5	2.03.2	1.83.2
Total Area	6.59.0	5.53.5	6.59.0

Source: Approved Mining Plan

*Topsoil dump proposed on the northern side, but it will be removed and utilized for backfilling during this plan period. Hence waste dump area is not proposed in the land use pattern during this plan period.

Table 2.4: External infrastructures

Sl.No	Particulars	Location	Direction	Approximate distances in kms
1.	Nearest Post Offices	Panruti	NE	2
2.	Nearest Town (DH)	Panruti	NE	1.5
3.	Nearest Polices station	Panruti	NE	2
4.	Nearest Govt. Hospital	Panruti	NE	2
5.	Nearest School	Panruti	NE	0.160
6.	Nearest DSP offices	Panruti	NE	2
7.	Nearest Railway station	Panruti	NE	2.6

8.	Nearest Seaport	Chennai	NE	168
9.	Nearest Airport	Puducherry	NE	37.3

Source: Survey of India Toposheet

2.2.3 Size or Magnitude of Operation

Table 2.5: Mining details

Particulars	Details
Method of Mining	Opencast mechanized
Geological resources	3,54,625.25 Ts
Mineable reserves	2,16,091 Ts
Production	98,611 Ts (5 years)
Topsoil	24,224 tonnes
Depth of Mining	5.5 m
Water table	50m bgl

Source: Approved mining plan

2.3 GEOLOGY

2.3.1 Regional Geology

The general geological formation of the district is simple with metamorphic rocks belonging to the gneiss family. Resting on these are the three great groups of sedimentary rocks belonging to different geological periods and overlaying each other in regular succession from the coast on the east to the hills on the west. The lowest of these groups is the fossil-bearing cretaceous limestone around Pondicherry and Vriddhachalam. Above this comes a younger form the Red hills near Pondicherry and the Mount Capper hills south-west of Cuddalore. Uppermost are the alluvial beds of the deltas of rivers. There is every reason to believe that this order of the strata has existed unaltered through a long geological period; that in fact, since the beginning of the time when the oldest of the sedimentary beds, these of cretaceous age, were deposited. Cuddalore sandstones and there are a number of flowing wells in this area. Gneiss, trap and sandstone are the main minerals of the district. Gneiss is used for building purposes with excellent results especially in the temples. Its susceptibility to fine carving is exemplified in the chains cut from it which may be seen in the shrine at Srimushnam and the great temple at Chidambaram. Trap is scarcely used for building purposes because of its intractable hardness and inherent moisture absorbing quality. Sandstone is used for building purposes as well as for making mortars, troughs, etc. Besides these minerals, laterite occur over a wide belt of country between Pondicherry and Vriddhachalam (notably on Mount Capper), in the red soil tract around Srimushnam and to the east of Vriddhachalam. It is largely used for building purposes and road making.

ARCHAEANS

The Archaean rocks are exposed in the north-western and western part of the area or more precisely a Hne passing roughly west of Vriddhachalam and Ulundurpettai. The basement rocks (i.e. Archaean) constitute granitoid

gneisses with pegmatite and dolerite intrusive in Neyveli Basin. The Archaean rocks form the basement in the area over which the later sediments were deposited. Outcrops of granitoid gneisses (i.e. Archaean) can be seen around Mangalam and Ulundurpettai. The well section shows coarse, weathered and pale colored gneisses up to a depth of 2 to 4m passing into fresh bluish rocks below. The coarse granite gneisses chiefly consist of quartz, feldspar, biotite and hornblende. Pegmatite and quartz veins intruding the granitoid gneisses. The pegmatite predominantly consists of quartz and feldspar. The dolerites are the youngest intrusive rocks in the area. They cut across the gneisses in NNE-SSW or NE-SW direction between Mangalam and Ulundurpettai.

CRETACEOUS

ARIYALUR GROUP

In the western of the area, marine fossiliferous limestone, calcareous sandstones and marlstones succeed the Archaean crystalline basement rocks. They were deposited in shallow marine environment and have been classified as Ariyalur group of rocks (i.e. uppercretaceous). The rocks of Ariyalur group are exposed in a narrow NE-SW trending formation.

TERTIARY

The Tertiary geology is represented by the sediments of Mio-Pliocene periods. No basement rocks have been encountered even in the few deep bore holes drilled by the Neyveli Lignite Corporation. But sediments probably representing Cretaceous period such as siliceous limestone, calcareous sandstone, black silts and clay with thin bands of lignite have been encountered in the bore hole recently drilled by Neyveli Lignite Corporation. These Cretaceous formations are overlain by the yellowish white to dirty white sandstone, grey siltstone, pebbly gravelly coarse grained sandstones with minor clays which form the Mio-Pliocene Cuddalore sediments. They are prominently seen as raised mounds around PudurSedapallayam, Samatikuppam areas in the northwestern part and these are only the continuation of large Tiruvendipuram sandstone plateau occurring south of Gadilam River. Pebbly, gravelly, ferri-crete, concretionary soils with reddish brown sands (Lateritised, weathered gully eroded outcrops) occur as veneer over the sandstone. This lateritic cover of sandstone slowly disappears towards east as they are covered by thick alluvium and dunal sands. But the slopes of the sandstone plateau have thin soil cover and form a gently sloping pediplain in the areas of Kothandaramapuram, Palliodai, Puvanikuppam and Kullanchavadi.

NEYVELI FORMATION

The Neyveli Formation represents the lower most tertiary group of rocks. They are essentially argillaceous and occur as a narrow belt overlying the Ariyalur group. It also occurs as inliers and outliers surrounded by Cuddalore Formation and Ariyalur Formation respectively. The Neyveli Formation is composed of silty claystones; black clays /shells, argillaceous sandstones, calcareous sandstones, fossiliferous limestones, algal limestones, etc. The algal limestones and argillaceous sandstones of the Neyveli Formation can be correlated to that of the Niniyur Formation of Ariyalur area. It is occurring around Gopurapuram village near Vridhachalam and is assigned to Paleocene to Oligocene in age.

CUDDALORE FORMATION

The Cuddalore sandstones occur intermittently along the eastern coast of south India and represent the upper most Tertiary Formation. The rocks of this Formation consist of argillaceous sandstone, pebble-bearing sandstones, mottled sandstone, ferruginous sandstone, grits and clay beds and lignite seams. The presence of the pebble and cobbles, mottled appearance, general impoverishment in micas and absence of garnet grains help to distinguish them from the older group of rocks. The sandstones of the Cuddalore Formation are whitish, pinkish or mottled in colour and are chiefly argillaceous. The sandstone generally consists of rounded pebbles (pebbles and

fragments) of quartz. The Cuddalore sandstones were altered and covered by either Laterite capping or by thick alluvium of Gadilam and Ponnaiyar rivers in the north and in the south by Vellar and Manimukta rivers.

QUATERNARY FORMATION

The quaternary formation is comprises sediments of fluvial, fluvio-marine and marine regime. The sediments includes fine to coarse-grained sands, silts, clays, laterites and lateritic gravels. The fluvial sediments are confined in the flood plains of the Ponniyar, Gadilam, ManimukthaVellar and Kollidam rivers which consist of mostly of sands and sandy or clay loams. The laterites were generally ferruginous, yellowish dark brown, metallic luster, hard and with fairly extensive occurrence in the area are underlined by Cuddalore sandstones.

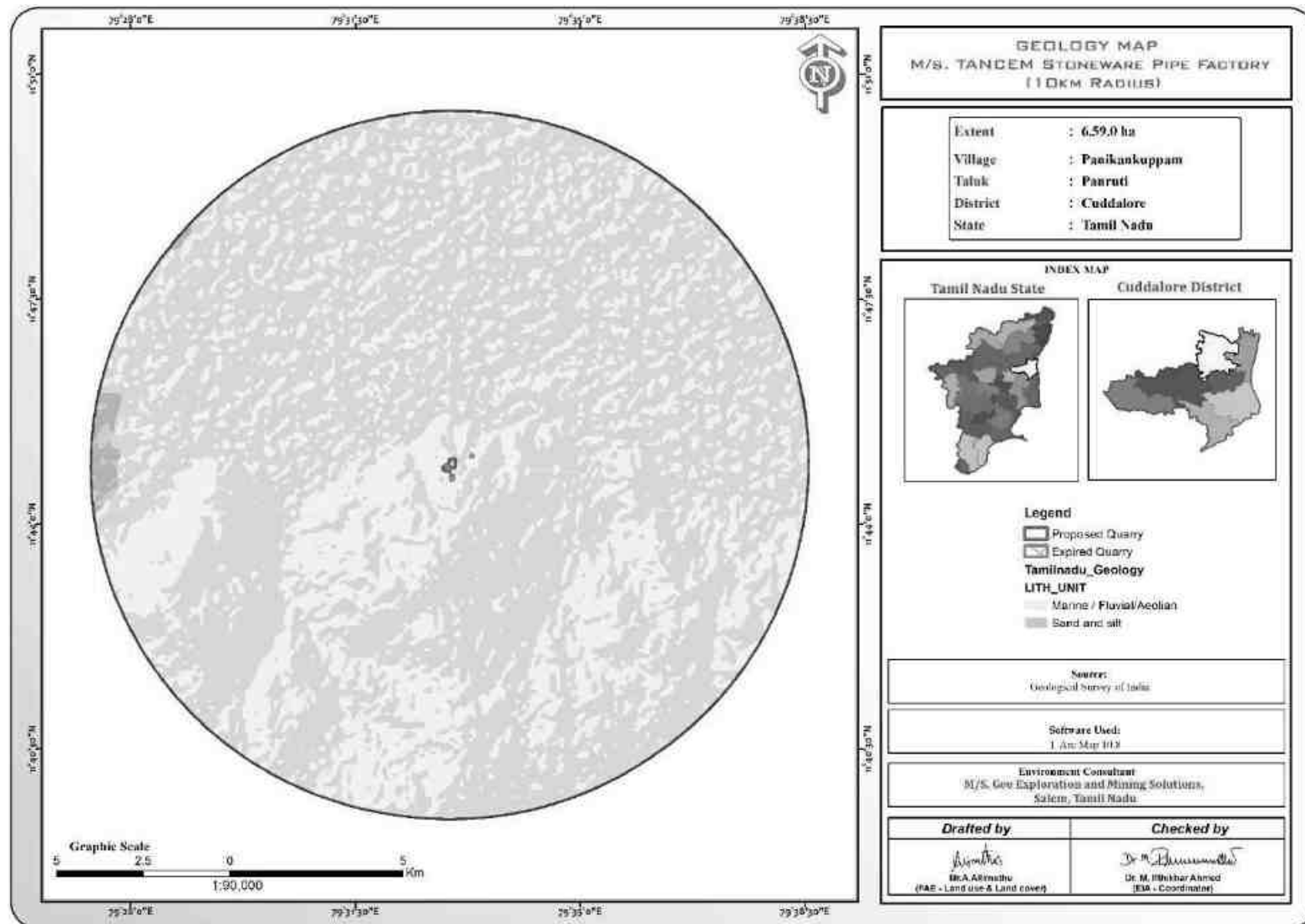
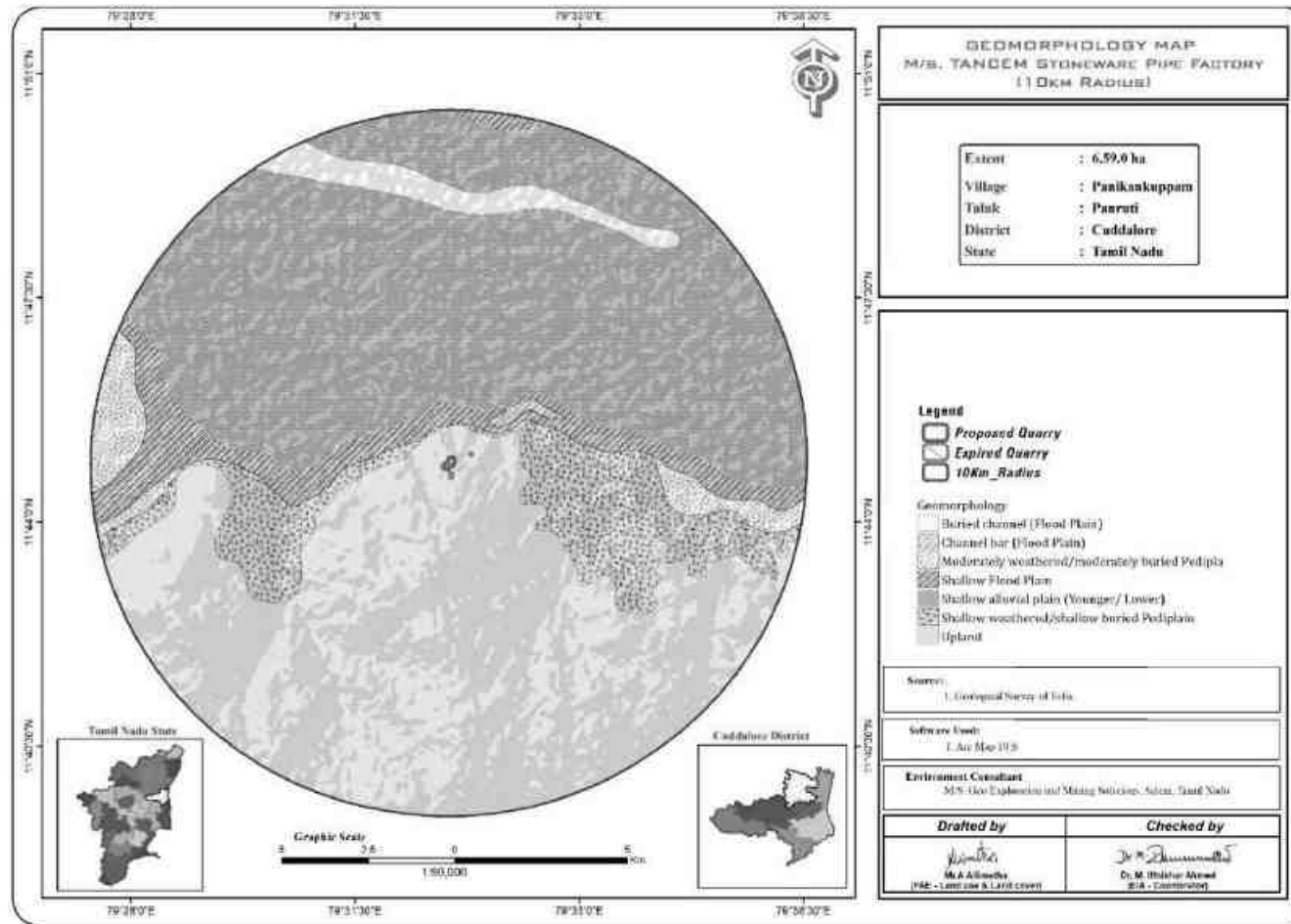
FIGURE 2.9: REGIONAL GEOLOGY MAP

FIGURE 2.10: GEOMORPHOLOGY MAP

2.4 QUALITY OF RESERVE

Fireclay occurring in this area is well exposed in outcrops, trench cuttings and excavations made for village roads. Detailed exploration is proposed to carry out in the area by trial pits after granting of quarrying lease.

2.5 RESERVE ESTIMATION AND PRODUCTION

The Fire clay deposit in the area recommended for quarrying lease is simple flat-bedded deposit of shallow depth. The geological resources of Fire clay in the area are estimated by area calculation method. The total area recommended for quarrying lease is 6.59.0 Hectares. The entire area is mineralized and the average depth of the top soil layer is 1.5 meter and the average thickness of Fireclay is 20 meters. The average depth is arrived from the geological field studies and measuring the thickness at the Fireclay exposure in out crops and road cuttings. The total geological reserve (ROM) in the applied area is 3,54,625.25 Ts of Fire clay.

The mineable reserves in the area recommended for quarrying lease has been estimated by cross section method. The net area available for mining after deducting the area blocked up as safety distance is considered for the estimation of mineable reserves of Fire clay. It is proposed to leave a distance of 7.5 meters from other adjoining patta lands, 50 meters from village roads situated northern side of the applied area and 50 meters from Odai situated in S.F.Nos. 138& 139 in the western side of the applied area as safety barrier. In addition, approach to the private land owners within the mineable area have also been provided with adequate safety distance. Accordingly the mineable area demarcated by excluding the area under safety barriers and approach road will divide the area recommended for quarrying lease. The mineable reserves of Fire clay with 100% recovery with depth of 5.5 m is estimated as 2,16,091 tonnes of Fire clay.

The total quantity of production for the first 5 years has been estimated as 98,611 tonnes of Fire clay for a depth of 5.5m. Estimated life of the mine based on the proposed production will be around 11 years.

Table 2.6: Resources and Reserves

DESCRIPTION	Quantity in Tonnes
Geological Resources of Fire clay	3,54,625.25 Ts
Mineable Reserves of Fire clay	2,16,091 Ts
Tentative Excavation for 1 st Five Year Plan Period	
Fire clay for 1 st Five Year Plan Period	98,611Ts
Topsoil for 1 st Five Year Plan Period	94,977 Ts
Peak Production (Fire clay) Proposed	24,224 Ts
Peak Production per Day (Fire clay)	21,798 Ts

Source: Approved Mining Plan

Table 2.7: Year wise Production details

Years	Fireclay @ 100%	Topsoil
I	24,224Ts/ 13,842m ³	16,608Ts/ 8,304m ³
II	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
III	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
IV	18,522Ts/ 10,584m ³	21,798Ts/ 10,899m ³
V	18,821Ts/ 10,755m ³	12,975Ts/ 6,487.5m ³
Total	98,611Ts/ 56,349m³	94,977Ts/ 47,488.5m³

Source: Approved Mining Plan

OMS Calculation –

Peak production in the first five year plan period	=	24,224 tonnes (Fire Clay)
Anticipated Daily Production	=	24,224 /300 working days in a year
	=	81 tonnes
No. of working hours per day	=	8.00 am to 5.00 pm with (1 hour lunch interval)
Total No. of Labours to be engaged	=	14 Numbers

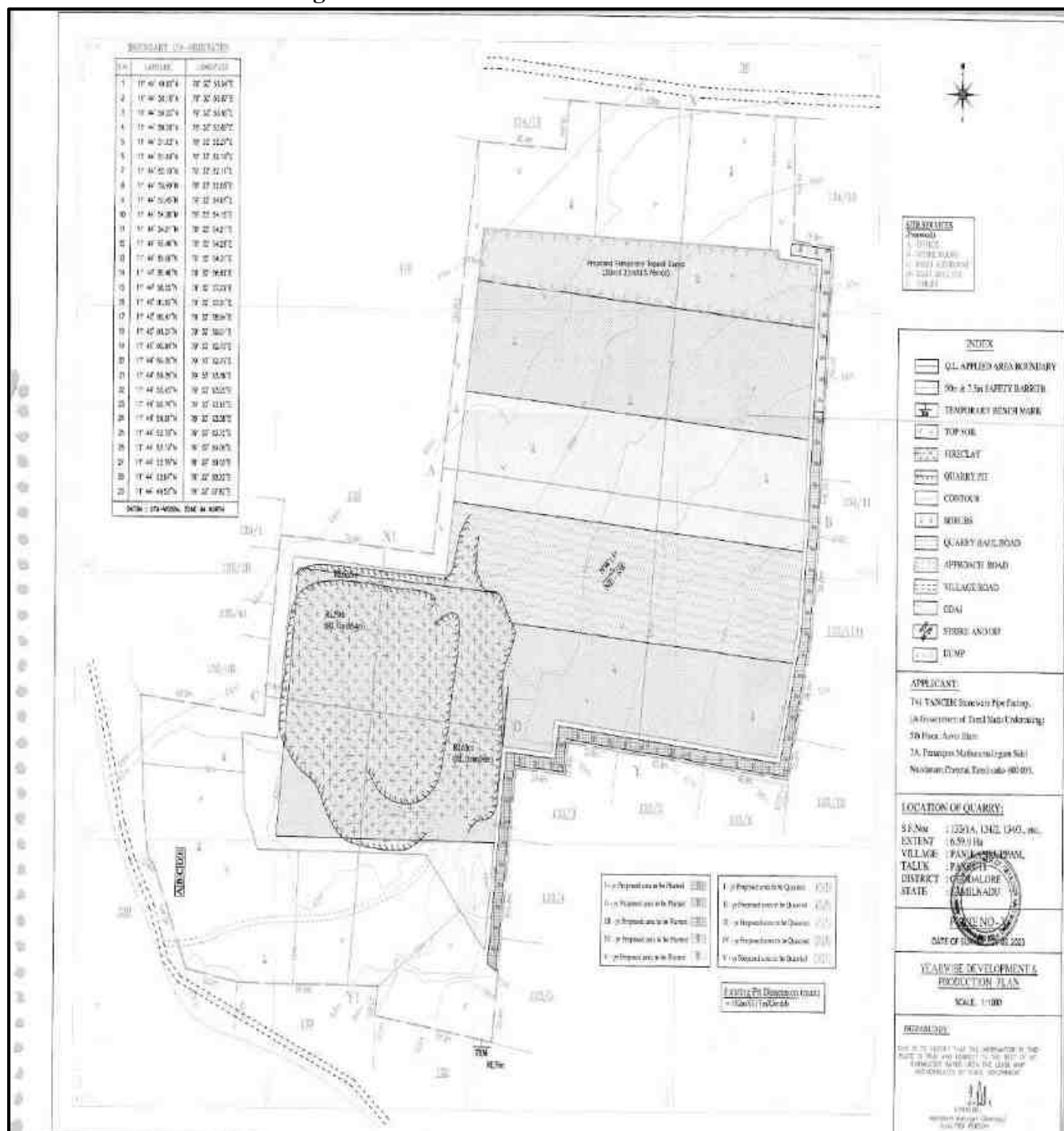
$$\text{OMS} = \frac{\text{Daily production}}{\text{No. of workers}} = \frac{81}{14} = \mathbf{6 \text{ tonnes}}$$

Output per Man Shift (OMS) – **6 tonnes (Fire clay)** including excavation and mineral handling**Trips Required for Fire clay Transportation –**

Considering 20 tonnes Capacity Tipper	=	81 tonnes / 20 tonnes
	=	<u>3-4 Trips</u>

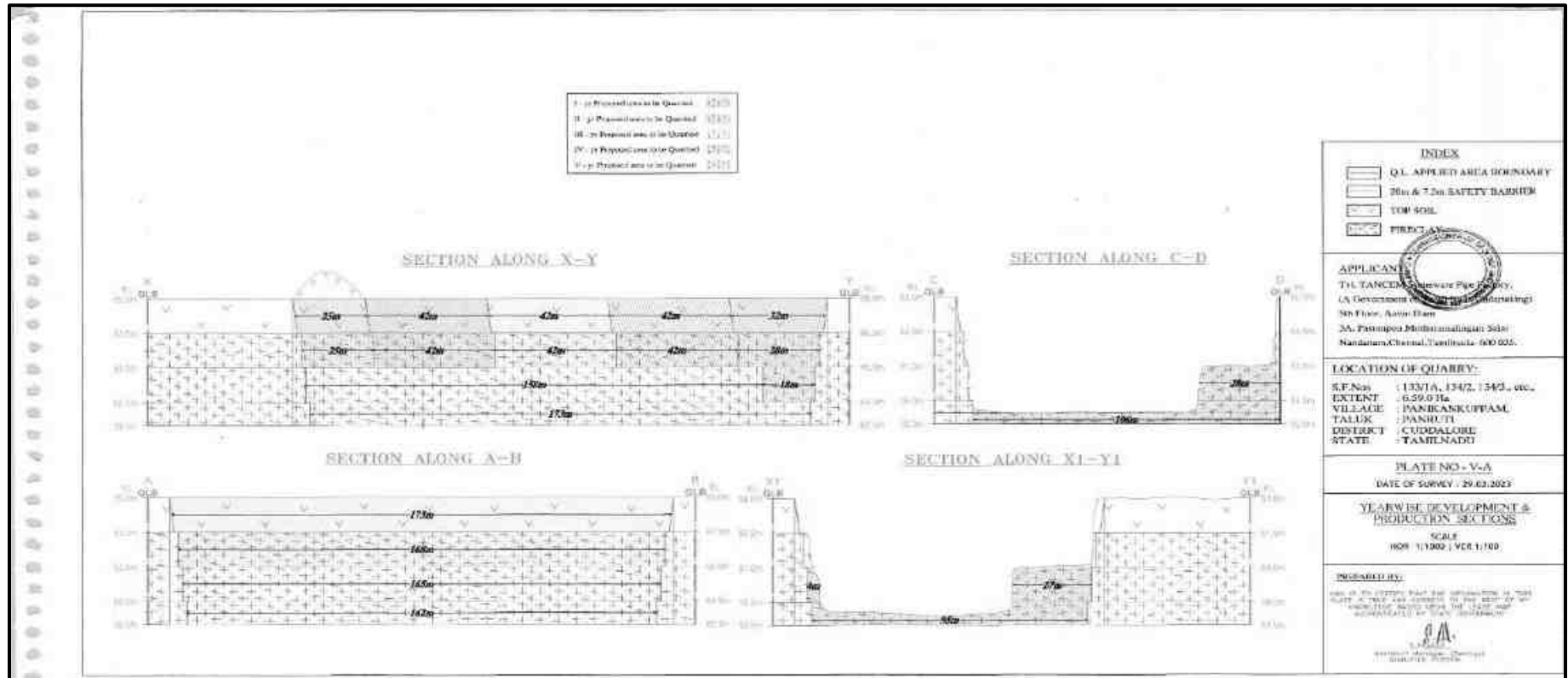
For the proposed peak production of **Fire clay**, the maximum number of tipper (20 tonnes capacity) trips required **per day would be around 3-4.**

Figure 2.11: Year-wise Production Plan



Source: Approved Mining plan

Figure 2.12: Year-wise production cross section



Source: Approved Mining plan

CONCEPTUAL PLAN

LEGEND

- QUARRY BOUNDARY
- ACCESS ROAD
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING UTILITY
- EXISTING CULVERT
- EXISTING DRAINAGE
- EXISTING EROSION CONTROL
- EXISTING VEGETATION
- EXISTING TOPOGRAPHY
- EXISTING ELEVATION
- EXISTING DISTANCE
- EXISTING AREA
- EXISTING VOLUME
- EXISTING WEIGHT
- EXISTING FORCE
- EXISTING PRESSURE
- EXISTING TEMPERATURE
- EXISTING HUMIDITY
- EXISTING WIND SPEED
- EXISTING WIND DIRECTION
- EXISTING RAINFALL
- EXISTING SUNLIGHT
- EXISTING SOUND
- EXISTING VIBRATION
- EXISTING ELECTROMAGNETIC INTERFERENCE
- EXISTING RADIATION
- EXISTING PARTICULATE MATTER
- EXISTING GASES
- EXISTING ODOUR
- EXISTING NOISE
- EXISTING VIBRATION
- EXISTING ELECTROMAGNETIC INTERFERENCE
- EXISTING RADIATION
- EXISTING PARTICULATE MATTER
- EXISTING GASES
- EXISTING ODOUR
- EXISTING NOISE

CONCEPTUAL PLAN

SCALE: 1:1000

DATE: 1/1/2011

PROJECT: QUARRY SITE

CLIENT: [REDACTED]

DESIGNER: [REDACTED]

APPROVED: [REDACTED]

DATE: 1/1/2011

2.5.1 Disposal of overburden / Waste

Table 2.8: Year Wise Proposal for top Soil

Period	Avg. Thickness (m)	Topsoil (Tonnes)
1st Year	1.5	16608
2nd Year	1.5	21798

3rd Year	1.5	21798
4th Year	1.5	21798
5th Year	1.5	12975
Total		94977

Source: Approved Mining Plan

From the above table it is inferred that during the first five years of plan period 94977 Tonnes of Top soil will be removed and side casted for exposing the Fire clay and will be utilized for simultaneous backfilling of mined out pit.

2.6 METHOD OF MINING

Opencast mechanized mining method is proposed for quarrying, the overburden in the form of top soil, the top soil will be side casted. The Fire clay in this area is in friable form and can be excavated by using hydraulic excavator. The mine will be worked in 50m X 50m blocks within the mineable blocks and the side casted topsoil will be backfilled and leveled. There will not be any drilling and blasting involved in the mining operation. It is proposed to leave a distance of 7.5 meters from other adjoining patta lands, 50 meters from village roads situated northern side of the applied area and 50 meters from Odai situated in S.F.Nos. 138& 139 in the western side of the applied area as safety barrier.

The Fire clay will be loaded to trucks for transportation to cement manufacturing unit. The Fire clay will be utilized directly and mobile screen will be utilized whenever required for improving the grade. The mined-out pit will be back filled with side casted topsoil and screened fines. The back filled area will be leveled properly for developing plantation.

It is proposed to load Fire clay directly from the mine face to trucks. Hence, hydraulic excavators will be deployed for removal and loading of Fire clay.

The machineries proposed to deploy in the area is front end cum back hoe loader for backfilling and leveling, water tanker for plantation development and water sprinkling of haul roads and diesel operated mobile tower lights for quarry general lighting.

Table 2.9: Lists of Machineries Proposed

Sl.No.	Machinery	Numbers of Units
1	Hydraulic Excavator	1
2	Tipper	2

Source: Approved Mining plan

The total direct manpower requirement for the full scale quarrying operations is given below.

Table 2.10: Man power requirement

Sl.No.	Category	Number of Persons
1	Mines manager	1
2	Mines Mate	2
3	Machinery operators	2
4	Skilled labour	4
5	Semi-skilled	2
6	Unskilled	3
Total		14

Source: Approved Mining plan

2.6.1 Conceptual Mining Plan/ Final Mine Closure Plan

The Fire clay deposit is soft & fragile in nature and occurring as a thin layer of around 20 m thick overlain by soil for a thickness of around 2m. The maximum depth of mine working will be 5.5 meters. The entire Fire clay mined out will be utilized in the ceramic manufacturing unit. The topsoil will be side casted and will be utilized for the backfilling of mined out pit for the plantation purpose. There will not be any external waste dumps or top soil dumps in the area. It is proposed to mine entire Fire clay reserves in 11 years Life of Mine.

2.6.2 Traffic Density:

The traffic survey conducted based on the transportation route of material, the fire clay is proposed to be transported mainly through

Traffic density measurements were performed at two locations and given below in table no. 2.10.

Traffic density measurement was made 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 either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

TABLE.2.11: TRAFFIC SURVEY LOCATIONS

Station Code	Road Name	Distance and Direction	Type of Road
TS-1	Panikankuppam-Maligampattu Panchayat Road	North	Panchayat Road
TS-2	Panchayat Road	110m SE	Panchayat Road

Source: On-site monitoring by GEMS FAE & TM

TABLE 2.12: EXISTING TRAFFIC VOLUME

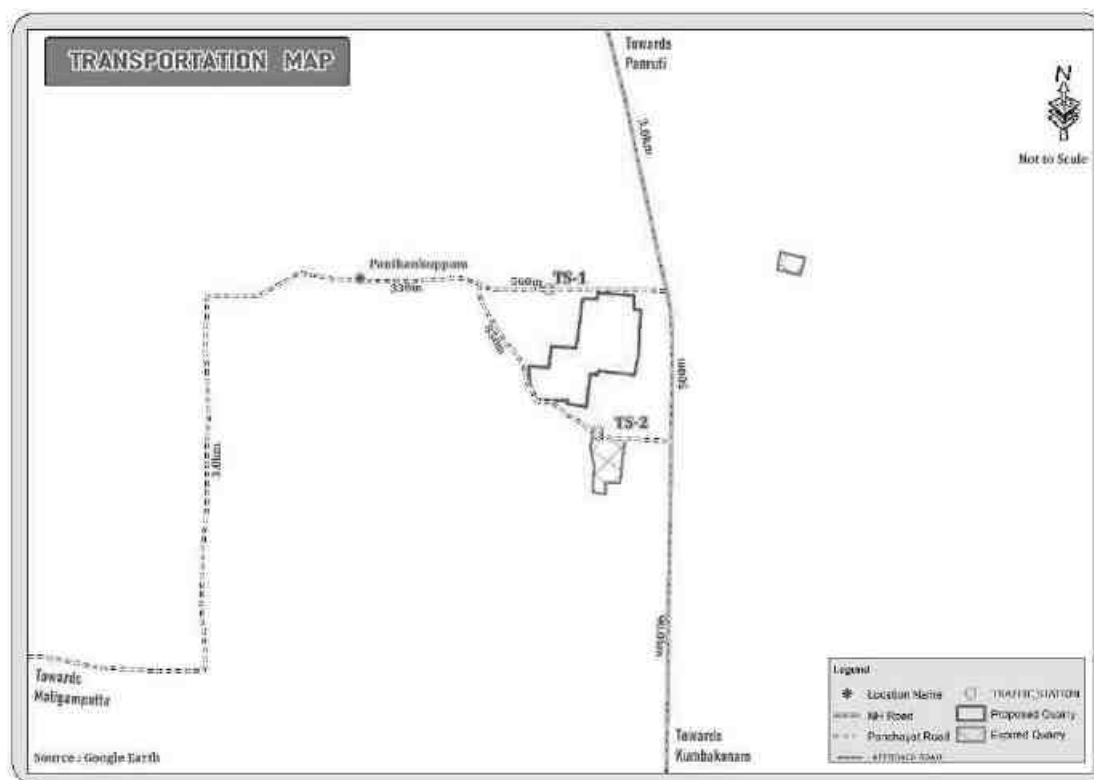
Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	20	60	30	30	100	50	140
TS2	25	75	40	40	150	75	190

Source: On-site monitoring by GEMS FAE & TM

* PCU conversion factor: HMV (Trucks and Bus) = 3, LMV (Car, Jeep and Auto) = 1 and 2/3 Wheelers = 0.5

TABLE 2.13: FIRECLAY HOURLY TRANSPORTATION REQUIREMENT

Transportation of Fireclay per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
20 tonnes	10	30

FIGURE.2.14: MINERAL TRANSPORTATION ROUTE MAP**TABLE 2.14: SUMMARY OF TRAFFIC VOLUME**

Route	Existing Traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
TS1	140	30	170	1200
TS2	190	30	220	1500

Source: On-site monitoring analysis summary by GEMS FAE & TM

- Due to these projects the existing traffic volume will not exceed
- As per the IRC 1960 this existing village road can handle 1200 PCU in hour and Major district road can handle 1500 PCU in hour hence there will not be any conjunction due to this proposed transportation.

2.6.3 Mineral Beneficiation and Processing

There is no proposal for the mineral processing or ore beneficiation in the project area

2.7 PROJECT REQUIREMENT

2.7.1 Water Source & Requirement

Detail of water requirements in KLD as given below:

Water will be purchased from water vendors by water tankers. Packaged Drinking Water is available from the nearby approved water vendors.

Table 2.15: Water Requirements

Purpose	Quantity	Sources
Domestic purpose	0.5 KLD	Drinking water is available from the nearby community wells
Dust suppression	0.8 KLD	From existing bore well on nearby mine
Green belt	0.7 KLD	From existing bore well on nearby mine
Total	2.0 KLD	

* Drinking water will be sourced from approved water vendors

Source: Approved Mining Plan & Pre – Feasibility Report

Table 2.16 Project cost

Sl.No	Description	Cost in Rupees
1	Fixed asset cost	8,75,000/-
2	Operational cost	17,70,000/-
3	EMP	3,80,000/-
Total project cost		Rs.30,25,000/-

Source: Approved Mining Plan

2.7.2 Power and Other Infrastructure Requirement

The project does not require power supply for the mining operations. The quarrying activity is proposed during day time only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Electricity office and other internal infrastructure will be utilized from solar power.

The temporary infrastructures such as Mine Office, First Aid Room, Rest Shelter etc., will be constructed within the project area. No workshops are proposed inside the area hence there will not be any process effluent generation from the proposed project area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. There is no toxic effluent expected to generate in the form of solid, liquid or gaseous form hence there is no requirement of waste treatment.

2.7.3 Fuel Requirement

High speed Diesel (HSD) will be used for mining machineries. Diesel will be brought from nearby Fuel Stations.

Per hour Excavator will consume = 16 liters / hour

Per hour Excavator will excavate = 10m³

(For the entire life period) = 1,23,480.5/60

Diesel consume 2058 working hours = 2058 hours x 10 liters = 20580 liters of HSD for entire project life

(For during this period) = 56,349/60

Diesel consume 1644 working hours = 939 hours x 10 liters

= 9390 liters of HSD for during this period.

Besides other accessories like compressor etc., 20 liters will be utilized per day.

Hence, it is computed as average **60-80 Ltrs** of HSD per day will utilized in the mining operation.

2.8 PROJECT IMPLEMENTATION SCHEDULE

The Fire clay quarry operation will commence after the grant of Environmental Clearance, CTO and CTE from the State Pollution Control Board. The conditions imposed during the Environmental Clearance will be compiled before the start of mining operation.

Table 2.17 Expected time schedule for the project

Sl. No.	Particulars	Time Schedule (In Month)*					Remark if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent To Establish						Project Establishment Period
3	Consent To Operate						Production Start Period
*Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

Source: Anticipated based on Timelines framed in EIA Notification & CPCB Guidelines

CHAPTER – 3: DESCRIPTION OF ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out one season (October to December 2025) (Post Monsoon Season) with CPCB guidelines. Environmental data has been collected with reference to cluster quarries by CHENNAI METTEX LAB PRIVATE LIMITED Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD Notified Laboratory, for the below attributes

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

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The data collection has been used to understand the existing environment scenario around the cluster against which the potential impacts of the project can be assessed. The study area has been divided into two zones viz **core zone** and **buffer zone** where core zone is considered as cluster and buffer zone taken as 10km radius from the periphery of the Cluster. Both Core zone and Buffer zone is taken as the study area.

Study Period

The baseline study was conducted during the **post-monsoon** season i.e., October – December 2025 (3 Months).

Study Methodology

- The project area was surveyed in detail with the help of Total Station and the boundary pillars were picked up with the help of GPS. The boundary coordinates were superimposed on the satellite imagery to understand the relief of the area, besides Land use pattern of the area was studied through the Bhuvan (ISRO)
- Soil samples were collected and analysed for relevant physio-chemical characteristics, exchangeable Cations, nutrients & micro nutrients etc., in order to assess the impact due to mining activities and to recommend saplings for Greenbelt development.
- Ground water samples were collected during the study period from the existing bore wells, while surface water was collected from ponds in the buffer zone. The samples were analysed for parameters necessary to determine water quality (based on IS: 10500:2012 criteria) and those which are relevant from the point of view of environmental impact of the proposed mines.
- An onsite meteorological station was setup in cluster area, to collect data about wind speed, wind direction, temperature, relative humidity, rainfall and general weather conditions were recorded throughout the study period.

- In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality.
- The Noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone.
- Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area.
- Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project.

The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below Table 3.1.

Table 3.1: Environmental monitoring attributes and frequency of monitoring

Attribute	Parameters	Frequency of monitoring	No. of locations	Protocol
Land-use	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
Soil Characteristics	Physio-Chemical Characteristics	Once during the study period	6 (2 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (1 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data & Secondary Data from IMD Station
Ambient Air Quality	PM ₁₀ PM _{2.5} SO ₂ NO _x CO	24 hourly twice a week (October – December 2025)	7 (3 core & 4 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (3 core & 4 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrant & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/ Chennai Mettux Laboratories in association with GEMS

* All monitoring and testing are been carried out as per the Guidelines of CPCB and MoEF & CC.

3.1 LAND ENVIRONMENT

The main objective of this section is to provide a baseline status of the study area covering 10km radius around the proposed mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

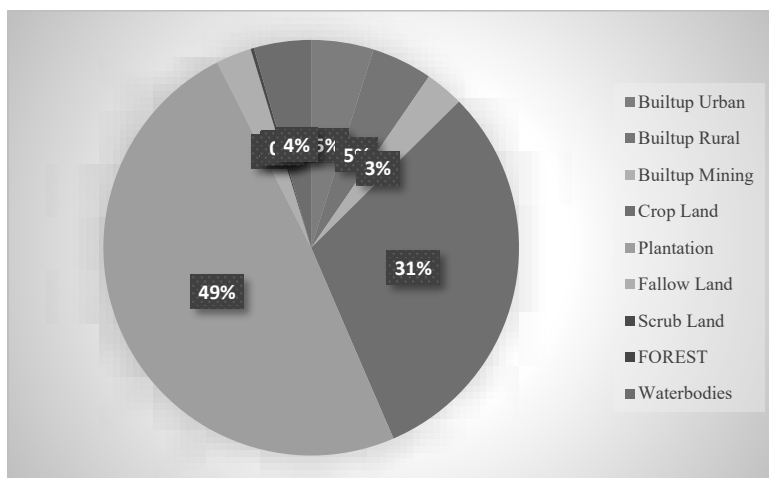
3.1.1 Land Use/ Land Cover

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

Table 3.2: LAND USE / LAND COVER TABLE 10 Km RADIUS

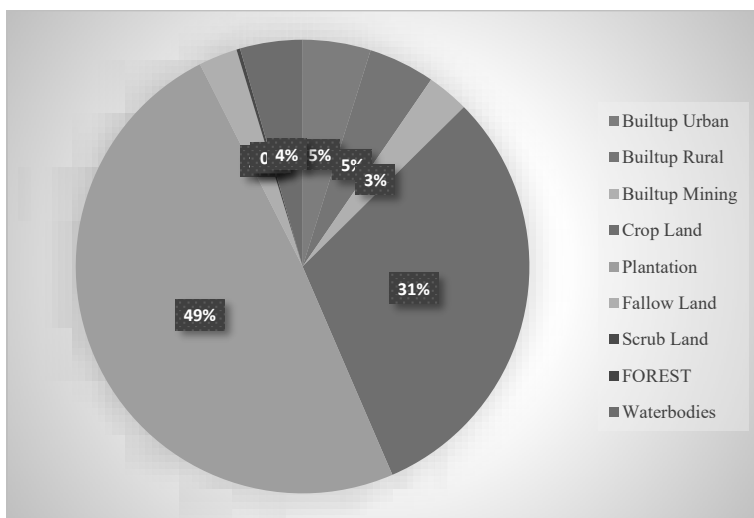
S.No	CLASSIFICATION	AREA_HA	AREA_%	AREA_HA	AREA_%
BUILTUP					
1	Builtup Urban	359.70	1.11	72.17	4.85
2	Builtup Rural	1704.91	5.24	70.57	4.74
3	Builtup Mining	176.93	0.54	44.64	3.00
AGRICULTURAL LAND					
4	Crop Land	17096.93	52.55	460.193	30.93
5	Plantation	9858.60	30.30	729.061	49.00
6	Fallow Land	993.08	3.05	41.19	2.77
BARREN/WASTE LANDS					
7	Scrub Land	397.61	1.22	3.93	0.26
FOREST LAND					
8	FOREST	590.97	1.82	0	0.00
WETLANDS/ WATER BODIES					
9	Waterbodies	1358.22	4.17	66.27	4.45
TOTAL		32536.96	100.00	1488.02	100.00

Source: Survey of India Toposheet and Landsat Satellite Imagery

Figure 3.1: Pie Chart of Land Use/Land Cover Analysis of 10km

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 85.9% followed by Built-up Lands – 6.89%, Scrub & Forest land – 3.04%, and Water bodies 4.17%.

The total mining area within the study area is 176.93 ha i.e., 0.54%. The cluster area of 6.59.0 ha contributes about 3.72% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

Figure 3.2: Pie Chart of Land Use/Land Cover Analysis of 2km

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 82.7% followed by Built-up Lands – 12.59%, Scrub & Forest land – 0.26%, and Water bodies 4.45%.

The total mining area within the study area is 44.64 ha i.e., 3%. The cluster area of 6.59.0 ha contributes about 14.76% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.1.2 Topography

The proposed project area is almost an undulated terrain, covered with Top Soil formation of 1.5 to 6.0m thickness; The Fireclay is Overlain by a thick bed of red soil of having thickness ranging from 1.5 to 13.2m. The soil is soft in nature and can be dozed off.

3.1.3 Drainage Pattern of the Area

Drainage pattern are created by stream erosion over time that reveals characteristics of the kind of rocks and geological structures in a landscape region drained by streams.

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land.

Dendritic patterns, which are by far the most common, develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be eroded equally easily in all directions.

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

3.1.4 Seismic Sensitivity

The proposed project site falls in the seismic Zone II, low damage risk zone as per BMTPC, Vulnerability Atlas of Seismic zone of India IS: 1893 – 2002. The project area falls in the hard rock terrain on the peninsular shield of south India which is highly stable.

(Source: https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf)

3.1.5 Environmental Features in the Study Area

There is no Wildlife Sanctuaries, National Park and Archaeological monuments within project area. No Protected and Reserved Forest area is involved in the project area. Therefore, there will be no need to acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e. 10 km radius, are given in the below Table 3.3.

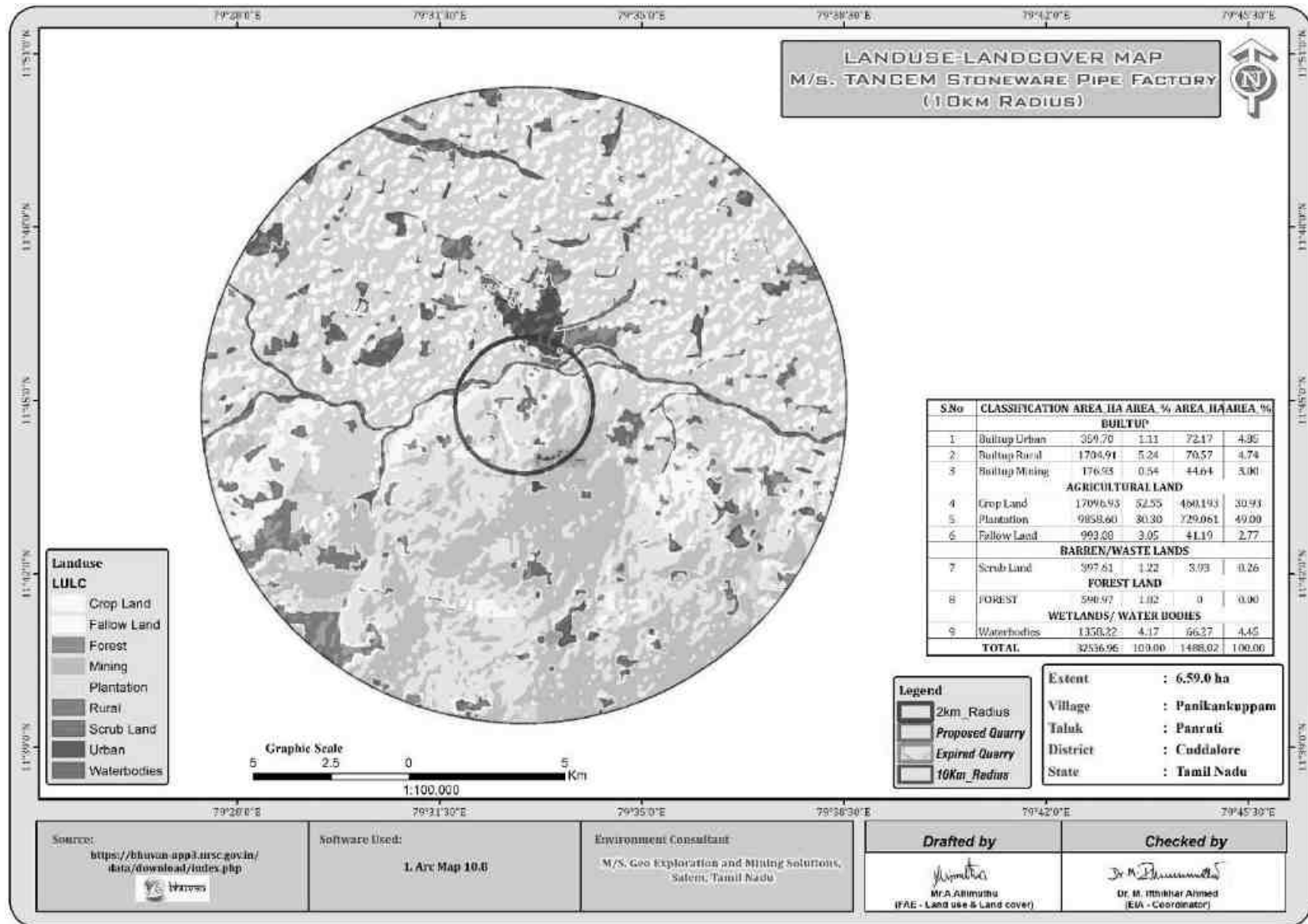
FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS

TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER

Sl.No	Sensitive Ecological Features	Name	Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	Oussudu Lake Bird Sanctuary	30.0km – North East
2	Reserve Forest	Kangiruppu RF	6.7km – South West
3	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10Km Radius
4	Critically Polluted Areas	None	Nil within 10km Radius
5	Mangroves	None	Nil within 10km Radius
6	Mountains/Hills	None	Nil within 10km Radius
7	Notified Archaeological Sites	None	Nil within 10km Radius
8	Industries/ Thermal Power Plants	None	Nil within 10km Radius
9	Defence Installation	None	Nil within 10km Radius

TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE

SL.No	NAME	DISTANCE & DIRECTION
1	Odai	50m Safety SW
2	Odai	600m SW
3	Kedilam River	1.2km North
4	Lake	1.8km SW

Source: Village Cadastral Map and Field Survey

3.1.6 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.5 and Figure 3.3.

The objective of the soil sampling is -

To determine the baseline soil characteristics of the study area; study the impact of proposed activity on soil characteristics and study the impact on soil more importantly agriculture production point of view.

TABLE 3.5: SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	Project Area	11°44'59.69"N 79°33'2.01"E
2	S-2	Near Quarry (Residential Land)	380m NE	11°45'4.78"N 79°33'14.07"E
3	S-3	Ulunthampattu (Residential Land)	1.80km North	11°45'58.73"N 79°32'54.74"E
4	S-4	Melmambattu (Barren Land)	3.5km SE	11°43'25.21"N 79°34'19.22"E
5	S-5	Palapattu (Agriculture Land)	5.5km East	11°44'44.54"N 79°36'3.20"E
6	S-6	Elandampattu (Agriculture Land)	6km NW	11°45'29.91"N 79°29'42.32"E

Source: On-site monitoring/sampling by Chennai Mettix Laboratories in association with GEMS

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Five (5) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The samples were sent to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.6.

TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION

Particulars	Details
Frequency	One grab sample from each station-once during the study period
Methodology	Composite grab samples of the topsoil were collected from 3 depths, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene bags and analysed at the laboratory.

Source: On-site monitoring/sampling by Chennai Mettix Laboratories in association with GEMS

Soil Testing Result –

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classifications of soil is presented below in Figure 3.4 and the physico-chemical characteristics of the soil & Test Results in Table 3.7.

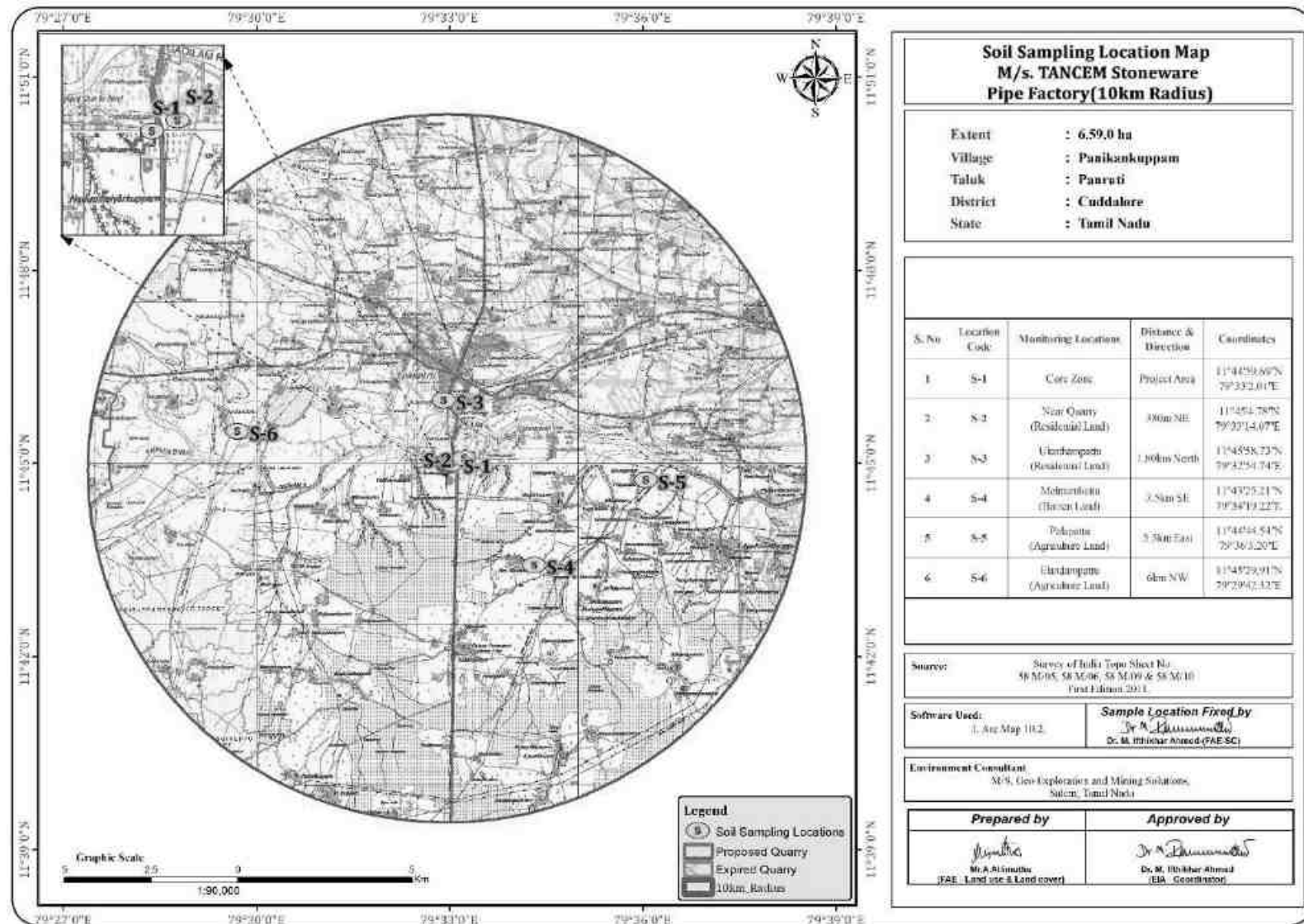
Figure 3.4: Soil Sampling Locations around 10 km radius

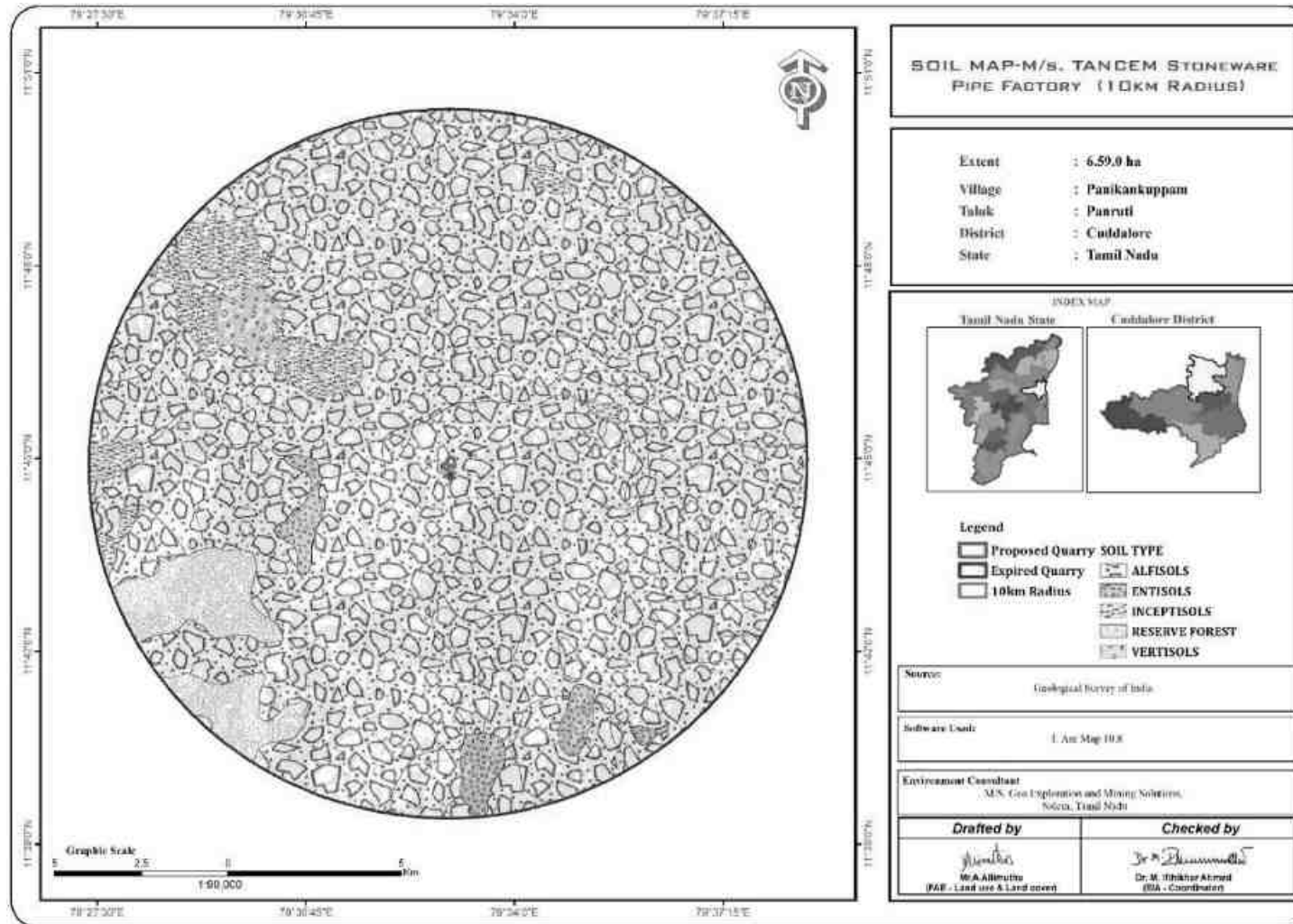
Figure 3.5: Soil Map of the study area

TABLE 3.7: SOIL SAMPLING RESULTS

Parameter		S-1 (Core Zone)	S-2 (Near Quarry)	S-3 (Ulundhampattu)	S-4 (Melmambattu)	S-5 (Palapattu)	S-6 (Onnipalayam)
1	pH @ 25°C	6.98	6.76	7.20	7.19	6.8	6.9
2	Conductivity @ 25°C	245.0 µmhos/cm	302.5 µmhos/cm	258.1+ µmhos/cm	366.5 µmhos/cm	395.5 µmhos/cm	420.5 µmhos/cm
3	Texture						
	Clay	27.2 %	28.7 %	27.2 %	29.4 %	28.5 %	27.5 %
	Sand	31.9 %	37.5 %	30.5 %	33.8 %	40.1 %	30.8 %
	Silt	40.9 %	33.8 %	42.3 %	36.8 %	31.4%	41.7 %
4	Water Holding Capacity	42.3 %	41.3%	38.3 %	40.8 %	38.6 %	40.9 %
5	Bulk Density	1.01 g/cm ³	0.89 g/cm ³	1.21 g/cm ³	1.08 g/cm ³	1.03 g/cm ³	1.89 g/cm ³
6	Porosity	36.5 %	40.9 %	40.8 %	39.3 %	41.2 %	37.8 %
7	Calcium as Ca	55.5 mg/kg	76.5 mg/kg	73.5 mg/kg	61.5 mg/kg	58.9 mg/kg	52.6 mg/kg
8	Magnesium as Mg	22.3 mg/kg	33.4 mg/kg	34.3 mg/kg	30.6 mg/kg	26.6 mg/kg	22.8 mg/kg
9	Manganese as Mn	29.6 mg/kg	26.5 mg/kg	27.6 mg/kg	23.7 mg/kg	27.8 mg/kg	19.9 mg/kg
10	Zinc as Zn	2.27 mg/kg	4.06 mg/kg	6.82 mg/kg	3.98 mg/kg	3.98 mg/kg	4.25 mg/kg
11	Boron as B	1.02 mg/kg	2.01 mg/kg	1.36 mg/kg	1.52 mg/kg	1.09 mg/kg	1.74 mg/kg
12	Chloride as Cl	80.5 mg/kg	89.5 mg/kg	79.5 mg/kg	68.1 mg/kg	73.6 mg/kg	75.5 mg/kg
13	Total Soluble Sulphate as SO ₄	0.022 %	0.022 %	0.020 %	0.025 %	0.017 %	0.017 %
14	Potassium as K	27.1 mg/kg	20.6 mg/kg	23.8 mg/kg	31.3 mg/kg	27.7 mg/kg	28.6 mg/kg
15	Total Phosphorus as P	3.11mg/kg	6.08 mg/kg	4.69 mg/kg	5.24 mg/kg	3.58 mg/kg	3.15 mg/kg
16	Total Nitrogen as N	288.0 mg/kg	384.8 mg/kg	293.5 mg/kg	416.8 mg/kg	282 mg/kg	398.5 mg/kg
17	Cadmium as Cd	BDL (DL : 1.0 mg/kg)					
18	Total Chromium as Cr	BDL (DL : 1.0 mg/kg)					
19	Copper as Cu	BDL (DL : 1.0 mg/kg)					
20	Lead as Pb	1.91 mg/kg	1.21 mg/kg	0.96 mg/kg	1.07 mg/kg	0.98 mg/kg	1.05 mg/kg
21	Iron as Fe	63 mg/kg	18.98 mg/kg	10.29 mg/kg	15.21 mg/kg	4.03 mg/kg	16.08 mg/kg
22	Organic Matter	1.76 %	3.81 %	2.43 %	2.49 %	2.18 %	2.12 %
23	Organic Carbon	1.02 %	2.21 %	1.41 %	1.42 %	1.27 %	1.23 %
24	Cation Exchange Capacity	29.8 meq/100g of soil	27.8 meq/100g of soil	30.6 meq/100g of soil	25.9 meq/100g of soil	32.1 meq/100g of soil	27.1 meq/100g of soil

Source: On-site monitoring/sampling by Chennai Mettlex Laboratories in association with GEMS



Interpretation & Conclusion

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay, Sandy Clay to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.89 – 1.89 g/cm³. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e., ranging from 38.3 – 42.3 % and 36.5 – 41.2 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 6.76 to 7.2
- The available Nitrogen content range between 282 to 416.8 mg/kg
- The available Phosphorus content range between 3.11 to 6.08 mg/kg
- The available Potassium range between 20.6 to 31.3 mg/kg

3.2 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

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

3.2.2 Ground Water Resources:

Groundwater occurs in all the crystalline formations of oldest Achaeans and Recent Alluvium. The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc.

Ground water occurring in phreatic conditions in weathered and fractured gneiss rock formation. The weathering is controlled by the intensity of weathering and fracturing. Dug wells as well as bore wells are more common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depth of dug wells range from 7.2 to 13 m bgl. The dug wells yield up to 1 lps in summer months and few wells remain dry. The yield is adequate for irrigation for one or two crops in monsoon period.

3.2.3 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on;

- Drainage pattern;
- Location of Residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions

Two (1) surface water and Four (5) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.8 and shown as Figure 3.5.



TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	COORDINATES
SURFACE WATER				
1	SW-1	Kedilam River	1.2km North	11°45'37.56"N 79°33'7.54"E
GROUND WATER				
2	OW-1	Near Project Area	210m East	11°44'56.45"N 79°33'10.23"E
3	OW-2	Elandampattu	6km NW	11°45'32.17"N 79°29'41.10"E
4	OW-3	Palapattu	5.5km East	11°44'44.50"N 79°36'1.46"E
5	BW-1	Near Project Area	240m NW	11°45'2.28"N 79°32'49.79"E
6	BW-2	Melmambattu	3.5km SE	11°43'24.32"N 79°34'16.11"E

Source: On-site monitoring/sampling by Chennai Mettex Laboratories in association with GEMS

Figure 3.6: Photographs of Water Sampling

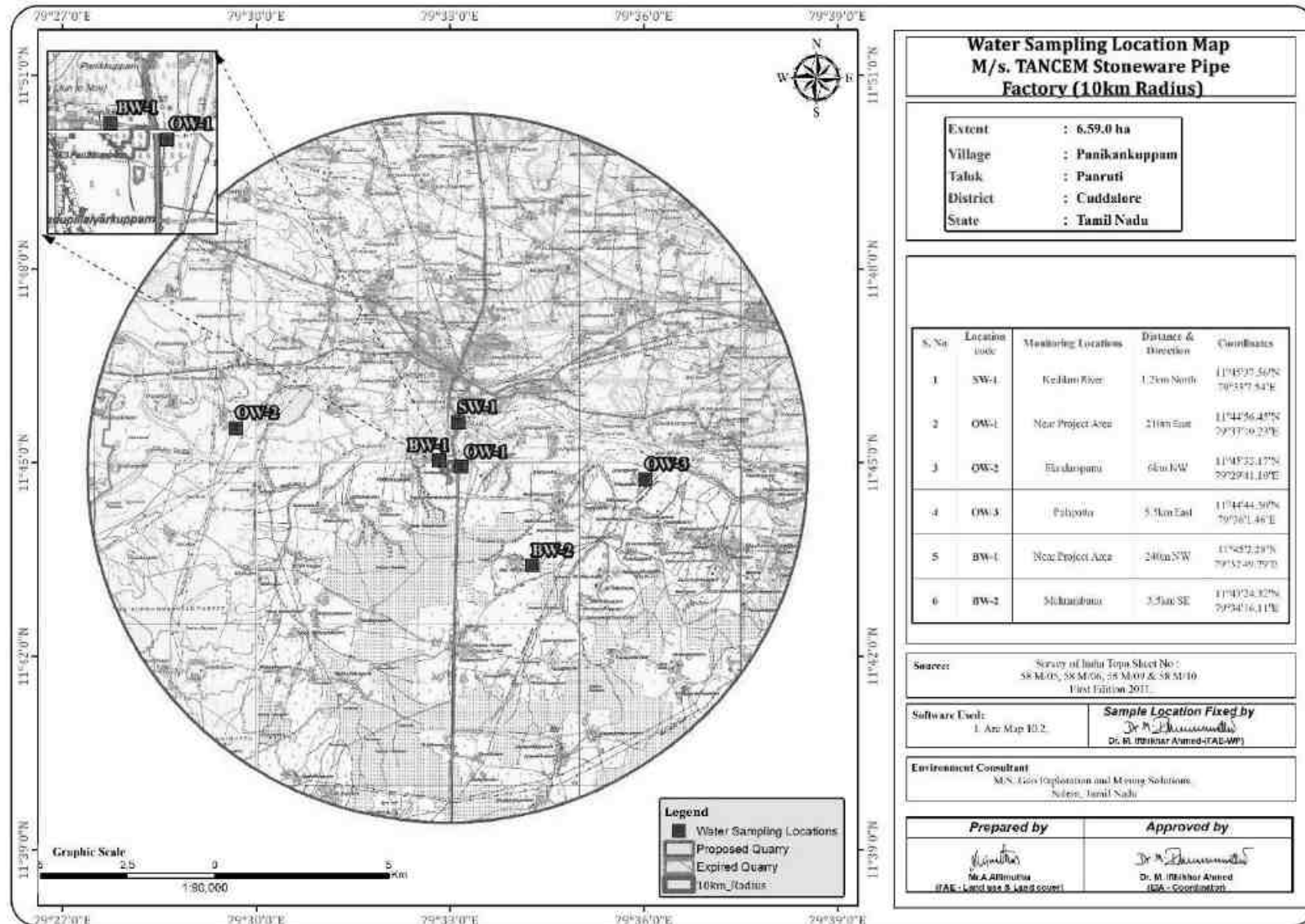
Figure 3.7: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

TABLE 3.9: GROUND WATER SAMPLING RESULTS

S.NO	Parameter	OW-1 (Near Project Area)	OW-2 (Elandampattu)	OW-3 (Palapattu)	BW-1 (Near Project Area)	BW-2 (Melmambattu)
1	Colour	1	1	1 Hazen	5 Hazen	5 Hazen
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	7.33	7.53	7.32	7.27	7.38
4	Conductivity @ 25°C	1085.0 µmhos/cm	1039.0µmhos/cm	1026.0 µmhos/cm	995.0 µmhos/cm	848.0 µmhos/cm
5	Turbidity	1 NTU	1 NTU	2 NTU	2 NTU	1 NTU
6	Total Dissolved Solids	640.0 mg/l	612.0mg/l	605.0 mg/l	578.0 mg/l	491.0mg/l
7	Total Hardness as CaCO ₃	180.0 mg/l	172.0 mg/l	164.0 mg/l	144.0 mg/l	128.0 mg/l
8	Calcium as Ca	38.4 mg/l	44.8 mg/l	40.0 mg/l	33.6 mg/l	32.0 mg/l
9	Magnesium as Mg	20.4 mg/l	14.5 mg/l	15.5 mg/l	14.6 mg/l	11.6 mg/l
10	Total Alkalinity as CaCO ₃	165.0 mg/l	151.5 mg/l	152.0 mg/l	135.6 mg/l	118.7 mg/l
11	Chloride as Cl	219.5 mg/l	200.5 mg/l	198.2 mg/l	198.6 mg/l	150.2 mg/l
12	Sulphate as SO ₄	51.4 mg/l	51.4 mg/l	51.4 mg/l	48.6 mg/l	36.8 mg/l
13	Iron as Fe	0.42 mg/l	0.52 mg/l	0.41 mg/l	0.38 mg/l	0.35 mg/l
14	Residual Free Chlorine	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	0.38 mg/l	0.42 mg/l	0.41 mg/l	0.33 mg/l	0.31 mg/l



16	Nitrate as NO ₃	5.3 mg/l	5.3 mg/l	4.3 mg/l	8.9 mg/l	5.8 mg/l
17	Copper as Cu	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	Barium as Ba	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
32	Ammonia (as	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)



	total ammonia-N)					
33	Sulphide as H ₂ S	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)	BDL (DL:1.0 mg/l)
37	Total Coliform	202 MPN/100ml	192 MPN/100ml	151 MPN/100ml	127 MPN/100ml	141 MPN/100ml
38	Escherichia coli	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml

* IS: 10500:2012-Drinking Water Standards; # within the permissible limit as per the WHO Standard. The water can be used for drinking purpose in the absence of alternate sources. Note: SW- Surface water, GW – Ground water



TABLE 3.10: SURFACE WATER SAMPLING RESULTS

Sl. No.	Parameter	SW-1 (Kedilam River)
1	Colour	2 Hazen
2	Odour	Agreeable
3	pH at 25°C	7.91
4	Conductivity @ 25°C	1235.0 μ mhos/cm
5	Turbidity	5 NTU
6	Total Dissolved Solids	728 mg/l
7	Total Hardness as CaCO ₃	204.0 mg/l
8	Calcium as Ca	33.7 mg/l
9	Magnesium as Mg	19.4 mg/l
10	Total Alkalinity as CaCO ₃	193.4 mg/l
11	Chloride as Cl	251.0 mg/l
12	Sulphate as SO ₄	58.2 mg/l
13	Iron as Fe	0.51 mg/l
14	Residual Free Chlorine	BDL (DL:0.1 mg/l)
15	Fluoride as F	0.48 mg/l
16	Nitrate as NO ₃	19.3 mg/l
17	Copper as Cu	BDL (DL:0.01 mg/l)
18	Manganese as Mn	BDL (DL:0.02 mg/l)
19	Mercury as Hg	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	BDL (DL:0.001 mg/l)
21	Selenium as Se	BDL (DL:0.005 mg/l)
22	Aluminium as Al	BDL (DL:0.005 mg/l)
23	Lead as Pb	BDL (DL:0.005 mg/l)
24	Zinc as Zn	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	BDL(DL : 0.02 mg/l)
26	Boron as B	BDL(DL : 0.05 mg/l)
27	Mineral Oil	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	15.5 mg/l
32	Chemical Oxygen Demand	50.3 mg/l
33	Dissolved Oxygen	7.6 mg/l
34	Barium as Ba	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-)	BDL (DL:0.01

	N)	mg/l)
36	Sulphide as H ₂ S	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	20.18 mg/l
40	Total Coliform	1119 MPN/100ml
41	Escherichia coli	211 MPN/100ml

3.2.4 Interpretation& Conclusion

Surface Water

Ph:

At the sampling location, pH (7.91) and turbidity were within recommended standards, indicating suitable conditions for sustainable aquatic life(6.5 to 8.5 pH)

Total Dissolved Solids:

Total Dissolved Solids was recorded as 728 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 251 mg/l. Nitrates (as NO₃) was detected 19.3mg/l, while sulphates was detected 58.2 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.27 to 7.53 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 491 – 640 mg/l in all samples. The Total hardness varied between 128 to 180 mg/l for all samples. On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.3 Hydrology and Hydrogeological Studies

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 50m. The maximum depth proposed project is 5.5m BGL. Hence there is 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 the proposed project.

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 and will be used for dust suppression and greenbelt development and during the end of the life of the mine this collected water will act as a temporary reservoir.

TABLE 3.11: POST MONSOON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

Station Code	Water Level in Meters bgl			Longitude	Latitude
	Oct-25	Nov-25	Dec-25		
OW1	9.4	10.2	10.8	79° 33' 10.2279" E	11° 44' 56.4979" N
OW2	10.1	10.9	11.5	79° 32' 36.9255" E	11° 44' 59.4636" N
OW3	10.4	11.2	11.8	79° 33' 02.2574" E	11° 45' 31.1873" N
OW5	9.2	10	10.6	79° 33' 45.7687" E	11° 44' 45.4353" N
OW4	10.5	11.3	11.9	79° 33' 03.1507" E	11° 44' 04.8665" N
OW6	9.1	9.9	10.5	79° 32' 07.5015" E	11° 44' 58.5477" N

Source: Onsite monitoring data

TABLE 3.12: POST MONSOON WATER LEVEL OF BOREWELLS 1 KM RADIUS

Station Code	Water Level in Meters bgl			Longitude	Latitude
	Oct-25	Nov-25	Dec-25		
BW1	71	71.6	72.2	79° 32' 49.7939" E	11° 45' 02.3134" N
BW2	71.5	72.1	72.7	79° 33' 08.1089" E	11° 45' 36.1723" N
BW3	70.8	71.4	72	79° 33' 48.5935" E	11° 44' 38.2385" N
BW4	71.2	71.8	72.4	79° 33' 07.7120" E	11° 44' 34.2161" N
BW5	70.9	71.5	72.1	79° 32' 17.0884" E	11° 44' 12.8892" N
BW6	71.8	72.4	73	79° 32' 36.5599" E	11° 44' 51.3911" N
BW7	70.2	70.8	71.4	79° 32' 06.6752" E	11° 44' 47.3349" N

Source: Onsite monitoring data

FIGURE 3.8: OPEN WELL CONTOUR MAP –Oct-2025

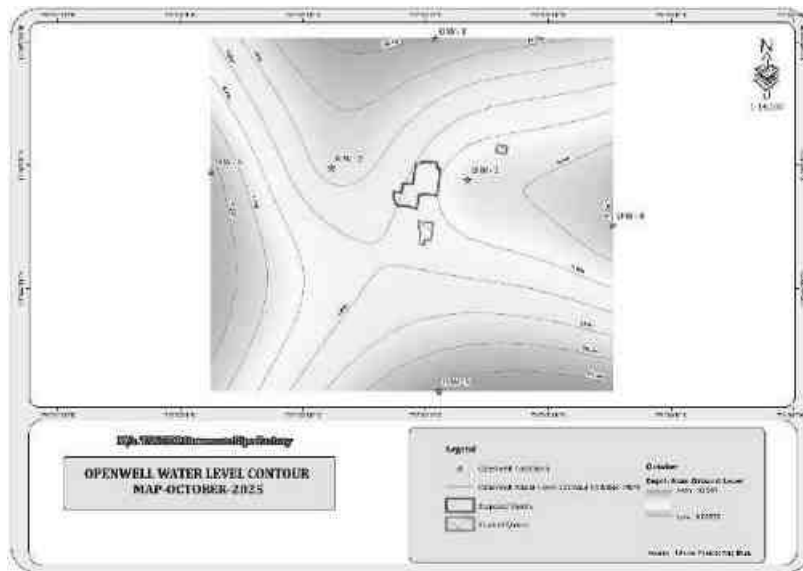


FIGURE 3.9: OPEN WELL CONTOUR MAP – Nov-2025

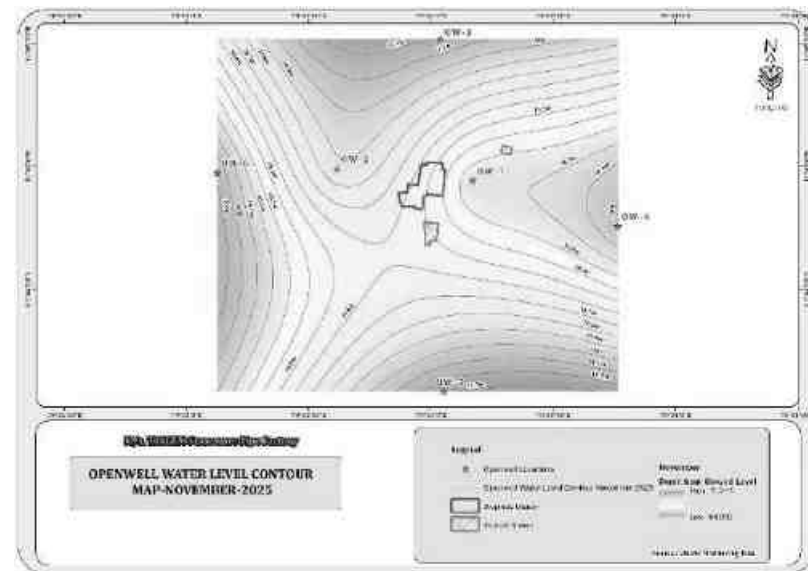


FIGURE 3.10: OPEN WELL CONTOUR MAP – Dec 2025

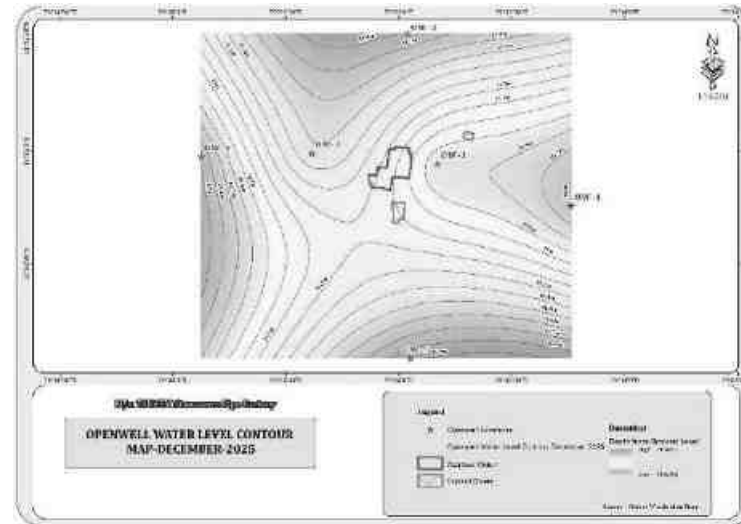


FIGURE 3.11: BOREWELL CONTOUR MAP – Oct 2025

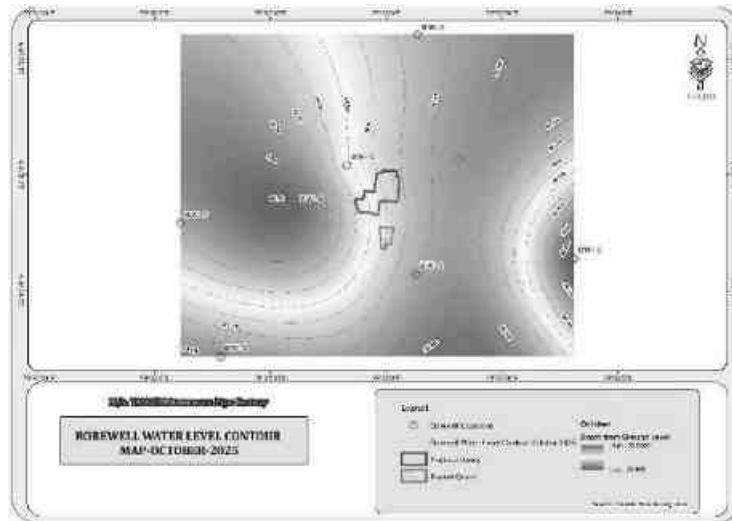


FIGURE 3.12: BOREWELL CONTOUR MAP – Nov 2025

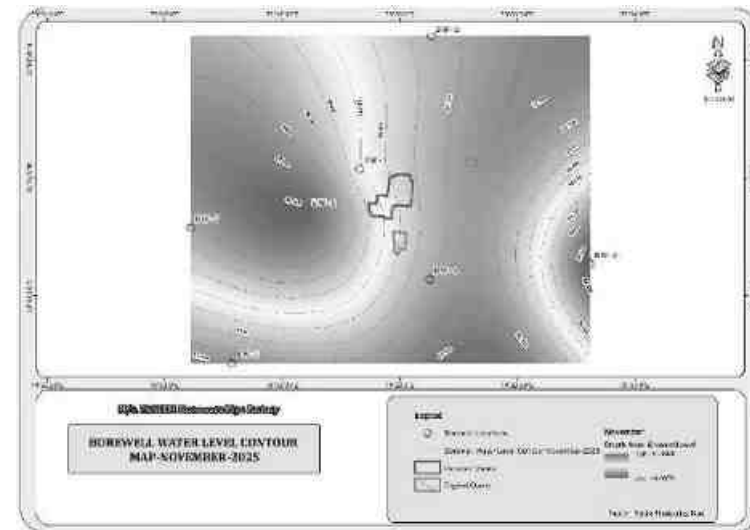


FIGURE 3.13: BOREWELL CONTOUR MAP – Dec-2025

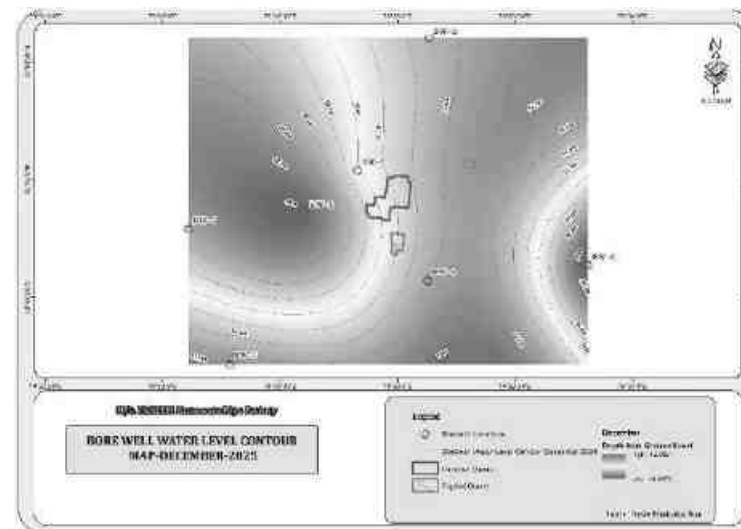


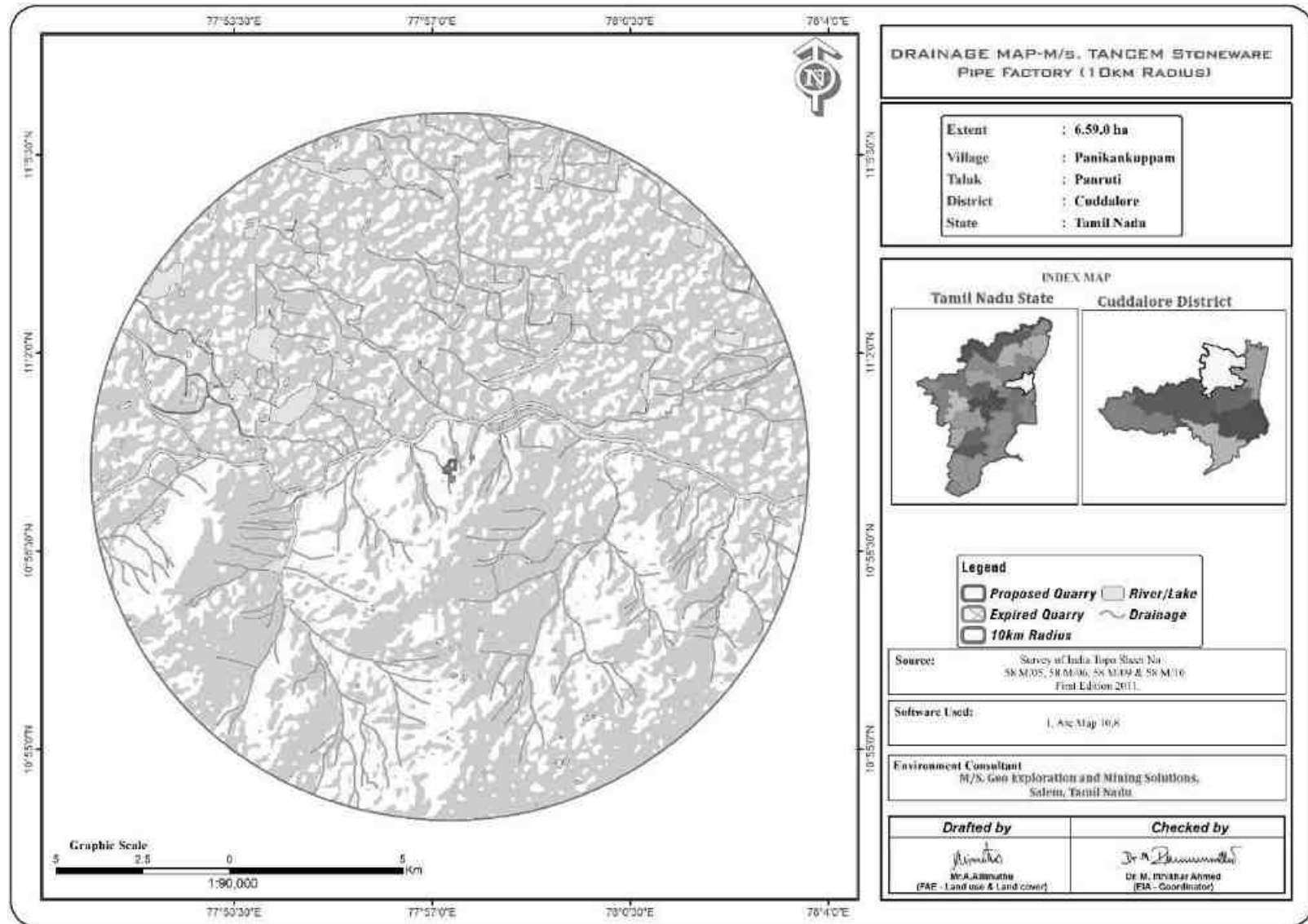
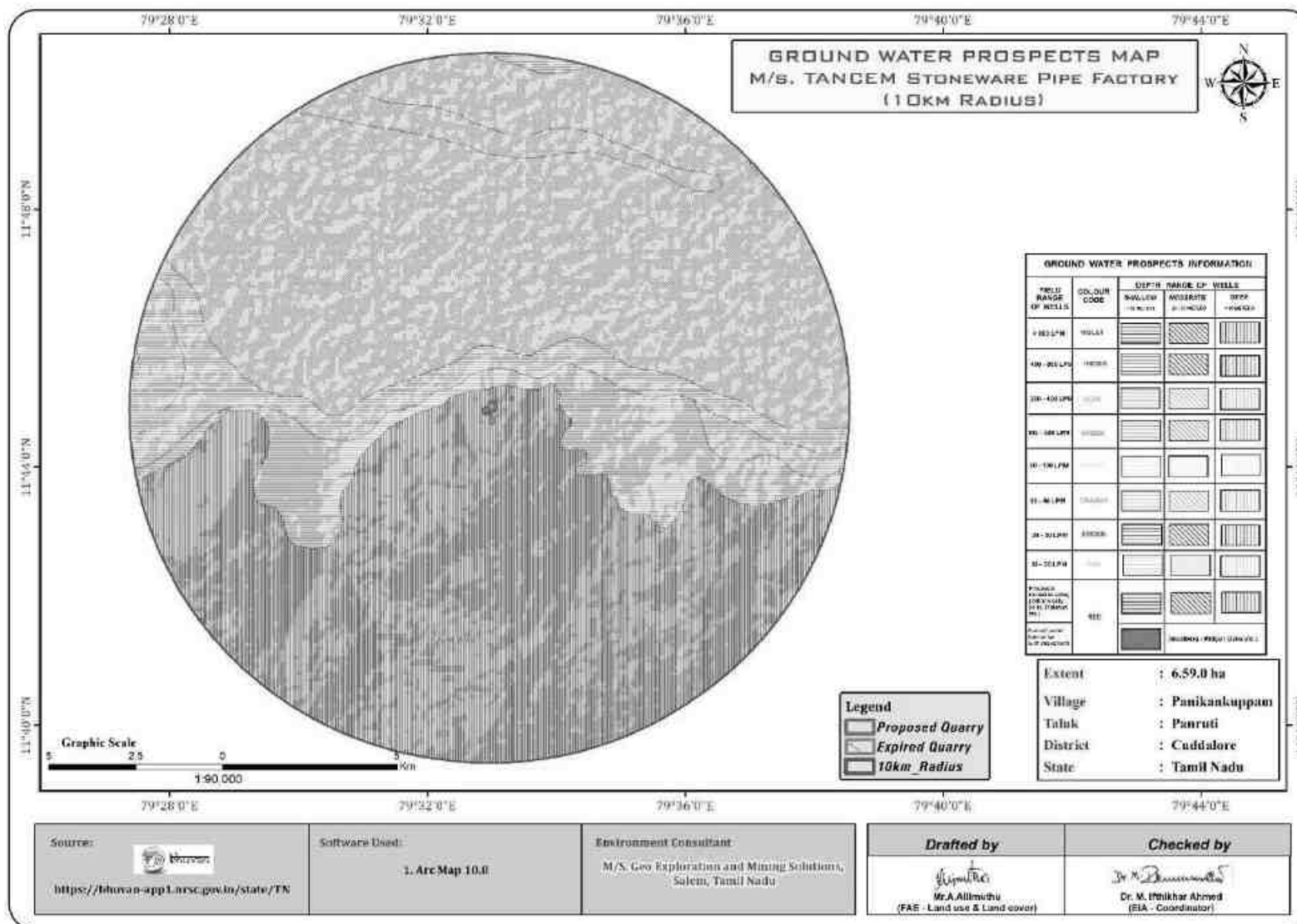
FIGURE 3.14: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

FIGURE 3.15: GROUND WATER PROSPECT MAP



3.2.5.1 Methodology and Data Acquisition

Electric Resistivity Method is well established for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface. The present study makes use of vertical electric sounding (VES) to delineate the Vertical Resistivity structure at depth. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral in homogeneities and is capable of providing higher depth of investigation. This is 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.

$$\rho_a = \frac{G\Delta V}{I}$$

ΔV = 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,

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

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

$\emptyset$ = Fractional pore volume

A = Constants with values ranging from 0.5 to 2.5

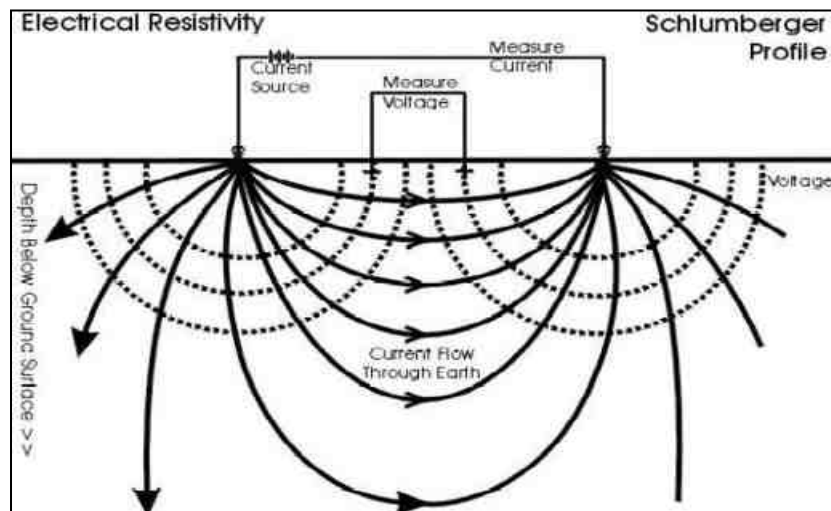
3.2.5.2 Survey Layout

The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. Here the present study is considered with Schlumberger 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 – AT. 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 noise ration can be enhanced by $\sqrt{N}$ where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2\dots+16/16)]$ 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.

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.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 70-75m. The maximum depth proposed out of proposed project is 67m BGL. Hence there is 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.

3.2.5.4 Geophysical Data Interpretation

The geophysical data was obtained to study the lateral variations, vertical in homogeneities in the sub – surface with respect to the availability of groundwater. From the interpreted data, it has inferred that the area has moderate groundwater potential in the investigated area. This small quarrying operation will not have any significant impact on the natural water bodies.

3.4 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality.

The baseline studies on air environment include identification of specific air 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 cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime objective of the baseline air

quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed projects in cluster.

This section describes the identification of sampling locations, methodology adopted during the monitoring period and sampling frequency.

3.3.1 Meteorology & Climate

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.

Climate –

- The climatic conditions in this region are characterized by a tropical climate. In Cuddalore, the quantity of rainfall during summers surpasses that of winters. This location is classified as Aw by Köppen and Geiger. The average annual temperature is 27.8 °C | 82.1 °F in Cuddalore. Annually, approximately 1091 mm | 43.0 inch of precipitation descends.
- Cuddalore are in the middle of our planet and the summers are not easy to define. The most favored period for a visit is during the months of January, February, March, December.
- During February, the amount of precipitation is at its lowest, with only 14 mm | 0.6 inch recorded. On average, the highest amount of rainfall occurs during November with a mean value of 288 mm | 11.3 inch.
- The month of maximum warmth in a year is May. The average temperature during this period reaches up to 30.6 °C | 87.0 °F, making it the hottest time of the year. On average, the month of January is considered to be the coldest time of year with temperatures averaging at around 24.8 °C | 76.6 °F.

<https://en.climate-data.org/asia/india/tamil-nadu/cuddalore-24057/>

Rainfall –

TABLE 3.13: RAINFALL DATA

Actual Rainfall in mm						Normal Rainfall in mm
2019	2020	2021	2022	2023	2024	
1091.8	1585.3	2040.4	1332.1	1151.1	608.4	1178.6

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

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Oct-2025	Nov-2025	Dec-2025
1	Temperature (°C)	Max	29.92	28.21	25.78



		Min	25.93	23.72	22.17
		Avg	27.92	25.96	23.97
2	Relative Humidity (%)	Avg	79.21	84.46	85.99
3	Wind Speed (m/s)	Max	4.55	7.97	5.67
		Min	1.36	1.47	2.12
		Avg	2.95	4.72	3.89
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		ENE,SSW	NNE,NE	NNE,NE

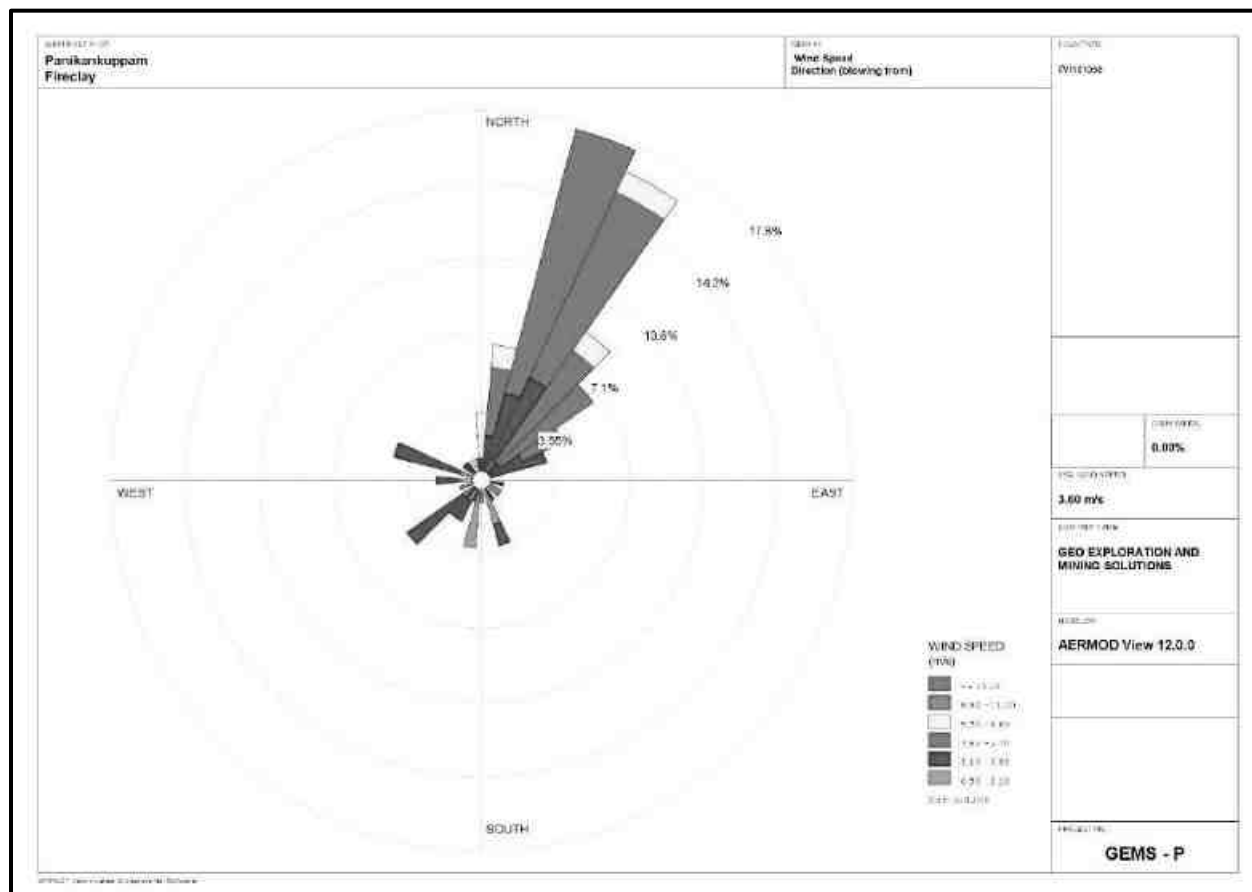
Source: On-site monitoring/sampling by Chennai Mettlex Laboratories in association with GEMS

Correlation between Secondary and Primary Data

The meteorological data collected at the site is almost similar to that of secondary data collected from IMD Coimbatore_Agro. A comparison of site data generated during the three months with that of IMD, Coimbatore_Agro reveals the following:

- The average maximum and minimum temperatures of IMD, Cuddalore_Agro showed a higher in respect of on-site data i.e. in Panikankuppam village.
- The relative humidity levels were lesser at site as compared to IMD, Cuddalore_Agro.
- The wind speed and direction at site shows similar trend that of IMD, Cuddalore_Agro.

Wind rose diagram of the study site is depicted in Figure. 3.14. Predominant downwind direction of the area during study season is North-East to South West.

FIGURE 3.18: WINDROSE DIAGRAM

In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

1. Predominant winds were from NE- SW
2. Wind velocity readings were recorded between 0.50 to 8.80 m/s
3. Calm conditions prevail of about 0.00 % of the monitoring period
4. Temperature readings ranging from 23.97 to 27.92 °C
5. Relative humidity ranging from 79.21 to 85.99 %
6. The monitoring was carried out continuously for three months.(October to December 2025)

3.3.2 Methodology and Objective

The prime objective of the ambient air quality study is to assess the existing air quality of study area and its conformity to NAAQS. The observed sources of air pollution in the study area are industrial, traffic and domestic activities. The baseline status of the ambient air quality has been established through a scientifically designed ambient air quality monitoring network considering the followings:

- Meteorological condition on synoptic scale;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status;

- Location of residential areas representing different activities;
- Accessibility and power availability; etc

3.3.3 Sampling and Analytical Techniques

TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS

Parameter	Method	Instrument
PM2.5	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM10	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by Chennai Mettlex Laboratories & CPCB Notification

TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl.No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide (µg/m ³)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide (µg/m ³)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than 10µm) PM ₁₀ (µg/m ³)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	Particulate matter (size less than 2.5 µm PM _{2.5} (µg/m ³)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

Source: NAAQS CPCB Notification No. B-29016/20/90/PCI-I Dated: 18th Nov 2009

*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval,

** 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at seven (7) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period October to December 2025. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station, for negating the effects of wind-blown ground dust. The equipment was placed at open space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results.

3.3.5 Ambient Air Quality Monitoring Stations



Seven (7) monitoring stations were set up in the study area as depicted in Figure 3.15 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ1	Core Zone	Project Area	11°44'54.50"N 79°33'0.07"E
2	AAQ2	Near Quarry	380m NE	11°45'4.59"N 79°33'14.52"E
3	AAQ3	Near Quarry (Residential)	470m West	11°44'53.56"N 79°32'36.09"E
4	AAQ4	Ulunthampattu (School)	1.80km North	11°46'0.21"N 79°32'50.50"E
5	AAQ5	Melmambattu (Residential)	3.5km SE	11°43'25.22"N 79°34'17.44"E
6	AAQ6	Palapattu (Residential)	5.5km East	11°44'43.62"N 79°36'2.11"E
7	AAQ7	Elandampattu (Residential)	6km NW	11°45'32.85"N 79°29'38.73"E

Source: On-site monitoring/sampling by Chennai Mettlex Laboratories in association with GEMS

Figure 3.19: Photographs of Ambient Air Quality Monitoring



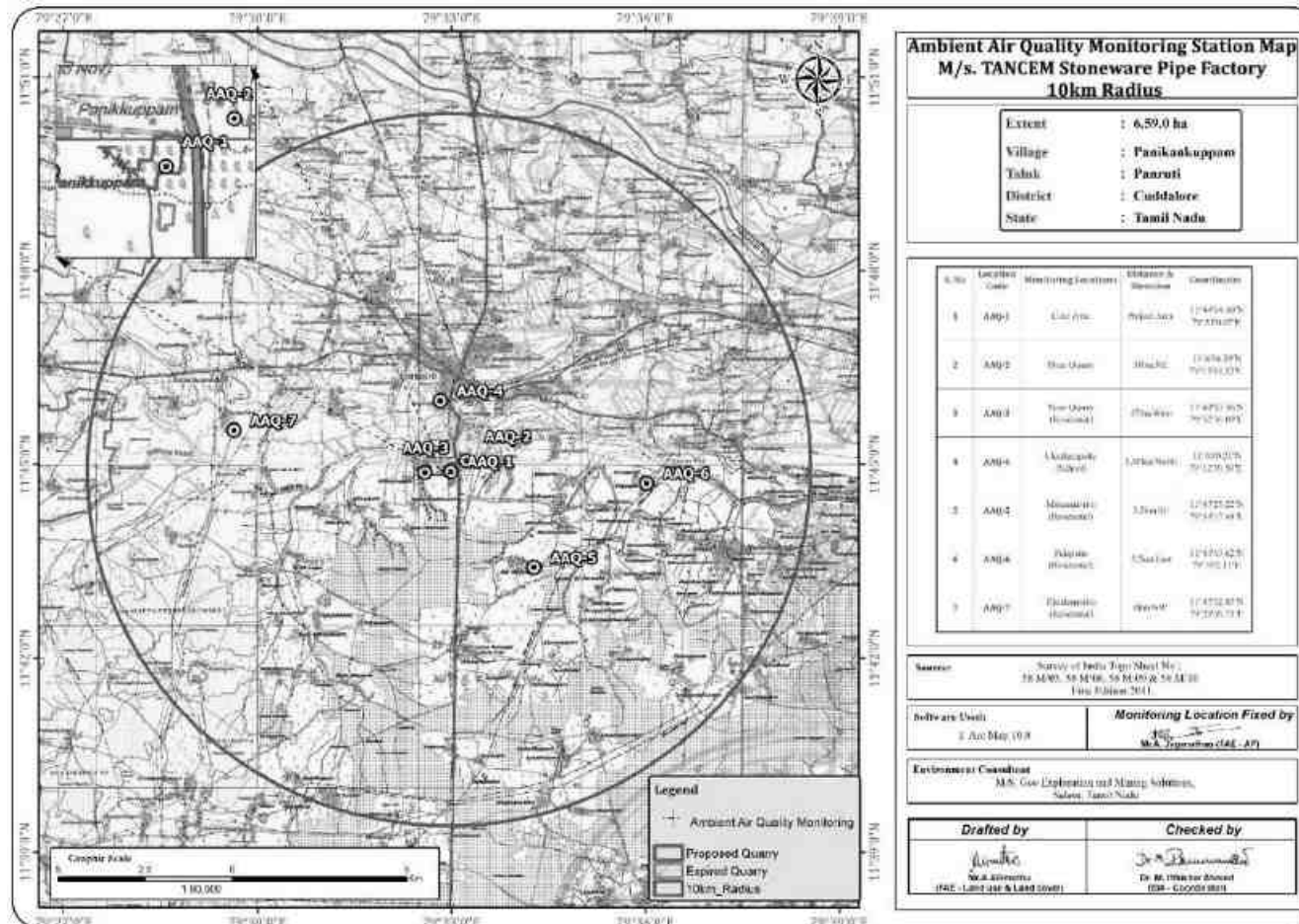
Figure 3.20: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

TABLE 3.18: SUMMARY OF AAQ – 1 to AAQ – 7

PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	18.4	18.9	22.4	22.1	22.9	22.2	24.4
Minimum	17.3	17.8	20.1	20.2	21.9	20.1	23.0
Maximum	19.6	19.8	24.8	24.5	23.9	24.1	25.9
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0

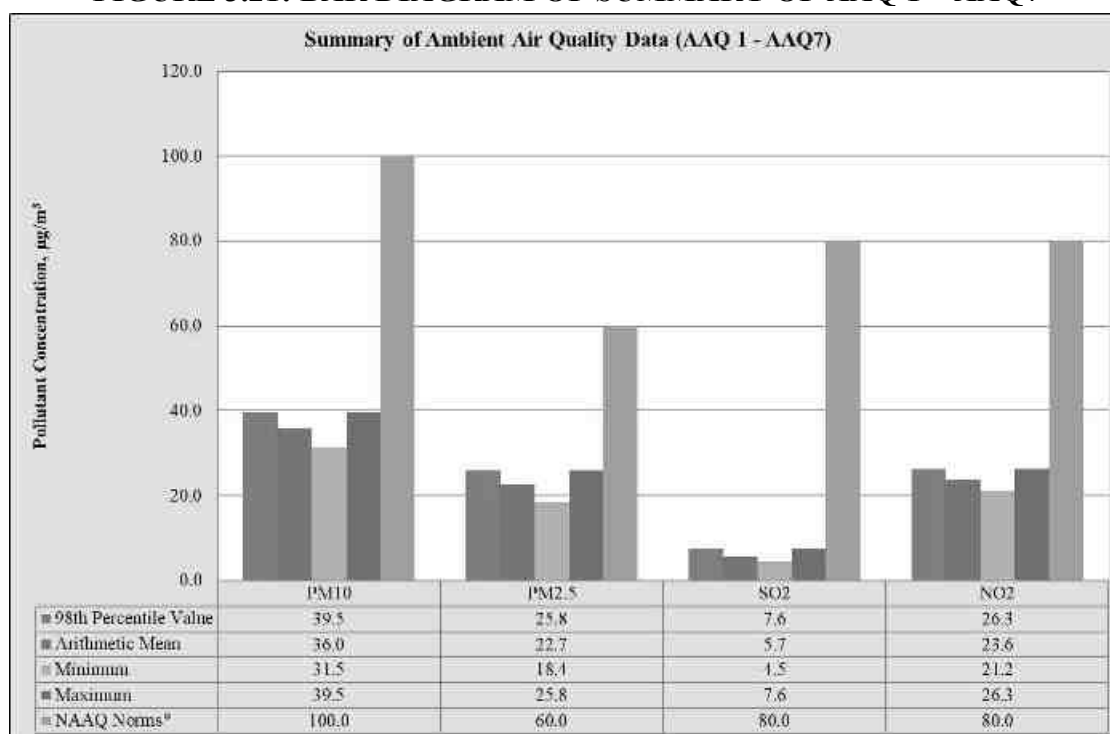
PM10	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	32.0	32.7	34.7	37.4	35.6	36.6	35.6
Minimum	30.1	30.9	33.1	35.5	34.0	34.6	34.1
Maximum	36.5	33.0	36.4	39.9	36.8	39.2	36.9
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	4.8	5.0	5.1	5.4	5.3	5.5	6.6
Minimum	4.1	4.2	4.0	4.4	4.5	4.5	5.3
Maximum	5.8	5.7	6.0	6.4	5.9	6.5	7.7
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

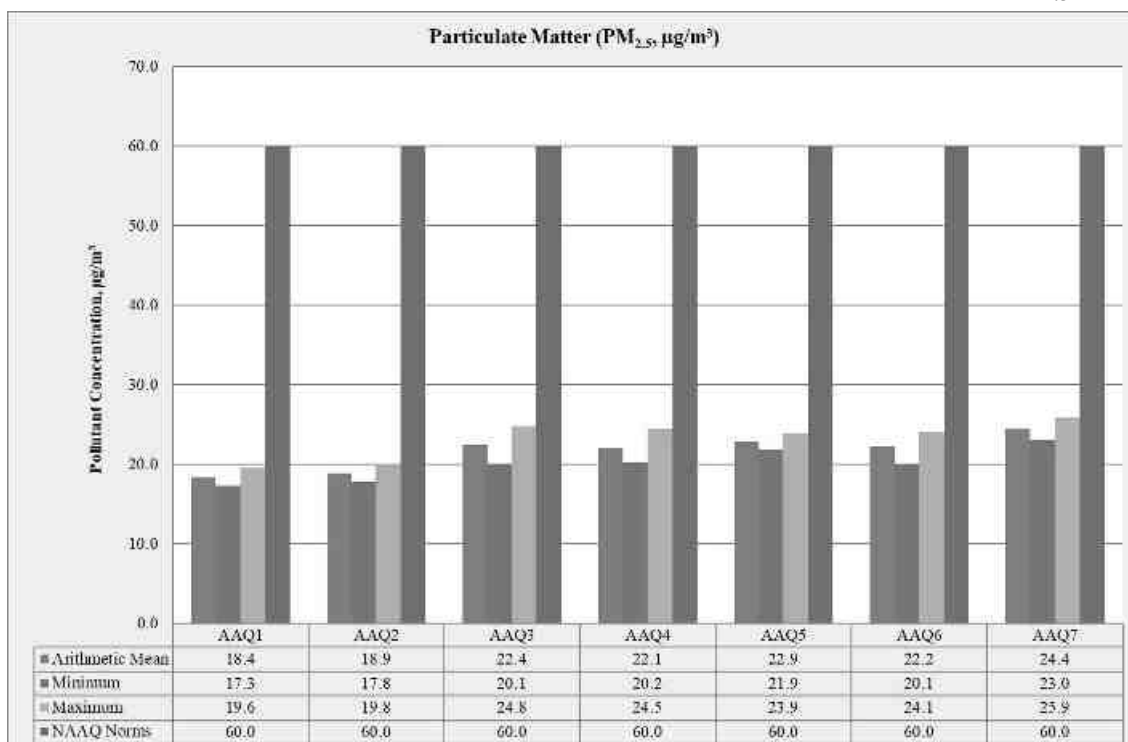
NO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	21.0	22.0	23.0	23.3	24.5	23.1	24.8
Minimum	20.0	21.0	21.3	21.5	22.4	21.0	23.0
Maximum	22.1	22.9	25.6	25.0	25.9	25.0	26.9
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DATA

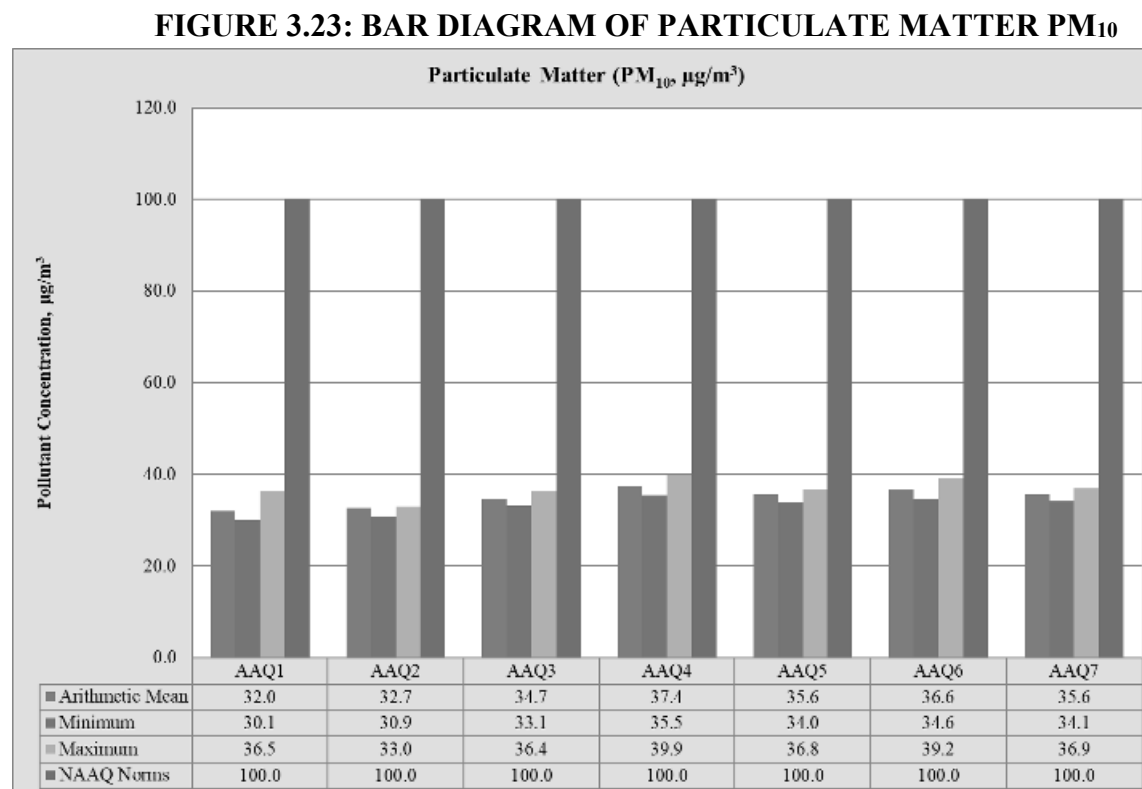
1	Parameter	PM ₁₀	PM _{2.5}	SO ₂	NO ₂
2	No. of Observations	260	260	260	260
3	10 th Percentile Value	31.5	18.4	4.5	21.2
4	20 th Percentile Value	33.8	20.3	4.8	21.5
5	30 th Percentile Value	34.6	21.0	4.9	22.1
6	40 th Percentile Value	35.1	22.2	5.1	22.6
7	50 th Percentile Value	35.5	22.5	5.2	23.1
8	60 th Percentile Value	36.1	23.0	5.4	23.7
9	70 th Percentile Value	36.4	23.5	5.7	24.1
10	80 th Percentile Value	36.9	23.9	6.0	24.7
11	90 th Percentile Value	37.7	24.2	6.4	25.2
12	95 th Percentile Value	38.7	25.0	7.1	25.6
13	98 th Percentile Value	39.5	25.8	7.6	26.3
14	Arithmetic Mean	36.0	22.7	5.7	23.6
15	Geometric Mean	35.9	22.6	5.6	23.6
16	Standard Deviation	2.3	2.2	1.0	1.7
17	Minimum	31.5	18.4	4.5	21.2
18	Maximum	39.5	25.8	7.6	26.3
19	NAAQ Norms*	100.0	60.0	80.0	80.0

FIGURE 3.21: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ7

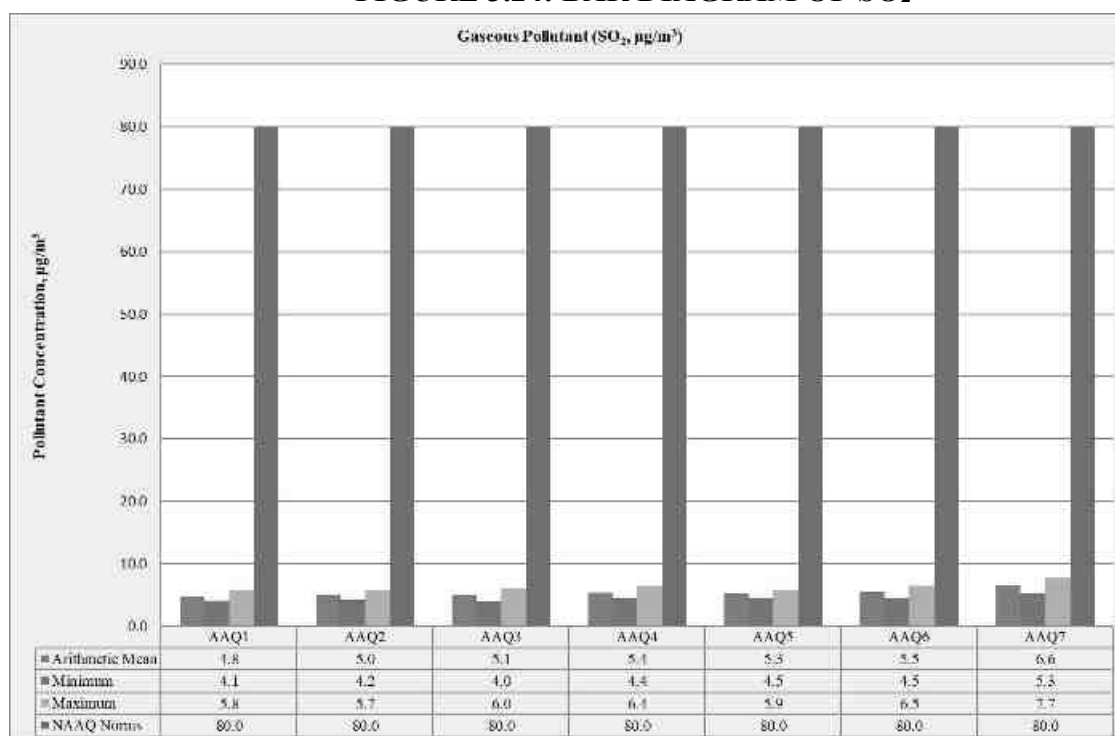
Source: Table 3.17 to 3.27

FIGURE 3.22: BAR DIAGRAM OF PARTICULATE MATTER PM_{2.5}

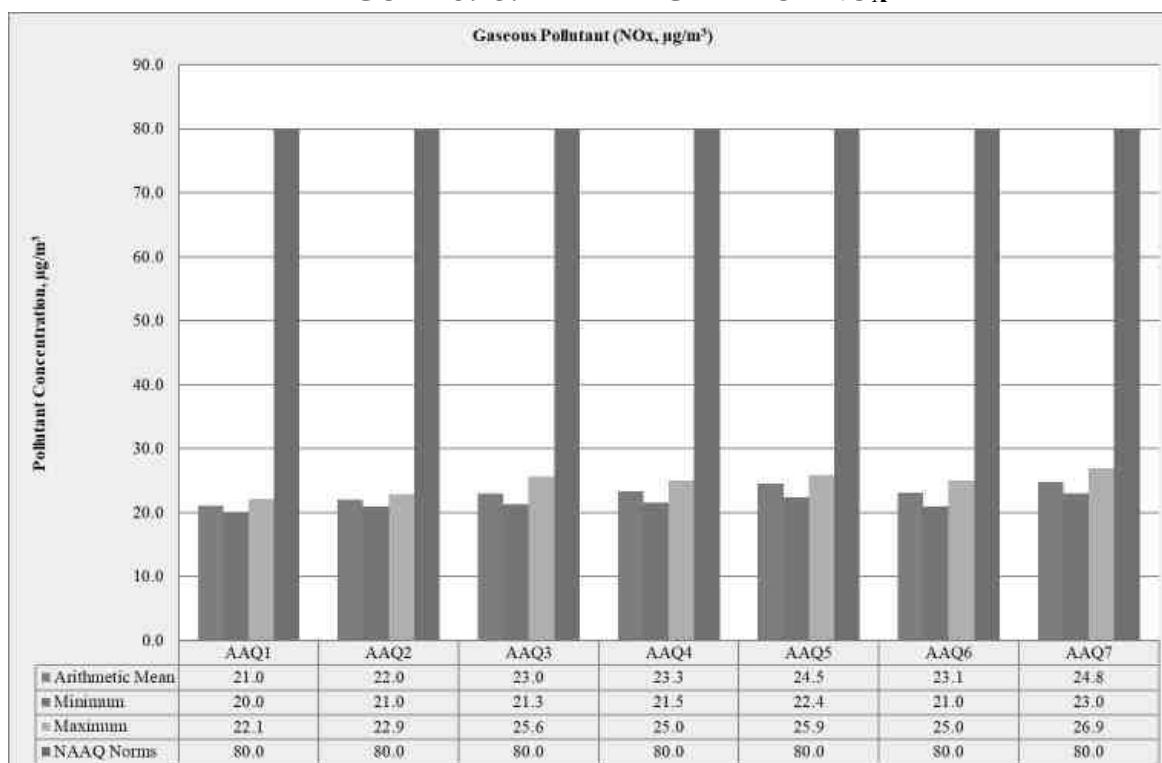
Source: Table 3.17 to 3.27



Source: Table 3.17 to 3.27

FIGURE 3.24: BAR DIAGRAM OF SO₂

Source: Table 3.17 to 3.27

FIGURE 3.25: BAR DIAGRAM OF NO_x

Source: Table 3.17 to 3.27

3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 32.0 µg/m³ to 37.4 µg/m³, PM_{2.5} data ranges from 18.4 µg/m³ to 24.4 µg/m³, SO₂ ranges from 4.8 µg/m³ to 6.6 µg/m³ and NO₂ data ranges from 21.0 µg/m³ to 24.8 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (7) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

TABLE 3.20: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N1	Core Zone	Project Area	11°44'56.26"N 79°32'57.38"E
2	N2	Near Quarry	380m NE	11°45'4.91"N 79°33'13.71"E
3	N3	Near Quarry (Residential)	470m West	11°44'54.32"N 79°32'35.89"E
4	N4	Ulunthampattu (School)	1.80km North	11°46'0.14"N 79°32'49.69"E
5	N5	Melmambattu (Residential)	3.5km SE	11°43'25.48"N 79°34'15.16"E
6	N6	Palapattu (Residential)	5.5km East	11°44'43.43"N 79°36'1.35"E
7	N7	Elandampattu (Residential)	6km NW	11°45'34.48"N 79°29'38.55"E

Source: On-site monitoring/sampling by Chennai Mettux Laboratories in association with GEMS

3.4.2 Method of Monitoring

Digital Sound Level Meter was used for the study. All reading was taken on the 'A-Weighting' frequency network, at a height of 1.5 meters from ground level. The sound level meter does not give a steady and consistent reading and it is quite difficult to assess the actual sound level over the entire monitoring period. To mitigate this shortcoming, the Continuous Equivalent Sound level, indicated by Leq, is used. Equivalent sound level, 'Leq', can be obtained from variable sound pressure level, 'L', over a time period by using following equation. The equivalent noise level is defined mathematically as,

$$Leq = 10 \log L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A)

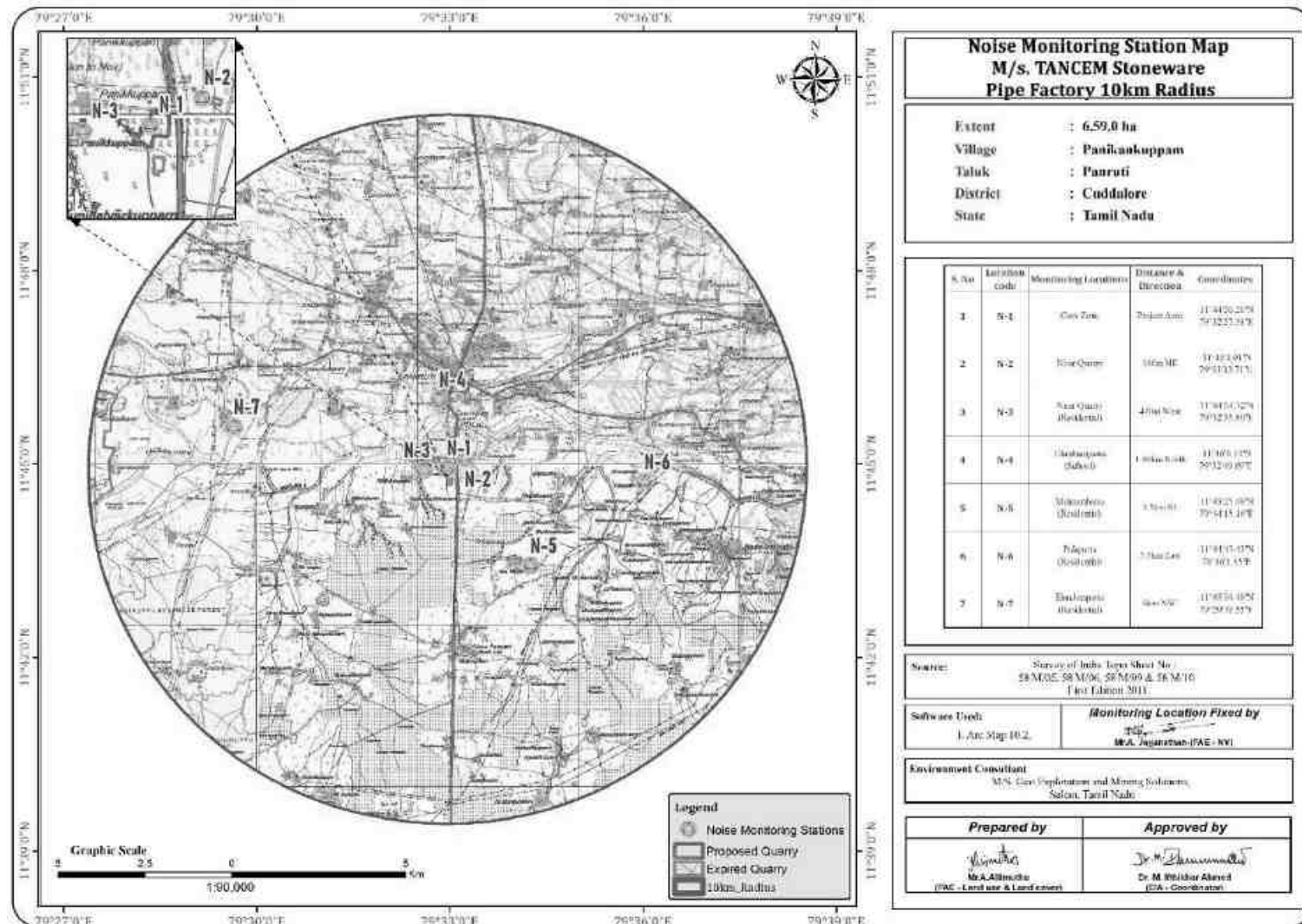


T = Time interval of observation

Measured noise levels, displayed as a function of time, is useful for describing the acoustical climate of the community. Noise levels recorded at each station with a time interval of about 60 minutes are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing time varying noise levels.

Figure 3.26: Photographs of Noise Monitoring



Figure 3.27: NOISE MONITORING STATIONS AROUND 10 KM RADIUS

3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352)

An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.32.

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.21: AMBIENT NOISE QUALITY RESULT

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Core Zone	38.6	37.0	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Near Quarry	39.3	36.9	
3	Near Quarry (Residential)	42.8	34.7	
4	Ulunthampattu (School)	44.3	35.4	
5	Melmambattu (Residential)	44.1	40.1	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
6	Palapattu (Residential)	46.8	38.8	
7	Elandampattu (Residential)	40.2	38.8	

Source: On-site monitoring/sampling by Chennai Mettex Laboratories in association with GEMS

FIGURE 3.28: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

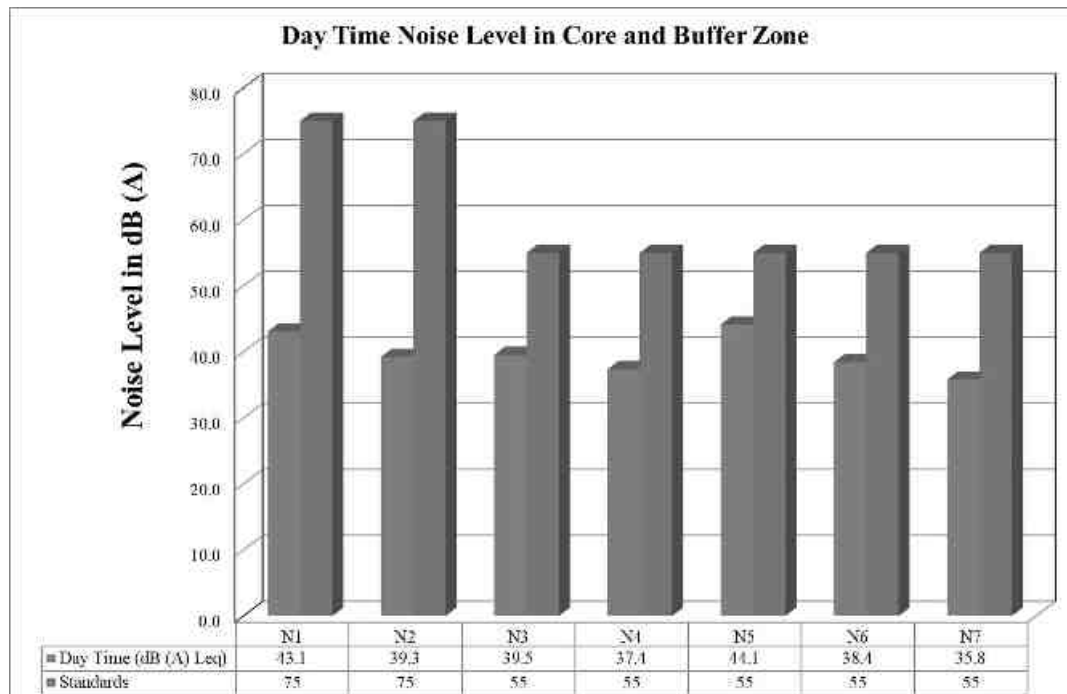
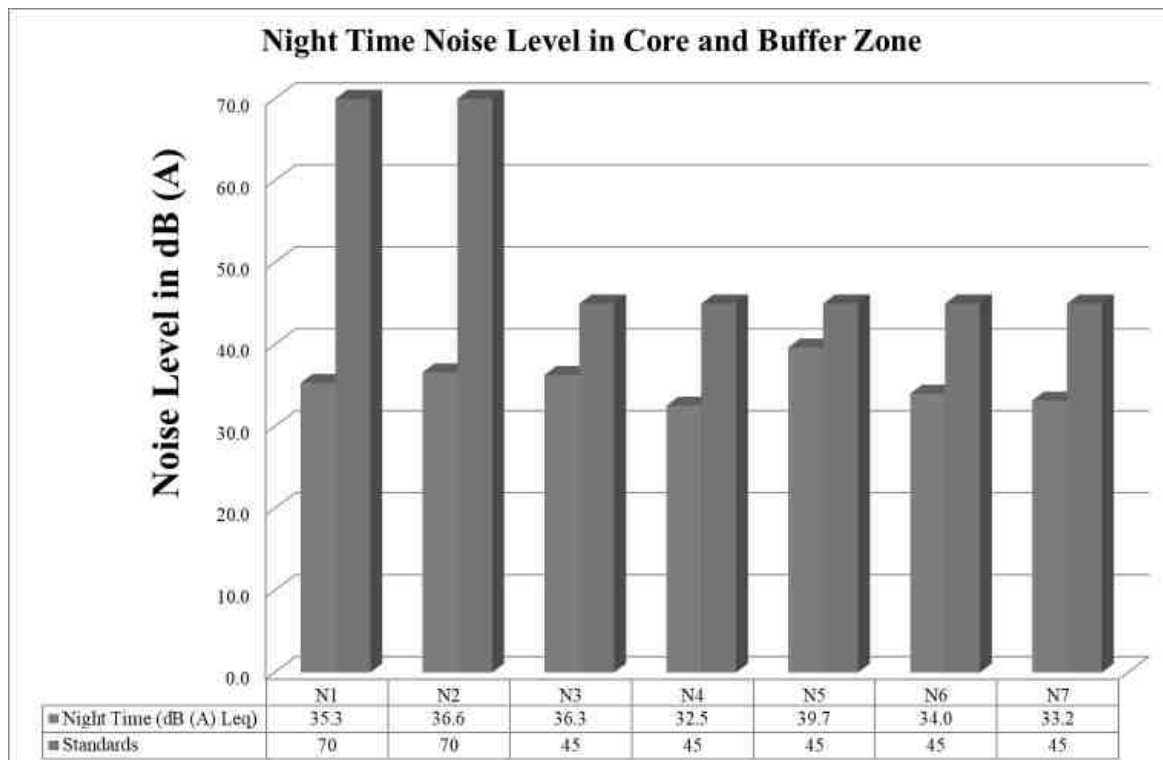


FIGURE 3.29: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE

3.4.4 Interpretation & Conclusion:

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 39.3-43.1 dB (A) Leq and during night time were 35.3-36.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 35.8 to 44.1 dB (A) Leq and during night time were from 32.5 to 39.7 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.6 BIOLOGICAL ENVIRONMENT

3.5. Biological Environment

3.5.1. Study area Ecology

Biodiversity, or biological diversity, refers to the variety of life forms on Earth, encompassing all species of plants, animals, fungi, and microorganisms, as well as the ecosystems they create. This diversity can be broadly measured by the number of species in a given area. Biodiversity is crucial for maintaining ecosystem resilience, as each species plays a vital role in essential functions such as pollination, nutrient cycling, and climate regulation. Moreover, biodiversity is crucial to human well-being, providing resources like food, medicine, and clean water. Unfortunately, human activities-including deforestation, pollution, climate change, and mining threatening biodiversity at an alarming rate, leading to habitat destruction and biodiversity loss. The preservation of biodiversity is therefore critical for sustaining natural systems and ensuring the health and stability of our planet for future generations.

Fireclay mining is generally carried out through open-cast mining methods, which involve extensive land disturbance. The process requires clearing of surface vegetation, removal of topsoil, and excavation of large portions of the earth's surface to access fireclay deposits. These activities directly result in habitat loss, compelling several plant and animal species to relocate or perish if they are unable to adapt to the altered environment. Additionally, open-cast fireclay mining accelerates soil erosion, disrupts natural drainage patterns,

and generates fugitive dust emissions during excavation, loading, and transportation. These factors adversely affect the surrounding terrestrial and aquatic ecosystems, increasing stress on native flora and fauna

Baseline studies are critical before granting environmental clearance for mining projects, as they provide a comprehensive understanding of the existing environmental, ecological, and social conditions of a given area. These studies assess biodiversity, air and water quality, soil composition, and the presence of sensitive habitats or endangered species. By collecting this baseline data, we can accurately predict the potential environmental impacts of mining and develop strategies to minimize and mitigate the negative impact. Furthermore, baseline studies serve as a benchmark to monitor changes over time, ensuring accountability and adherence to environmental regulations. In the context of mining, it is essential to protect and conserve rare, endangered, endemic, or threatened (REET) species of flora and fauna in both the core and buffer zones to ensure the conservation these species.

3.5.2. Project Description

The study area, in and around the core and buffer zones, is a plain, open land, agricultural land and farms. The core zone is a 6.59.0 Ha fireclay Quarry located at S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District. The core mining site is located undulated terrain. The images of the study area are shown in Fig No.3.33. Buffer zone is covered by mainly rainfed agriculture land as well as irrigated agriculture farms with diverse crops.



Core zone



Core zone



Buffer Zone



Buffer zone

Images of core and buffer zones of the proposed fireclay quarry

3.5.3. Scope of the Assessment



The biodiversity assessment for the fireclay Quarry involves a comprehensive baseline survey of the existing flora, fauna, and other ecological features, including rare, endemic, or threatened species within the project site and surrounding areas. The assessment employs rapid visual surveys, quadrat sampling, and targeted sampling of key habitats. Additionally, secondary data is collected from existing literature, reports, online biodiversity databases, and expert discussions. The study estimates population sizes and distributions of key species, particularly those with conservation status (e.g., endangered species), and evaluates population trends if historical data is available. It also identifies breeding sites, migration routes, and nesting areas critical to species' life cycle processes. The study predicts the potential direct and indirect impacts of mining on biodiversity, including habitat loss, pollution, noise, dust, and soil degradation, and recommends measures to minimize, mitigate, and, where possible, restore or offset biodiversity loss. This detailed biodiversity report has been prepared on behalf of the stakeholders involved in the fireclay Quarry and is submitted to the Tamil Nadu State Environment Impact Assessment Authority (TN-SEIAA) for review and approval.

3.5.4. Objectives of Biodiversity Study

- To conduct field surveys in the proposed fireclay quarry area to document qualitative and quantitative analysis of flora and fauna in core mining and buffer zones.
- To identify and list out the flora and fauna, and check the existence of species categorized under IUCN Red List and Wildlife Protection Act Schedules.
- To calculating the species diversity and evenness index for biodiversity (flora) in core and buffer zones of the proposed quarry site.
- To identify the impacts of mining activities on local ecosystems, including agricultural lands, and evaluate how these changes may affect biodiversity.
- To recommend biodiversity conservation and management plans for the proposed mining site.

3.5.4.1. Field survey

Field survey study was conducted twice in the month Dec 2025 to survey the existing flora and fauna in the core area (actual mining place) (6.59.0hectares) as well as the buffer area (1000-meter radius from the core zone). The study was conducted by a team consisting of experts in Biodiversity assessment, NABET certified Functional Area Expert (FAE) in Ecology and Biodiversity, and local residents for guidance. The study team visited the mining site twice to collect the field data on floral and faunal species in the study areas.

3.5.5. Methodology

3.5.5.1. Primary data collection

Identification of vegetation in relation to the natural flora and crops was conducted through reconnaissance field surveys and onsite observations in core and buffer zone. The plant species identification was done based on the reference materials and also by examining the morphological characteristics and reproductive parts of plants. Land use pattern in relation to agriculture crop varieties were identified through physical verification of land and interaction with local villagers.

The faunal elements (animal species) of core and buffer zone were identified by direct sightings or indirect evidences viz. pug marks, skeletal remains, scats and droppings etc. (Jayson and Easa 2004). Standard binocular was used for the observations. The authenticity of faunal elements occurrence was confirmed by interaction with the local people. Avifauna identification was done with pictorial descriptions of published literature. Information pertaining to existence of any migratory corridors and paths were obtained from local inhabitants. The status of each faunal element was determined and the Wildlife schedule category was ascertained as per the IUCN-Red Data Book and Indian wildlife (Protection) Act, 1972.

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment, transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering desired distance, within a time span of one hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

Direct observations and bird calls were used for bird documentation. Same transects were used for counting butterflies. Opportunistic observations were made for Amphibians, reptiles and ordinates. Presence of mammals was recorded by direct and indirect signs. All possible transects were taken for birds and butterflies. Birds and butterflies were classified into species level. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

Known species of flora and fauna were recorded and identified in the field. Doubtful plant specimens were photographed and collected and further identified in the lab using appropriate guides, literature, online resources.

Quadrat method was used to estimate the floral count in core and buffer zones within 1000-meter periphery from the core area. Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study, quadrats of 10 m × 10 m were laid down to assess trees, and sub quadrats of 5 m × 5 m were laid down for shrubs, 1 m x 1 m were laid done for herbs (Figure 3 and 4). Field observation data were recorded in filed note book/data sheets. Photographs and videos were taken for ecological components, flora and available fauna species.

3.5.5.2. Secondary data

The secondary baseline data such as the morphological features, flowering and fruiting phenology, habitat and distribution of flora and fauna have been collected from various data sources:

1. Forest working plan.
2. Schedule I to IV: Indian Wildlife (Protection) Amendment Act, 2022
3. Vivek Menon, Indian Mammals: A Field Guide. Hachette Book publishing India Pvt.Ltd., India.
4. Daniel J.C. The Book of Indian Reptiles and Amphibians, Bombay Natural History Society., India.
5. Ali, S and Ripley. Handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim and Bhutan, Oxford University Press, Bombay.
6. ENVIS Centre on Wildlife and Protected Area.
7. Birds Life Data Zone
8. Ebird.org
9. Global Biodiversity Information Facility
10. http://tnenvis.nic.in/Content/1_2878.aspx

3.5.5.3. Data compilation and analysis

Based on the collected data, analysis was done for species identification, habit distribution pattern analysis, and phytosociological relationship, and ecological index and identify the REET categories. Endemic species were analysed using distribution in the regional and local floras and online databases. Rare or Endangered or Endemic or Threatened species were analysed based on the IUCN Red List database and threatened plants of BSI (India database of Botanical Survey of India)

<https://bsi.gov.in/uploads/documents/research-program/Threatened-plants-of%20India.pdf>

<https://www.iucnredlist.org/>

3.6. Floral Diversity Analysis



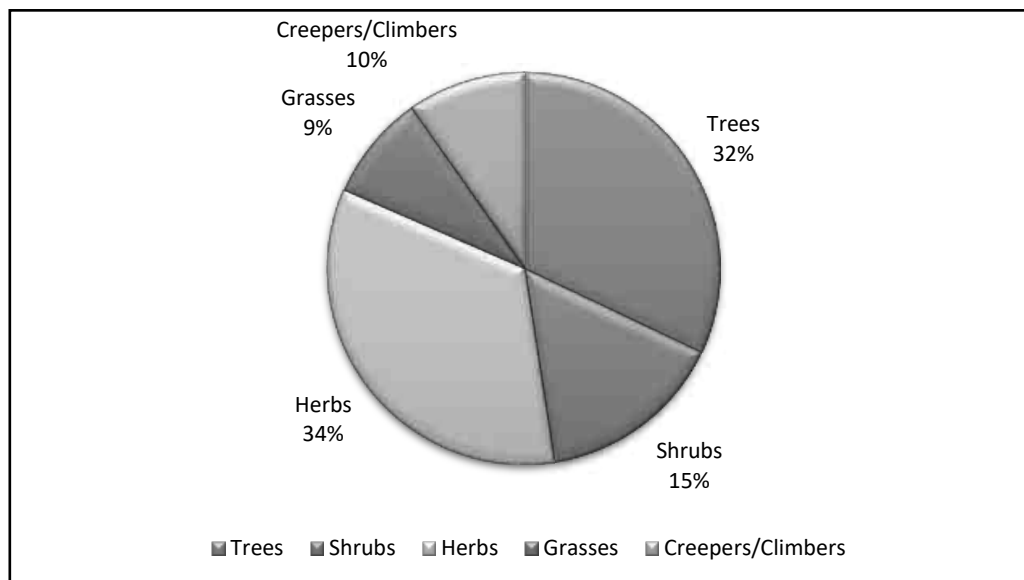
3.6.1. Floral Diversity in core zone

Identification of plant species for the natural flora and cultivated crops was conducted through field surveys and onsite observations. The plant species identification was done based on the reference materials and also by examining the plant morphological and reproductive characteristics of the plants i.e. flowers, fruits and seeds. Unidentified and double samples were photographed and minimally collected for further investigation in the laboratory. Land use pattern in relation to agriculture crop varieties were identified through physical verification of agriculture field.

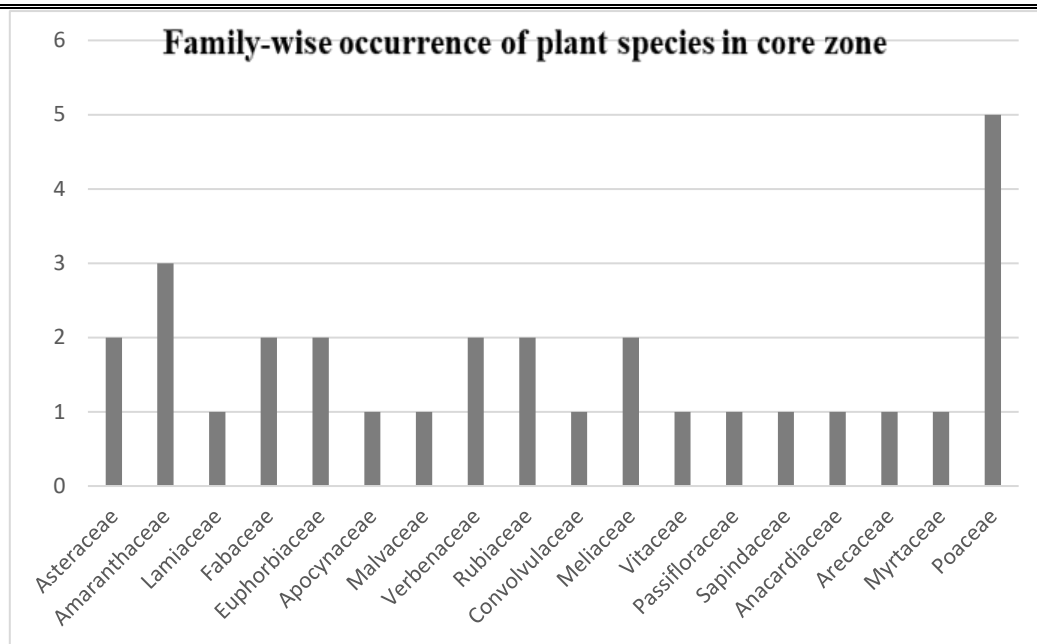
A total number of 103 species were recorded from the study area. Of the 103 species, 30 different species were observed in the core site. These floral species include 33% (10) herbs and shrubs 20% (6), Trees 20% (6) Climbers 10% (3) and Grasses 17% (5) (Fig No 3.35). The observed floral species are most commonly distributed plants and most of the herbs are annual plants herbs. herbs are dominant in the core site (Table No 3.53). The members of Asteraceae are abundant in number (Fig No 3.36). The details of scientific names and family names of core zone flora are given in Table No 3.53.

Occurrence of different floral habits in core and buffer zones of the study area.

Habit	Core Zone	Buffer Zone
Herbs	10	35
Shrubs	6	16
Climbers/ Creepers	3	10
Trees	6	33
Grasses	5	9
Total	30	103



Habit analyses of the species recorded from core zone of the study area.



Family-wise occurrence of plant species in core zone



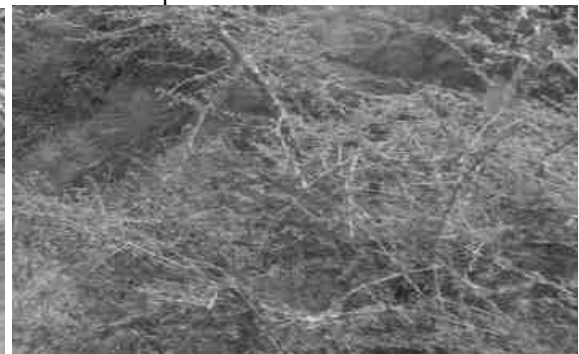
Azadirachta indica



Ipomea cornea



Eucalyptus



Canthium parviflorum



Morinda citrifolia



Lantana camara

Flora species observation in the Core zone area

3.6.2. Tree survey around 300m radius

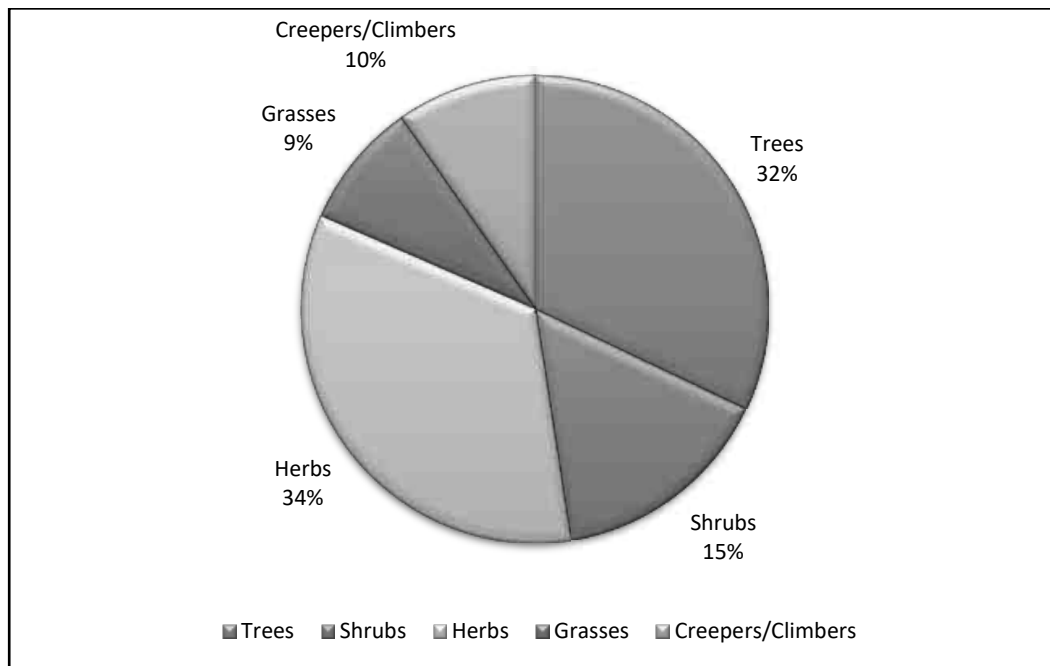
The trees surveys were conducted around 300m radius from the proposed project site cluster are of Panikankuppam Village. This is the standard scientific method followed by various workers in respect of phytosociological studies (Cotton and Curtis 1956; Ralhan et al. 1982; Saxena and Sing 1982; Nayak et al. 2000; Lu et al. 2004; Nautiyal 2008). While sampling, circumference at breast Height (CBH) of tree species was measured at 1.36m from ground level, along with the name of the species, phenology (flowering, fruiting, and flushes), and uses. After surveying areas, a detailed trees inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded. The species of trees were documented during this base line survey. The dominant plant species growing in this area were *Azadirachta indica* *Prosopis juliflora*, etc. Please refer the Table No.3.54.

Tree survey around 300m radius from the proposed project site (Primary data)

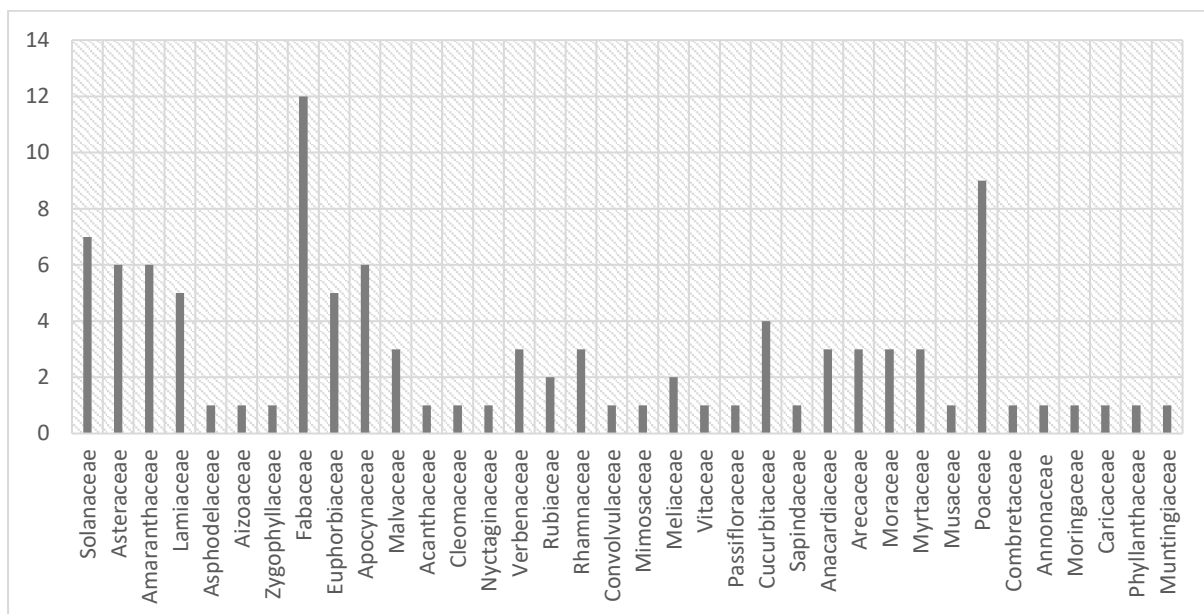
S. No	English Name	Vernacular Name	Scientific Name	No of trees
Trees				
1.	Jack fruit	Pala maram	<i>Artocarpus heterophyllus</i>	40
2.	Gum tree	Thaila maram	<i>Eucalyptus</i>	78
3.	Neem	Vembu	<i>Azadirachta indica</i>	35
4.	Cashew	Mundhiri	<i>Anacardium occidentale</i>	450
5.	Palm tree	Pannai maram	<i>Borassus flabellifer</i>	35

3.7. Floral Diversity in buffer zone

The buffer zone area (observed within 1000 meter) encompassed different land use patterns. The survey in the buffer zone reveals that a total of 103 plant species were recorded from both natural and agricultural habitats. The vegetation habit type analysis of buffer zone indicates that the flora composed of 34% herbs, 32% trees, 15% shrubs, 10% climbers and creepers, grasses 9% (Fig No 3.38 & Table No.3.56). These 103 species belong to the 32 families. The occurrence of maximum number of species are from family Fabaceae (13), followed by Fabaceae (12), Poaceae (9), Solanaceae (7). The details of scientific name, common name, vernacular name and habit type and status of IUCN category are given in Table No 3.57. Diversity of floral families and number of species recorded from each family are given in Table No.3.55 and Fig No 3.39.



Habit analyses of the species recorded from buffer zone of the study area



Family wise occurrence of flora in buffer zone.

Diversity of plant families and number of species recorded in the study area

S.No.	Family Name	Number of Species Recorded	S.No.	Family Name	Number of Species Recorded
1	Solanaceae	7	26	Areaceae	3



2	Asteraceae	6	27	Moraceae	3
3	Amaranthaceae	6	28	Myrtaceae	3
4	Lamiaceae	5	29	Musaceae	1
5	Asphodelaceae	1	30	Poaceae	9
6	Aizoaceae	1	31	Combretaceae	1
7	Zygophyllaceae	1	32	Annonaceae	1
8	Fabaceae	12	33	Moringaceae	1
9	Euphorbiaceae	5	34	Caricaceae	1
10	Apocynaceae	6	35	Phyllanthaceae	1
11	Malvaceae	3	36	Muntingiaceae	1
12	Acanthaceae	1			
13	Cleomaceae	1			
14	Nyctaginaceae	1			
15	Verbenaceae	3			
16	Rubiaceae	2			
17	Rhamnaceae	3			
18	Convolvulaceae	1			
19	Mimosaceae	1			
20	Meliaceae	2			
21	Vitaceae	1			
22	Passifloraceae	1			
23	Cucurbitaceae	4			
24	Sapindaceae	1			
25	Anacardiaceae	3			

Flora recorded from the study area (Core and Buffer zones) of the proposed fireclay quarry.

Herbs					
S.No	English Name	Vernacular Name	Scientific Name	Family Name	Recorded zone
1	Purple fruited pea egg plant	Thuthuvalai	<i>Solanum trilobatum</i>	Solanaceae	B
2	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	C+B
3	Mountain knotgrass	Siru peelai	<i>Aerva lanata</i>	Amaranthaceae	C+B
4	Malabar catmint	Peiviratti	<i>Anisomeles malabarica</i>	Lamiaceae	B
5	Eggplant	Kathrikkai	<i>Solanum melongena</i>	Solanaceae	B
6	Chrismas Bush	Poom pul	<i>Chromolaena odorata</i>	Asteraceae	C+B
7	Aloe barbadensis	Katrzhai	<i>Aloe vera</i>	Asphodelaceae	B
8	Round-leaved Portulaca	Saaranai	<i>Trianthema portulacastrum</i>	Aizoaceae	B
9	Mountain knotgrass	Thengaipoo kirai	<i>Aerva lanata</i>	Amaranthaceae	B
10	Prickly chaff flower	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	C+B
11	Bindii	Nerunchi	<i>Tribulus terrestris</i>	Zygophyllaceae	C+B
12	Fish poison	Kolochi	<i>Tephrosia purpurea</i>	Fabaceae	C+B
13	Ban Tulsi	Melakai poondur	<i>Croton bonplandianus</i>	Euphorbiaceae	B
14	Indian sarsaparilla	Nannari	<i>Hemidesmus indicus</i>	Apocynaceae	B
15	Asthma-plant	Amman pacharisi	<i>Euphorbia hirta</i>	Euphorbiaceae	C+B
16	Spiny amaranth	Mullu keera	<i>Amaranthus spinosus</i>	Amaranthaceae	B
17	Chilli	Milakai	<i>Capsicum annuum</i>	Solanaceae	B
18	Ban Tulsi	Reil poondur	<i>Croton bonplandianus</i>	Euphorbiaceae	B
19	Flannel Weed	Sida mutti	<i>Sida cordifolia</i>	Malvaceae	C+B
20	Indian Copperleaf	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	B
21	Marsh barbel	Neermulli	<i>Hygrophila auriculata</i>	Acanthaceae	B
22	Yellow-fruit nightshade	Kandakathirika	<i>Solanum surattense</i>	Solanaceae	B
23	Asian spiderflower	Naaikaduku	<i>Cleome viscosa</i>	Cleomaceae	B
24	Green Poinsettia	Palperukki	<i>Euphorbia heterophylla</i>	Euphorbiaceae	C+B
25	White dammar	Mookutipondur	<i>Vicoa indica</i>	Asteraceae	B
26	False daisy	Karisalankanni	<i>Eclipta alba</i>	Asteraceae	B
27	Pignut	Nattapoochedi	<i>Hyptis suaveolens</i>	Lamiaceae	B
28	Field beans	Avarai	<i>Hyacinth Beans</i>	Fabaceae	B



29	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	C+B
30	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	B
31	Europeanblack nightshade	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	B
32	Bright eyes	Nithiyakalyani	<i>Catharanthus roseus</i>	Apocynaceae	B
33	Carrot grass	Partiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	B
34	Red Spiderling	Mukirattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	B
35	Common wireweed	Arival manai poondu	<i>Sida acuta</i>	Malvaceae	B

Shrubs					
1	Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae	C+B
2	Tanner's cassia	Avaram	<i>Senna auriculata</i>	Fabaceae	C+B
3	Carray Cheddle	Kaarai	<i>Canthium parviflorum</i>	Rubiaceae	C+B
4	Castor oil plant	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	B
5	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	C+B
6	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	B
7	Jackal jujube	Surai ilantai	<i>Ziziphus oenoplia</i>	Rhamnaceae	B
8	Bush Morning Glory	Neiveli Kattamani	<i>Ipomoea carnea</i>	Convolvulaceae	C+B
9	Rough cocklebur	Marul-umattai	<i>Xanthium strumarium</i>	Asteraceae	B
10	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	B
11	Thorn apple	Oomathai	<i>Datura stramonium</i>	Solanaceae	B
12	Puriging nut	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	B
13	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae	B
14	Jackal jujube	Suraimullu	<i>Ziziphus oenoplia</i>	Rhamnaceae	B
15	Malabar catmint	Pei veratti	<i>Anisomeles malabarica</i>	Lamiaceae	B
16	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae	C+B

Climbers/ Creepers, Liana					
S.No	English Name	Vernacular Name	Scientific Name	Family Name	Recorded zone
1	Stemmed vine	Perandai	<i>Cissus quadrangularis (Cree</i>	Vitaceae	C+B
2	Love in a Mist	Poonaipiduku	<i>Passiflora vesicaria (Lia)</i>	Passifloraceae	C+B
3	Indian sarsaparilla	Nannaari	<i>Hemidesmus indicus (Cli</i>	Apocynaceae	B
4	Rosary Pea	Gundumani	<i>Abrus precatorius (Cli)</i>	Fabaceae	B
5	Ivy gourd	Kovai	<i>Coccinia grandis (Cli)</i>	Cucurbitaceae	B
6	Balloon Vine	Mutakkaththaan	<i>Cardiospermum halicacabum (Cli)</i>	Sapindaceae	C+B
7	Butterfly pea	Sangu poo	<i>Clitoria ternatea (cree)</i>	Fabaceae	B
8	Pointed gourd	Kovakkai	<i>Trichosanthes dioica (Cli)</i>	Cucurbitaceae	B
9	Wild bitter	Pavarkai	<i>Momordica charantia (Cli)</i>	Cucurbitaceae	B
10	White pumpkin	Poosanaikkaai	<i>Cucurbitaceae (Liana)</i>	Cucurbitaceae	B
Trees					
1	Cashew	Mundhiri	<i>Anacardium occidentale</i>	Anacardiaceae	C+B
2	Wild Date Palm	Icham	<i>Phoenix sylvestris</i>	Arecaceae	C+B
3	Jackfruit	Palla maram	<i>Artocarpus heterophyllus</i>	Moraceae	B
4	Indian siris	Vaaga	<i>Albizia lebbek (L.) Willd</i>	Fabaceae	B
5	Blue gum	Thayala maram	<i>Eucalyptus</i>	Myrtaceae	C+B
6	Banana tree	Vazhaimaram	<i>Musa acuminata</i>	Musaceae	B
7	Neem	Vembu	<i>Azadirachta indica</i>	Meliaceae	C+B
8	Tamarind	Puliyamaram	<i>Tamarindus indica</i>	Fabaceae	B
9	Mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae	B
10	Bamboo	Moonghil	<i>Bambusa bambo</i>	Poaceae	B
11	Yellow flame tree	Perunkondrai	<i>Peltophorum pterocarpum</i>	Fabaceae	B
12	Indian almond	Padam maram	<i>Terminalia catappa</i>	Combretaceae	B
13	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	B
14	Mango	Manga	<i>Mangifera indica</i>	Anacardiaceae	B



15	Peepal	Arasanmaram	<i>Ficus religiosa</i>	Moraceae	B
16	Custard apple	Seethapazham	<i>Annona reticulata</i>	Annonaceae	B
17	Indian Jujube	Ilanthai	<i>Ziziphus jujuba</i>	Rhamnaceae	B
18	Monkey pod tree	Thungumoonchi	<i>Samanea saman</i>	Fabaceae	B
19	Teak	Thekku	<i>Tectona grandis</i>	Verbenaceae	B
20	Millettia pinnata	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	B
21	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	B
22	Guava	Koyya	<i>Psidium guajava</i>	Myrtaceae	B
23	Indian mulberry	Nuna maram	<i>Morinda tinctoria</i>	Rubiaceae	C+B
24	Portia tree	Poovarasam	<i>Thespesia populnea</i>	Malvaceae	B
25	Drumstick tree	Murunga maram	<i>Moringa oleifera</i>	Moringaceae	B
26	Papaya	Pappali maram	<i>Carica papaya L</i>	Caricaceae	B
27	Indian gooseberry	Nelli	<i>Emblica officinalis</i>	Phyllanthaceae	B
28	Madras thorn	Kudukapuli	<i>Pithecellobium dulce</i>	Fabaceae	B
29	Malayan Cherry	Ten Pazham	<i>Muntingia calabura</i>	Muntingiaceae	B
30	Jamun Fruit Plant	Naval maram	<i>Syzygium cumini</i>	Myrtaceae	B
31	Banyan tree	Alamaram	<i>Ficus benghalensis</i>	Moraceae	B
32	Chinese chaste tree	Nochi	<i>Vitex negundo</i>	Verbenaceae	C+B
33	Indian ash tree	Othiya maram	<i>Lannea coromandelica</i>	Anacardiaceae	B
Grasses					
1	Jungle rice	Kozhikarpul	<i>Echinochloa colona</i>	Poaceae	B
2	Swollen Windmill Grass	Kondai Pul	<i>Chloris barbata</i>	Poaceae	C+B
3	Nut grass	Korai	<i>Cyperus rotandus</i>	Poaceae	C+B
4	Needle Grass	Thodappam	<i>Aristida adscensionis</i>	Poaceae	B
5	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	B
6	Needle Grass	-	<i>Aristida funiculata</i>	Poaceae	C+B
7	Bermuda gras	Arugam pullu	<i>Cynodon dactylon</i>	Poaceae	C+B
8	Kans grass	Wild sugarcane	<i>Saccharum spontaneum</i>	Poaceae	C+B
9	Mauritian Grass	Moongil pul	<i>Aphuda mutica</i>	Amaranthaceae	B



*Phoenix sylvestris**Anacardium occidentale**Morinda tinctoria**Borassus flabellifer**Cissus quadrangularis**Tectona grandis*

Flora species observation in the Buffer zone area

3.7.1. The vegetation in the RF / PF areas, ecologically sensitive areas

There are no protected (PF) forests either in the mine lease area or in the buffer zone. Kangiruppu Reserved Forest - 6.7km – South Western side of the area. Hence, no certificate from the Forest department is required. There are no impacts due to this mining activity. There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site. There are neither forests nor forest dwellers nor forest-dependent communities in the mine lease area. There shall be no forest-

impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project. There is no invasive species present in the study area.

3.7.2. Forest details

There are no biosphere reserves, wildlife sanctuaries, National parks, important bird areas (IBAs), RAMSAR Wetland sites, or faunal migration routes within and nearby the study area. The study area, encompassing the quarry lease area and a 1 km buffer zone, is not considered ecologically sensitive. there are no reserve forests within the buffer zone Information regarding reserve forests was obtained from the Protected Area Gazette Notification Database (Tamil Nadu).

<https://dfe.gov.in/uploads/documents/ramsar-sites-pub.pdf>

3.7.3. Agriculture flora in the study area

Scientific Name	Common Name	Vernacular Name
<i>Saccharum officinarum</i>	Sugar cane	Karumbu
<i>Oryza sativa</i>	Rice	Nellu
<i>Sesamum indicum</i>	Seasame	Ellu
<i>Manihot esculenta</i>	Casava	Kutchu Kilanku
<i>Psidium guajava</i>	Guava	Koyya

3.7.4. Horticulture

Major horticultural crops cultivated in the Jack fruit, Cashew.

Scientific Name	Common Name	Vernacular Name
<i>Momordica charantia</i>	Bitter Courd	Pakarkai
<i>Artocarpus heterophyllus</i>	Jack fruit	Palla maram
<i>Anacardium occidentale</i>	Cashew	Mundhiri
<i>Cucumis sativus</i>	Cucumber	Vellarikai
<i>Saccharum officinarum</i>	Banana	Vazhai
<i>Musa paradisiaca</i>	Mango	Maa maram
<i>Solanum melongena</i>	Brinjal	Kathirikai
<i>Cocos nucifera</i>	Coconut	Thennai

<https://www.tnagrisnet.tn.gov.in/ARS/dcs/reportVillageWise/2/Cuddalore/Panruti>

3.7.5. Fauna diversity

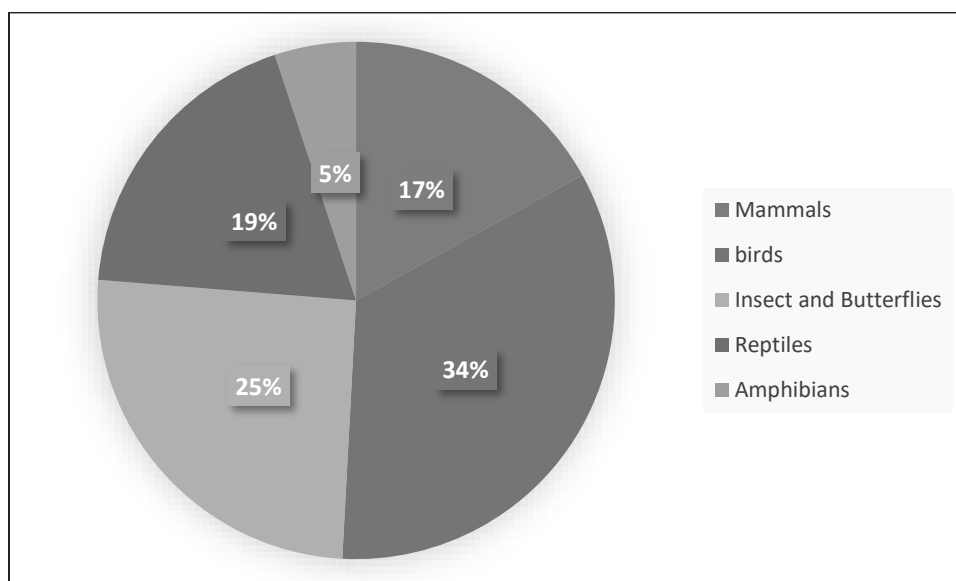
The baseline information of the proposed project site helps predict potential impacts on wildlife and habitats in the region. Field faunal survey was conducted to gather the existing mammals, birds, reptiles, amphibians, and butterflies in core and buffer zones of the proposed project. The methodologies used included random walks, opportunistic observations (for birds and insects), visual encounter surveys (for reptiles), and tracking signs (for mammals). Additionally, during the field survey, information was collected from local residents, using images and videos as tools to know the occurrence of faunal species in the study area. Our study team engaged



in discussions and consultations with locals from nearby villages, as well as with herders and farmers to get more details. To identify and analyze the data, thoroughly searched and referred the secondary literature on flora, fauna, protected areas, natural habitats, and wildlife species. Species identification was conducted in collaboration with experts from Finally, cross checked the list of identified fauna with the IUCN Red List database to determine the presence of any REET species in the study area.

3.8. Fauna Composition in the Core Zone and Buffer zone

The faunal species observed in the study area are given below. A total of 56 species were recorded in both the core and buffer zones of the study area. The core zone exhibited fewer species, with only a limited number of insects, mammals and reptiles, while the buffer zone showed greater species diversity. Among the 56 species recorded, the distribution pattern was as follows: 34% birds, 25% insects, 19% reptiles, 17% mammals and amphibians 5%. (Fig No 3.42). All these species were cross-checked against the IUCN Red List Database version 3.1 to identify any threatened species. Data analysis revealed that 39 species belong to IUCN categorized list as Least Concern, while 17 species were not listed. The analysis indicates that there are no REET species in the core and buffer zones of the proposed Fireclay quarry.



Occurrence of fauna in core and buffer zone

3.8.1. Mammals

The list of mammals observed including domesticated animals observed in the study areas are listed, a total 10 species were identified. Mammals traced from the site are common. There was no threatened species identified (Table No: 3.61).

Diversity of Mammals species observed in the study area.

S.No	Common Name	Scientific Name	Family Name	IUCN Status
1	House mouse	<i>Mus musculus</i>	Muridae	LC
2	Indian mole rat	<i>Bandicota bengalensis</i>	Muridae	LC



3	Greater bandicoot rat	<i>Bandicota indica</i>	Muridae	LC
4	Indian Grey Mongoose	<i>Herpestes edwardsi</i>	Herpestidae	LC
5	Goat	<i>Capra hircus</i>	Bovidae	NL
6	Indian Palm Squirrel	<i>Funambulus palmarum</i>	Sciuridae	LC
7	Cat	<i>Felis catus</i>	Felidae	NL
8	Indian hare	<i>Lepus nigricollis</i>	Leporidae	LC
9	Indian Field Mouse	<i>Mus booduga</i>	Muridae	LC
10	Cow	<i>Bos taurus</i>	Bovidae	NL

3.8.2. Aves

A total of 31 species of birds were identified by direct observations and voice-calls from the field. Also the expert opinion was sought to list the number of birds probably occurred in the area using the photographic field guide. There was no threatened species identified from the proposed site as per the IUCN status (Table No. 3.62).

Diversity of aves species observed in the study area.

S.No	Common Name	Scientific Name	Family name	IUCN Status
1	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC
2	Indian robin	<i>Copsychus fulicatus</i>	Muscicapidae	NE
3	House crow	<i>Corvus splendens</i>	Corvidae	LC
4	Pond Heron	<i>Ardeola grayii</i>	Ardeidae	LC
5	White-breasted kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	LC
6	Rock pigeon	<i>Columba livia</i>	Columbidae	LC
7	Common myna	<i>Acridotheres tristis</i>	Sturnidae	LC
8	Rose ringed parakeet	<i>Psittacula krameri</i>	Psittaculidae	LC
9	Great Egret	<i>Ardea alba</i>	Ardeidae	NE
10	Red vented Bulbul	<i>Pycnonotus cafer</i>	passerines	LC
11	Shikra	<i>Accipiter badius</i>	Accipitridae	LC
12	Black bulbul	<i>Hypsipetes leucocephalus</i>	Pycnonotida	LC
13	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	LC
14	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae	LC
15	Small green bee eater	<i>Merops orientalis</i>	Meropidae	LC
16	House Sparrow	<i>Passer domesticus</i>	Passeridae	LC
17	Spotted dove	<i>Spilopelia chinensis</i>	Columbidae	LC
18	Little Egret	<i>Egretta garzetta</i>	Ardeidae	NE
19	Asian Koel	<i>Eudynamis scolopacea</i>	Cuculidae	LC
20	Gray Francolin	<i>Ortygornis pondicerianus</i>	Phasianidae	LC
21	Common Quail	<i>Coturnix coturnix</i>	Phasianidae	LC
22	Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	LC
23	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	Apodidae	LC
24	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriidae	LC
25	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	LC
26	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	LC
27	Indian Pond-Heron	<i>Ardeola grayii</i>	Ardeidae	LC
28	Eastern Cattle-Egret	<i>Ardea coromanda</i>	Ardeidae	NE
29	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	NT
30	Large-billed Crow	<i>Corvus macrorhynchos</i>	Corvidae	LC
31	Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	LC

3.8.3. Insects



Among invertebrate, Butterflies were the most dominant category identified from the field. A total of 18 species were identified from the field and one species is in the least concerned category (Table No 3.63).

Diversity of Insects species observed in the study area.

S.No	Common Name	Scientific Name	Family Name	IUCN Status
1	Tawny coster	<i>Acraea terpsicore</i>	Nymphalidae	NL
2	Common rose	<i>Pachliopta aristolochiae</i>	Papilionidae	LC
3	Common mormon	<i>Papilio polytes</i>	Papilionidae	LC
4	Common tiger	<i>Danaus genutia</i>	Nymphalidae	LC
5	Lime Butterfly	<i>Papilio demoleus</i>	Papilionidae	LC
6	Plain Tiger butterfly	<i>Danaus chrysippus</i>	Nymphalidae	LC
7	Indian black ant	<i>Camponotus compressus</i>	Formicidae	NL
8	Caper white	<i>Belenois aurota</i>	Pieridae	NL
9	Common Castor	<i>Ariadne merione</i>	Nymphalidae	NL
10	Termite	<i>Odontotermes assmuthi</i>	Termitidae	NL
11	Chocolate pansy	<i>Junonia iphita</i>	Nymphalidae	NL
12	Lemon pansy	<i>Junonia lemonias</i>	Nymphalidae	NL
13	Crimson tip	<i>Colotis danae</i>	Pieridae	LC
14	Small Cupid	<i>Chilades parrhasius</i>	Lycaenidae	NL
15	Common crow	<i>Euploea core</i>	Nymphalidae	NL
16	Mottled Emigrant	<i>Catopsilia pyranthe</i>	Pieridae	NL
17	Blue Tiger	<i>Tirumala limniace</i>	Nymphalidae	NL
18	Danaid Eggfly	<i>Hypolimnas misippus</i>	Nymphalidae	LC

3.8.4. Reptiles

There were 10 different reptile species were spotted in the study area. All the species are least concern category.

Diversity of Reptile's species observed in the study area.

S.No	Common Name	Scientific Name	Family Name	IUCN Status
1	Oriental garden lizard	<i>Calotes versicolor</i>	Agamidae	LC
2	Rat snake	<i>Ptyas mucosa</i>	Colubridae	LC
3	House lizards	<i>Hemidactylus flaviviridis</i>	Gekkonidae	LC
4	Common skink	<i>Mabuya carinatus</i>	Scincidae	LC
5	Streaked kukri snake	<i>Oligodon taeniolatus</i>	Colubridae	LC
6	Snake eyed lizard	<i>Ophisops leschenaultii</i>	Lacertidae	LC
7	White-spotted supple skink	<i>Lygosoma albopunctata</i>	Scincidae	LC
8	Green vine snake	<i>Ahaetulla nasuta</i>	Colubridae	LC
9	Common skink	<i>Mabuya carinatus</i>	Scincidae	NL
10	South Indian rock agama	<i>Psammophilus dorsalis</i>	Agamidae	LC

*There is no Invasive alien species (IAP) in the study area.

3.9. Aquatic Ecology



There is an Odai passing on the Southwest side of the lease applied area. Canal is located 600m on South west and Kedilam River is passing on the 1km from Northwest side of the area. Aquatic weeds are found to be growing everywhere in 10 km radius area, in every water bog, pond, etc. Typha angustata can be found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, Eichhornia crassipes has taken its roots and covers the entire water surface by its sprawl and invasion.

3.9.1. Objectives of Aquatic Studies

- Generating data through actual field collection in these locations over the study period.
- Impacts on aquatic fauna/flora
- Consulted with locals to obtain knowledge about aquatic flora and animals.

3.9.2. Macrophytes

The macrophytes observed within the study area are Tabulated in Table No 3.65.

Description of Macrophytes

S.No	Scientific name	Common Name	IUCN
1.	<i>Aponogeton natans</i>	Floating lace plant	NA
2.	<i>Cyperus exaltatus</i>	Tall Flat Sedge	LC
3.	<i>Carex cruciata</i>	Cross Grass	NA
4.	<i>Hydrilla verticillata</i>	Water thymes	LC
5.	<i>Eichhornia crassipe</i>	Water hyacinth	NA
6.	<i>Marsilea quadrifolia</i>	Water clover	LC

3.9.3. Aquatic Faunal Diversity

Amphibian species like the common Indian Burrowing frog, Indian Toad were sighted near the water bodies located in the study area.

Amphibians Observed/Recorded from the Study Area

S.No	Scientific Name	Common Name	IUCN
1	<i>Sphaerotheca breviceps</i>	Indian Burrowing frog	LC
2	<i>Euphyctis hexadactylus</i>	Green pond frog	LC
3	<i>Bufo melanostictus</i>	Indian Toad	LC

3.9.4. Fishes

Fish is commonly found in all types of natural water bodies and very common source of food in Eastern South India. The local fishermen were enquired and also the secondary resources were reviewed to collect information on the fish found in the study area. Few common species are reported in the study area are given in Table No 3.68.

Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S.No	Common name	Scientific name	Family
1.	Dwarf panchax	<i>Aplocheilichthys parvus</i>	Aplocheilichthys
2.	Mrigal	<i>Cirrhinus mrigala</i>	Chordata

3.	Catla	<i>Catla Catla</i>	Cyprinidae
4.	Rohu	<i>Labeo rohita</i>	Cyprinidae
5.	Catfish	<i>Siluriformes</i>	Diplomystidae

3.10. Findings/Results

The assessment was carried out during the summer season. The inspection day was quite alright with respectable weather. The details of the flora and fauna observed are given below.

Records of threatened species in the area

No threatened species were observed

Endangered Species as per Wildlife (Protection) Act

No Endangered fauna was recorded in the project area.

Endemic Species of the Project areas

No endemic species were observed in the project area.

Migratory species of the Project areas

No migratory fauna observed in project area.

Migratory corridors and Flight paths

No migratory corridors and Flight paths were observed in project area.

Breeding and spawning grounds

No breeding and spawning grounds were earmarked for the wildlife fauna in project area.

There are no critically endangered, endangered, vulnerable and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves / (existing as well as proposed) within 10 km of the mine lease area. There are no protected forests within the project area. Hence submission of clearance from the National Board of Wildlife does not arise.

There is no endangered, endemic and RET Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

3.11. Interpretation& Conclusion

There is no schedule I species of animals observed within study area as per Wildlife Protection Amendment Act 2022 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.

Reference:

1. [Invasive Alien Species | IUCN](#)
2. <https://www.inaturalist.org/>



3. <https://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-2-43/tables/1>
4. Ali, S. (2002). The Book of Indian Birds (13th revised edition). Oxford University Press, New Delhi. 326pp.
5. Ali, S and Ripley, S.D. 1969. Handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim, Bhutan and Ceylon, 3. Stone Curlews to Owls. Oxford University Press, Bombay, 327pp.
6. Bird Life International 2012. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.
 Reptiles : <https://www.researchgate.net/publication/354269704>
 Butterflies : <https://www.researchgate.net/publication/346393903>
 Birds : <https://avibase.bsc-eoc.org/checklist.jsp?region=INsetnkc>
 Trees : <http://www.ethnobiomed.com/content/2/1/43>

3.7 SOCIO ECONOMIC ENVIRONMENT

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

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

3.6.1 Objectives of the Study

The objectives of the socio-economic study are as follows:

- To study the socio-economic status of the people living in the study area of the proposed mining project.
- To assess the impact of the project on Quality of life of the people in the study area.
- To recommend Community Development measures needs to be taken up in the study Area.

3.6.2 Scope of Work

- To study the Socio-economic Environment of the area from the secondary sources;
- Data Collection & Analysis
- Prediction of project impact
- Mitigation Measures

3.6.3 District Profile

Cuddalore district of Tamil Nadu has a total population of 2,605,914 as per the Census 2011. Out of which 1,311,697 are males while 1,294,217 are females. In 2011 there were a total 635,578 families residing in Cuddalore district. The Average Sex Ratio of Cuddalore district is 987. As per Census 2011 out of total population, 34% people live in Urban areas while 66% live in the Rural areas. The average literacy rate in urban areas is 86.4% while that in rural areas is 73.7%. Also the Sex Ratio of Urban areas in Cuddalore district is 999 while that of Rural areas is 980. The population of Children of age 0-6 years in Cuddalore district is 279950 which is 11% of the total population. There are 147644 male children and 132306 female children between the age 0-6 years. Thus as per the Census 2011 the Child Sex Ratio of Cuddalore is 896 which is less than Average Sex Ratio (987) of Cuddalore district. The total literacy rate of Cuddalore district is 78.04%. The male literacy rate is 76.26% and the female literacy rate is 62.97% in Cuddalore district.



3.6.4 Study area:

PANIKANKUPPAM VILLAGE

Panikkankuppam is a large village located in Panruti Taluka of Cuddalore district, Tamil Nadu with total 1038 families residing. The Panikkankuppam village has population of 4205 of which 2125 are males while 2080 are females as per Population Census 2011.

In Panikkankuppam village population of children with age 0-6 is 476 which makes up 11.32 % of total population of village. Average Sex Ratio of Panikkankuppam village is 979 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Panikkankuppam as per census is 874, lower than Tamil Nadu average of 943.

Panikkankuppam village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Panikkankuppam village was 76.13 % compared to 80.09 % of Tamil Nadu. In Panikkankuppam Male literacy stands at 84.18 % while female literacy rate was 68.03 %.

TABLE 3.22: PANIKANKUPPAM VILLAGE POPULATION FACTS

Number of Households	1038
Population	4205
Children Population	476
Scheduled Tribes (ST)	0
Scheduled Caste (SC)	714
Literacy	76.13%
Total Workers	1914
Main Worker	1331
Marginal Worker	583

Source: <https://www.census2011.co.in/data/village/636568-panikkankuppam-tamil-nadu.html>

DEMOGRAPHICS POPULATION OF VILLAGE PANIKANKUPPAM

Total Population	Male Population	Female Population
4205	2125	2080

Sex Ratio of Panikankuppam Village -Census 2011

The total population of Panikkankuppam is 4,205 out of which 2,125 are males and 2,080 are females thus the Average Sex Ratio of Panikkankuppam is 979.

Literacy of Panikankuppam Village

As per the Census 2011, the literacy rate of Panikkankuppam is 76.1%. Thus Panikkankuppam village has a higher literacy rate compared to 69.7% of Cuddalore district. The male literacy rate is 84.18% and the female literacy rate is 68.03% in Panikkankuppam village

Worker's profile of Panikankuppam Village

In Panikkankuppam village out of total population, 1,914 were engaged in work activities. 69.5% of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 30.5% were



involved in Marginal activity providing livelihood for less than 6 months. Of 1,914 workers engaged in Main Work, 256 were cultivators (owner or co-owner) while 613 were Agricultural labourers.

TABLE 3.23: PANIKANKUPPAM VILLAGE CENSUS DATA

Description	Census 2011 Data
Village Name	Panikankuppam
Teshil Name	Panruti
District Name	Cuddalore
State Name	Tamil Nadu
Total Population	4205
Total Area	564.83 (Hectares)
Total No of House Holds	1038
Total Male Population	2125
Total Female Population	2080
0-6 Age group Total Population	476
0-6 Age group Male Population	254
0-6 Age group Female Population	222
Total Person Literates	2839
Total Male Literates	1575
Total Female Literates	1264
Total Person Illiterates	1366
Total Male Illiterates	550
Total Female Illiterates	816
Scheduled Caste Persons	714
Scheduled Caste Males	360
Scheduled Caste Females	354
Scheduled Tribe Males	0
Scheduled Tribe Females	0

Source: <https://villageinfo.in/tamil-nadu/cuddalore/panruti/panikkankuppam.html/>

TABLE 3.24: PANIKANKUPPAM WORKING POPULATION

	Total	Male	Female
Total Workers	1914	1214	700
Main Workers	1331	943	388
Main Workers Cultivators	256	179	77
Agriculture Labourer	613	420	193
Household Industries	61	39	22
Other Workers	401	305	96
Marginal Workers	583	271	312
Non Working Persons	2291	911	1380

TABLE 3.25: POPULATION DATA OF STUDY AREA

Sl.No.	Village Name	No of HH	Total Population	Male	Female	Total SC Population	Male SC	Female SC	Total ST Population	Male ST	Female ST
1	Anguchettipalayam	1978	8313	4058	4255	1812	877	935	1	0	1
2	Elandampattu	510	2186	1118	1068	1039	529	510	0	0	0
3	Kadampuliyur	1725	6648	3382	3266	1367	684	683	0	0	0
4	Kanisapakkam	855	3553	1775	1778	1168	569	599	0	0	0
5	Kiliruppu	1257	5118	2595	2523	786	385	401	0	0	0
6	Kilmambattu	1801	7392	3803	3589	513	259	254	0	0	0
7	Kottambakkam	880	3662	1825	1837	799	398	401	7	4	3
8	Maligamedu	1484	6009	3000	3009	937	466	471	5	2	3
9	Maligampattu	1059	4632	2349	2283	1744	867	877	3	2	1
10	Manappakkam	562	2372	1209	1163	579	300	279	0	0	0
11	Melmambattu	1048	4346	2240	2106	386	181	205	0	0	0
12	Palappattu	287	1230	619	611	1206	607	599	0	0	0
13	Panikkankuppam	1038	4205	2125	2080	714	360	354	0	0	0
14	Poongunam	755	3114	1546	1568	1135	546	589	6	2	4
15	Purangani	559	2345	1181	1164	0	0	0	0	0	0
16	Sathippattu	1540	6018	3069	2949	13	7	6	10	6	4
17	Semakottai	682	3268	1656	1612	1859	952	907	0	0	0
18	Semmedu	445	1922	977	945	470	248	222	0	0	0
19	Sirunangaivadi	180	677	340	337	0	0	0	0	0	0
20	Siruvathur	1275	5429	2736	2693	563	274	289	3	2	1
21	Talambattu	387	1693	881	812	303	164	139	0	0	0

Source: www.censusindia.gov.in - Tamilnadu Census of India – 2011



Sl.No.	Village Name	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate	Total Workers Population	Male Workers	Female Workers	Total Main Workers
1	Anguchettipalayam	5303	2879	2424	3010	1179	1831	3582	2435	1147	2655
2	Elandampattu	1235	708	527	951	410	541	971	661	310	953
3	Kadampuliyur	4245	2532	1713	2403	850	1553	3477	1914	1563	2702
4	Kanisapakkam	2413	1334	1079	1140	441	699	1740	1096	644	1136
5	Kiliruppu	3110	1846	1264	2008	749	1259	2307	1208	1099	747
6	Kilmambattu	4442	2664	1778	2950	1139	1811	3342	1991	1351	2574
7	Kottambakkam	2697	1434	1263	965	391	574	1536	1079	457	1237
8	Maligamedu	3824	2118	1706	2185	882	1303	3556	1950	1606	3187
9	Maligampattu	2675	1564	1111	1957	785	1172	2063	1261	802	1459
10	Manappakkam	1459	836	623	913	373	540	1298	746	552	1186
11	Melmambattu	2722	1606	1116	1624	634	990	2033	1212	821	1608
12	Palappattu	626	366	260	604	253	351	883	446	437	535
13	Panikkankuppam	2839	1575	1264	1366	550	816	1914	1214	700	1331

14	Poongunam	1872	1018	854	1242	528	714	1436	909	527	1295
15	Purangani	1466	881	585	879	300	579	853	576	277	759
16	Sathippattu	3907	2256	1651	2111	813	1298	3234	1775	1459	3059
17	Semakottai	2137	1223	914	1131	433	698	1497	903	594	1258
18	Semmedu	1085	634	451	837	343	494	1106	587	519	769
19	Sirunangaivadi	493	282	211	184	58	126	319	205	114	154
20	Siruvathur	2907	1652	1255	2522	1084	1438	2764	1568	1196	2223
21	Talambattu	1037	623	414	656	258	398	764	473	291	298

Sl.No.	Village Name	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Cultivation Workers Male	Main Cultivation Workers Female	Main Agriculture Workers	Main Agriculture Workers Male	Main Agriculture Workers Female	Main Other Workers	Main Other Workers Male
1	Anguchettipalayam	1894	761	241	163	78	666	432	79	1237	1006
2	Elandampattu	650	303	42	31	11	517	279	0	115	102
3	Kadampuliyur	1688	1014	551	384	167	842	725	56	528	431
4	Kanisapakkam	763	373	9	5	4	508	320	25	274	233
5	Kiliruppu	596	151	285	226	59	224	54	27	157	130



6	Kilmambattu	1678	896	273	241	32	1175	736	93	297	232
7	Kottambakkam	899	338	91	88	3	208	214	60	664	561
8	Maligamedu	1773	1414	622	453	169	924	1161	64	416	356
9	Maligampattu	1202	257	223	217	6	773	198	27	238	199
10	Manappakkam	704	482	59	51	8	406	432	15	274	237
11	Melmambattu	946	662	607	374	233	335	189	210	267	216
12	Palappattu	300	235	4	2	2	274	220	1	36	24
13	Panikkankuppam	943	388	256	179	77	420	193	61	401	305
14	Poongunam	842	453	343	269	74	176	261	35	480	384
15	Purangani	527	232	207	195	12	180	163	35	174	132
16	Sathippattu	1722	1337	1078	687	391	584	533	239	625	399
17	Semakottai	718	540	232	152	80	305	338	159	224	179
18	Semmedu	530	239	20	15	5	447	202	3	97	67
19	Sirunangaivadi	128	26	56	52	4	36	33	3	52	41
20	Siruvathur	1213	1010	537	328	209	748	776	6	156	137
21	Talambattu	267	31	79	68	11	134	125	9	84	73



Sl.No.	Village Name	Main Other Workers Female	Total Margin Workers	Margin Workers Male	Margin Workers Female	Margin Cultivation Workers	Margin Cultivation Workers Male	Margin Cultivation Workers Female	Margin House Hold Workers	Margin House Hold Workers Male	Margin House Hold Workers Female	Margin Other Workers	Margin Other Workers Male	Margin Other Workers Female	Non Worker Population	Non Worker Male	Non Worker Female
1	Anguchettipalayam	231	927	541	386	62	28	34	887	521	366	40	20	20	4731	1623	3108
2	Elandampattu	13	18	11	7	2	2	0	18	11	7	0	0	0	1215	457	758
3	Kadampuliyur	97	775	226	549	32	18	14	560	197	363	215	29	186	3171	1468	1703
4	Kanisapakkam	41	604	333	271	18	16	2	580	327	253	24	6	18	1813	679	1134
5	Kiliruppu	27	1560	612	948	389	293	96	1383	588	795	177	24	153	2811	1387	1424
6	Kilmambattu	65	768	313	455	219	152	67	698	295	403	70	18	52	4050	1812	2238
7	Kottambakkam	103	299	180	119	4	0	4	282	177	105	17	3	14	2126	746	1380
8	Maligamedu	60	369	177	192	6	2	4	365	174	191	4	3	1	2453	1050	1403
9	Maligampattu	39	604	59	545	9	3	6	507	49	458	97	10	87	2569	1088	1481
10	Manappakkam	37	112	42	70	10	1	9	106	38	68	6	4	2	1074	463	611
11	Melmambattu	51	425	266	159	40	37	3	369	253	116	56	13	43	2313	1028	1285
12	Palappattu	12	348	146	202	2	0	2	328	142	186	20	4	16	347	173	174
13	Panikkankuppam	96	583	271	312	45	23	22	563	267	296	20	4	16	2291	911	1380

14	Poongunam	96	141	67	74	9	7	2	138	65	73	3	2	1	1678	637	1041
15	Purangani	42	94	49	45	17	14	3	94	49	45	0	0	0	1492	605	887
16	Sathippattu	226	175	53	122	3	1	2	172	52	120	3	1	2	2784	1294	1490
17	Semakottai	45	239	185	54	26	20	6	228	180	48	11	5	6	1771	753	1018
18	Semmedu	30	337	57	280	15	9	6	325	53	272	12	4	8	816	390	426
19	Sirunangaivadi	11	165	77	88	31	29	2	162	74	88	3	3	0	358	135	223
20	Siruvathur	19	541	355	186	87	56	31	501	333	168	40	22	18	2665	1168	1497
21	Talambattu	11	466	206	260	3	2	1	447	200	247	19	6	13	929	408	521

TABLE 3.25: Communication & Transport Facilities in the Study Area

Sl	Village Name	PO	SPO	PTO	T	PCO	MP	IC / CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Anguchettipalayam	1	1	1	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
2	Elandampattu	2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
3	Kadampuliyur	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
4	Kanisapakkam	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
5	Kiliruppu	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
6	Kilmambattu	2	1	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
7	Kottambakkam	2	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	2	1
8	Maligamedu	2	1	2	1	2	1	2	2	2	1	2	2	1	1	1	1	2	1
9	Maligampattu	2	1	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
10	Manappakkam	2	2	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
11	Melmambattu	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
12	Palappattu	2	2	2	1	2	1	2	1	1	2	2	2	2	2	1	1	2	1
13	Panikkankuppam	2	1	2	1	1	1	2	2	1	2	2	1	1	1	1	1	2	1
14	Poongunam	2	2	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
15	Purangani	2	2	2	1	1	1	1	2	2	2	2	2	2	2	1	1	2	1
16	Sathippattu	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
17	Semakottai	2	1	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
18	Semmedu	2	2	2	1	1	1	2	2	1	1	2	2	1	1	1	1	2	1
19	Sirunangaivadi	2	2	2	1	2	1	2	1	1	2	2	2	2	2	1	1	2	1
20	Siruvathur	2	1	2	1	1	1	2	1	1	2	2	2	2	2	1	1	2	1
21	Talambattu	2	2	2	1	2	1	2	2	2	1	1	2	2	2	1	1	2	1

TABLE 3.25: Water & Drainage Facilities in the Study Area

Sl	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Anguchettipalayam	1	1	2	1	1	2	2	2	1	1	2
2	Elandampattu	1	2	2	2	2	2	2	2	1	1	2
3	Kadampuliyur	1	2	1	2	2	2	2	2	1	1	2
4	Kanisapakkam	1	2	2	2	1	2	2	2	1	1	1
5	Kiliruppu	1	2	2	2	1	2	2	2	1	1	1
6	Kilmambattu	1	1	1	1	1	2	2	2	1	1	2
7	Kottambakkam	1	1	1	1	1	2	2	2	1	1	2
8	Maligamedu	1	1	2	2	1	2	2	2	1	1	2
9	Maligampattu	1	1	2	2	2	2	2	1	1	1	2
10	Manappakkam	1	2	2	2	2	2	2	2	1	1	2
11	Melmambattu	1	2	2	1	1	2	2	2	1	1	2
12	Palappattu	1	2	2	2	2	2	2	2	1	2	1
13	Panikkankuppam	1	2	2	2	1	2	2	2	1	1	2
14	Poongunam	1	2	2	1	1	2	2	2	1	1	1
15	Purangani	1	2	2	2	2	2	2	2	1	1	2
16	Sathippattu	1	1	2	2	1	2	2	2	1	1	2
17	Semakottai	1	1	2	1	2	2	2	2	1	1	2
18	Semmedu	1	2	2	2	2	2	2	2	1	1	1
19	Sirunangaivadi	1	1	2	2	2	2	2	2	1	2	1
20	Siruvathur	1	2	2	1	1	2	2	2	1	1	2
21	Talambattu	1	2	2	2	1	2	2	2	1	1	2

TABLE 3.25: Other Facilities in the study Area

Sl	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL		NPS	APS	BDRO	PS
1	Anguchettipalayam	2	2	2	2	1	1	2	1	1	1	2	2	2		2	1	1	1
2	Elandampattu	2	2	2	2	1	1	2	2	1	1	2	2	2		1	1	1	1
3	Kadampuliyur	2	2	2	2	1	1	2	2	1	1	2	1	1		1	1	1	1
4	Kanisapakkam	2	2	1	1	1	1	2	2	1	1	2	2	2		1	1	1	1
5	Kiliruppu	2	2	2	1	1	1	2	2	1	1	2	1	1		1	1	1	1
6	Kilmambattu	2	2	2	2	1	1	1	2	1	1	2	1	2		2	1	1	1
7	Kottambakkam	2	2	2	1	1	1	2	2	1	1	2	1	1		1	1	1	1
8	Maligamedu	2	2	1	1	1	1	2	2	1	1	2	2	1		1	1	1	1
9	Maligampattu	2	2	2	2	1	1	2	2	1	1	1	1	1		1	1	1	1
10	Manappakkam	2	2	2	2	1	1	2	2	1	1	2	1	1		1	1	1	1
11	Melmambattu	2	2	2	2	1	1	1	2	1	1	2	1	2		2	1	1	1
12	Palappattu	2	2	2	2	1	1	2	2	2	1	2	2	2		2	2	2	1
13	Panikkankuppam	2	2	2	2	1	1	2	2	1	1	2	2	1		1	1	1	1
14	Poongunam	2	2	2	1	1	1	2	2	1	1	2	1	1		1	1	1	1
15	Purangani	2	2	2	2	1	1	2	2	2	2	2	2	2		2	1	2	1
16	Sathippattu	2	1	2	2	1	1	2	2	1	1	2	2	1		1	1	1	1
17	Semakottai	2	2	2	2	1	1	2	2	1	1	2	1	2		1	1	1	1
18	Semmedu	2	2	2	2	1	1	2	2	1	1	1	1	1		1	1	1	1
19	Sirunangaivadi	2	2	2	2	1	1	2	2	2	2	2	2	2		2	2	2	1
20	Siruvathur	2	2	2	2	1	1	1	2	1	1	2	1	1		1	1	1	1
21	Talambattu	2	2	2	2	1	1	2	2	1	1	2	1	1		1	1	1	1

TABLE 3.25: Educational Facilities in the study Area

Sl	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1	Anguchettipalayam	2	1	1	2	1	2	1	1	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2
2	Elandampattu	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	Kadampuliyur	2	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Kanisapakkam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Kiliruppu	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Kilmambattu	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	Kottambakkam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Maligamedu	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	Maligampattu	2	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Manappakkam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	Melmambattu	1	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	Palappattu	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	Panikkankuppam	2	2	2	1	2	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
14	Poongunam	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Purangani	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Sathippattu	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
17	Semakottai	1	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Semmedu	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Sirunangaivadi	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	Siruvathur	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21	Talambattu	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

TABLE 3.25: Medical Facilities in the Study Area

Sl. No.	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1	Anguchettipalayam	0	0	1	0	0	0	0	0	0	0	0	b
2	Elandampattu	0	0	0	0	0	0	0	0	0	0	0	b
3	Kadampuliyur	0	0	1	1	0	0	0	0	0	0	0	b
4	Kanisapakkam	0	0	1	0	0	0	0	0	0	0	0	c
5	Kiliruppu	0	0	1	0	0	0	0	0	0	0	0	b
6	Kilmambattu	0	0	1	0	0	0	0	0	0	0	0	b
7	Kottambakkam	0	0	1	0	0	0	0	0	0	0	0	b
8	Maligamedu	0	0	1	1	0	0	0	0	0	0	0	b
9	Maligampattu	0	0	1	0	0	0	0	0	1	0	0	b
10	Manappakkam	0	0	0	0	0	0	0	0	0	0	0	a
11	Melmambattu	0	0	1	0	0	0	0	0	0	0	0	a
12	Palappattu	0	0	0	0	0	0	0	0	0	0	0	b
13	Panikkankuppam	0	0	1	0	0	0	0	0	0	0	0	a
14	Poongunam	0	0	1	0	0	0	0	0	0	0	0	b
15	Purangani	0	0	1	0	0	0	0	0	0	0	0	a
16	Sathippattu	0	0	2	0	0	0	0	0	0	0	0	a
17	Semakottai	0	0	1	0	0	0	0	0	0	0	0	b
18	Semmedu	0	0	1	0	0	0	0	0	0	0	0	b
19	Sirunangaivadi	0	0	0	0	0	0	0	0	0	0	0	b
20	Siruvathur	0	0	1	0	0	0	0	0	0	0	0	b
21	Talambattu	0	0	0	0	0	0	0	0	0	0	0	b

3.8 SUMMARY OF THE BASELINE STATUS:

The interpretations of the baseline environmental status in the study area are following.

- * The monitored Air quality in the project area was found to be in compliance with the NAAQ norms for industrial and residential rural and other areas.
- * The noise level Leq during the day and night was found to be well within the ambient noise quality standards notified under Environmental (Protection) Act 1986.
- * The quality of the surface water and ground water are found well within the prescribed standards of CGWB Norms and drinking water specification IS 10500 and Central Pollution Control Board water quality criteria.
- * There is no eco sensitive zone or any Archeological/ historical places found within the vicinity of the project area.
- * There are no endangered red list species of fauna and the area is thinly populated. All basic facilities like school, hospitals, communication center, transportation center, are available in and around the project area.
- * There is sufficient buffer zone for the project with respect to physical and biological environments. There is no effluent discharge from the mine to the nearby water.

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 INTRODUCTION: -

The environmental impact can be categorized as either primary or secondary, primary impacts which are attributed directly by the project; secondary impacts are those which are indirectly induced. The open cast mining operations involve development of benches, approach road, haul road, excavation and handling of mineral. If adequate control measures are not taken to prevent/mitigate the adverse environmental impacts/lead to damage the eco-system.

The various anticipated impacts will be in

- * Land environment
- * Soil environment
- * Water Environment
- * Air Environment
- * Noise Environment
- * Socio economic environment
- * Solid waste

Based on the existing baseline environmental status, the environmental factors that are likely to be affected (Impacts) are identified, quantified and assessed.

4.1 LAND ENVIRONMENT

4.1.2 Anticipated Impact

The total area applied for quarry lease is 6.59.0ha out of which 4.29.28 ha is proposed for quarrying activity (Excavation). The proposed area is Government land. No forest land is involved in this project. The mining activity is proposed to a maximum depth of 8m below the ground level without intersecting the ground water able.

In the proposed mining plan only 5.5m depth has been envisaged as workable depth for safe & economic quarrying for the entire period. The quarried-out pit will be fenced with barbed wire also an earth bund will be formed around the quarry to prevent inadvertent entry of public and cattle.

Unutilized land will be converted into green belt, hence impact due to change in land use is positive. No release of toxic elements into the ground. No adverse impact is anticipated on land use of buffer zone associated due to the mining activity, as all the activities will be confined within the project area. The quarrying operations will impact the land usage and land aesthetics of project area. The land degradation is unavoidable during quarry activities like excavation, mineral handling etc.,

4.1.3 Mitigation measures

Due to the mining activities in the project area the land use pattern will be altered. In order to minimize the adverse effects, the following control measures will be implemented:

The effect of land degradation due to mineral excavation can be considerably reduced by planning to carry out timely greenbelt development and reclamation, plantation along roads, along mine peripheral premises etc.,

- * Top Soil will be side cast during the quarry operation, after the completion of quarrying operation the top soil will be spread out on the excavated area and used for plantation purpose



- * Construction of garland drains all around the quarry pit 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 and dust suppression
- * Thick plantation will be carried out on unutilized area, particularly on safety barrier, etc.,
- * At conceptual stage, the land use of mining area will change into area covered with greenbelt and plantation
- * Proper fencing will be carried out at the conceptual stage Security will be posted round the clock, to prevent inherent entry of the public and cattle

4.1.4 Soil Environment

4.1.4.1 Impact on Soil Environment

Soil characteristics indicate favorable condition for plant growth. The quantity of topsoil generated for the 5 year production period will be 1,39,293 tons. The topsoil will be side casted while excavation progress and backfilled simultaneously and plantation will be carried out during conceptual stage.

4.1.4.2 Mitigation measures for Soil Conservation

Garland drains will be constructed around the project area to arrest any soil wash off from the quarry area being carried away by the rainwater. This will also avoid the soil erosion and siltation in the mining pits.

4.2 WATER ENVIRONMENT

4.2.1 Anticipated Impact on Surface and ground water

The impact due to this quarrying activity on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity is not required much of water except for dust suppression and greenbelt development. Plantation is proposed, which will increase the water holding capacity and helps in recharging of groundwater. The working pit will be used for plantation. The quarrying activity will not intersect ground water table as quarrying is proposed to a depth of 5.5m and water table is found at a depth of 50m BGL.

4.2.2 Mitigation measures

The quarrying operation is restricted well above the water table. There is no intersection of surface water bodies (Streams, Canal, Odai etc.,) in the proposed project area. During rainy season rain water will be collected in the lower part of the quarry pit and later used for greenbelt development and for the water sprinkling in the haul roads. There is no proposal for discharging of quarry pit water outside the project area. Detail of water requirements in KLD as given below:

Table 4.1: Water Requirements

Purpose	Quantity	Sources
Domestic purpose	0.5 KLD	Drinking water is available from the nearby community wells
Dust suppression	0.8 KLD	From existing bore well on nearby mine
Green belt	0.7 KLD	From existing bore well on nearby mine

	Total	2.0 KLD	
--	--------------	----------------	--

Source: Approved Mining plan

There is no proposal of ore beneficiation mineral processing or workshop within the project area

Mitigation Measures: -

- * Construction of garland drains to divert surface run-off into the quarrying area.
- * Construction of check dams / gully plugs at strategic places to arrest silt wash off from broken up area.
- * Retaining walls with weep hole will be constructed around the mine boundaries to arrest silt wash off.
- * Periodic analysis of mine pit water and ground water quality in nearby villages.
- * Domestic sewage from mine office & urinals/latrines provided in quarry area is discharged in septic tank followed by soak pits.
- * In the silt trap De-silting will be carried out before and immediately after the monsoon season.
- * Regular monitoring and analyzing the quality of water in open well, bore wells and surface water.

4.3 AIR ENVIRONMENT

Quarrying Operations will be to carried out by opencast method without involving drilling and blasting, dust particles are generated only due to Excavation, Loading, handling of mineral and transportation. The air quality in the study area depends upon the nature and concentration of emissions and meteorological conditions. Prediction of impacts on air environment has been carried out taking into consideration proposed production of 2,16,091 tons of Fire clay on air environment and net increase in emissions by Open pit source modeling in AERMOD Software.

The major air pollutants due to mining activity includes: -

- * Particulate Matter (Dust) of various sizes.
- * Gases, such as, Sulphur Dioxide, Oxides of Nitrogen, Carbon Monoxide etc., from vehicular exhaust.
- * Dust is the single air pollutant observed in the open cast mines. Diesel operating vehicles produce NO_x, SO₂ and CO emissions, usually at low levels. Dust can be of significant nuisance surrounding land users and potential health risk in some circumstances.

4.3.1 Emission Rates

Quantification of particulate emissions has been carried out by the emission factor technique. Emission factor is a statistical average of the rate at which a pollutant is released during an activity. This factor when multiplied by the level of that activity in each situation will give the overall effect. Particulate emissions have been predicted by using standard equations suggested by USEPA for mining & allied activities.

4.3.2 Impacts on Air Environment

Mining Operations are carried out by opencast mechanized mining, the fugitive dust and air borne particulate matter generated during mineral excavation and transportation.

The emissions of Oxides of Nitrogen (NO_x) & Sulphur dioxide (SO₂), contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal.

Prediction of impacts on air environment was carried out taking into consideration proposed production and net increase in emissions.



The major air pollutants due to mining activity includes: -

- Fugitive dust and Particulate Matter of various sizes.
- Gases, such as, Sulphur Dioxide, Oxides of Nitrogen, Carbon Monoxide etc., from vehicular exhaust.
- Fugitive Dust is the major air pollutant observed in the open cast mines. Diesel operating drilling machines, small amount of blasting and movement of machinery/ vehicles produce NO_x, SO₂ and CO emissions, usually at low levels. Fugitive Dust can be of significant nuisance surrounding land users and potential health risk in some circumstances.

Table 4.3: Predominant Source of Air Pollution

Sl. No.	Source	Type of Pollutant
1	Mining activity (drilling/blasting/loading/HEMM)	Fugitive Dust, Particulate Matter (PM ₁₀ & PM _{2.5}), SO ₂ , NO _x , CO
2	Transport of waste or soil for dumping/ backfill	
3	Dumping of waste	
4	Mineral Loading	
5	Transportation of Mineral	

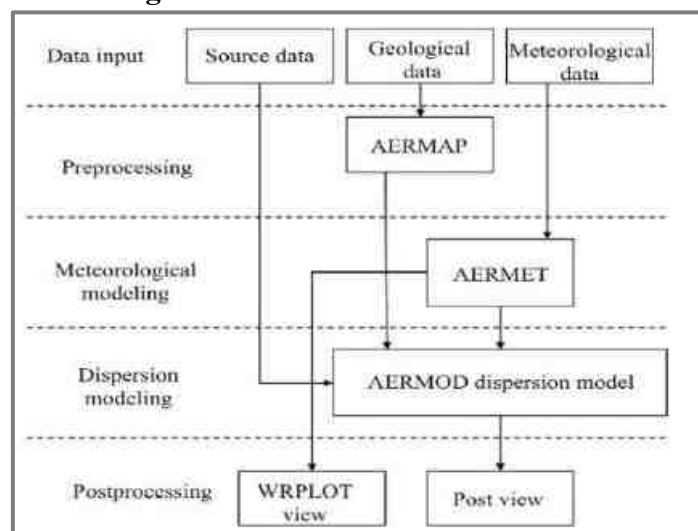
Source: Onsite Monitoring by functional area Experts and EIA Guidance and Manual, February. 2010

4.4 AERMOD Dispersion Model and Framework of Computation –

In order to assess the impact due to proposed maximum tentative production on air environment due to various mining activities, impact was predicted over a radial distance of 5000 m at grid interval of 500 m around the proposed site and at various sampling locations as per layout of the project area.

GLC was calculated over the study area in all directions to predict combined impact of blasting, loading & unloading of mineral and movement of trucks on the haul road in the project area in Cartesian coordinates (X, Y) to have better prediction of model results at various locations representing project site, human settlements, commercial area and sensitive areas as present in the study area.

Figure 4.1 Flow Chart of AERMOD



Source: AERMOD Lake view Environmental Software

4.4.1 Emissions Details –

Excavation of Mineral, Loading and transportation of mineral over the haul road, wind erosion of the exposed area and movement of HEMM will be the main polluting source in the proposed quarrying activities releasing Particulate Matter (PM₁₀ & PM_{2.5}) affecting Ambient Air of the area. Fugitive dust and particulates are generated in this process. Emission during Excavation, Loading and unloading was calculated by the area sources. Transportation of the mineral by trucks operated per hour on the haul road was calculated by the area source which was combination of line sources with each truck loaded with mineral transporting over the haul road of the mining area.

Details of predicted emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance is discussed and combined impact is predicted in the worst case scenario given as follows:

Blasting –Blasting is not required in this quarrying operation, the nature of deposit is soft and fragile in nature.

Loading and Unloading – US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately.

Haul Road – US EPA, 2006, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during transportation of mineral and over burden of mineral by trucks on haul road. Truck will be fully covered with tarpaulin material and emission of PM₁₀ during on the haul road will be insignificant.

4.4.2 Emission Estimation –

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER =overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of Fire clay. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4-2.

4.4.2.1 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the quarrying activities have been estimated to know the incremental concentration in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modelling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by quarrying activities. Suspended Particulate Matter (SPM) is the major pollutant occurred during quarrying activities. The prediction included the impact of

Excavation, Drilling, Blasting (Occasionally), loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and Cloud cover.

Impact was predicted over the distance of 10 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts

TABLE 4.2: ESTIMATED EMISSION RATE FOR PM₁₀

Activity	Source type	Value	Unit
Mineral Loading	Point Source	0.045957025	g/s
Haul Road	Line Source	0.00250414	g/s/m
Overall Mine	Area Source	0.044670449	g/s

TABLE 4.3: ESTIMATED EMISSION RATE FOR SO₂

Activity	Source type	Value	Unit
Overall Mine	Area Source	0.001380823	g/s

TABLE 4.4: ESTIMATED EMISSION RATE FOR NO_x

Activity	Source type	Value	Unit
Overall Mine	Area Source	0.000041332	g/s

FIGURE 4.1: AERMOD TERRAIN MAP

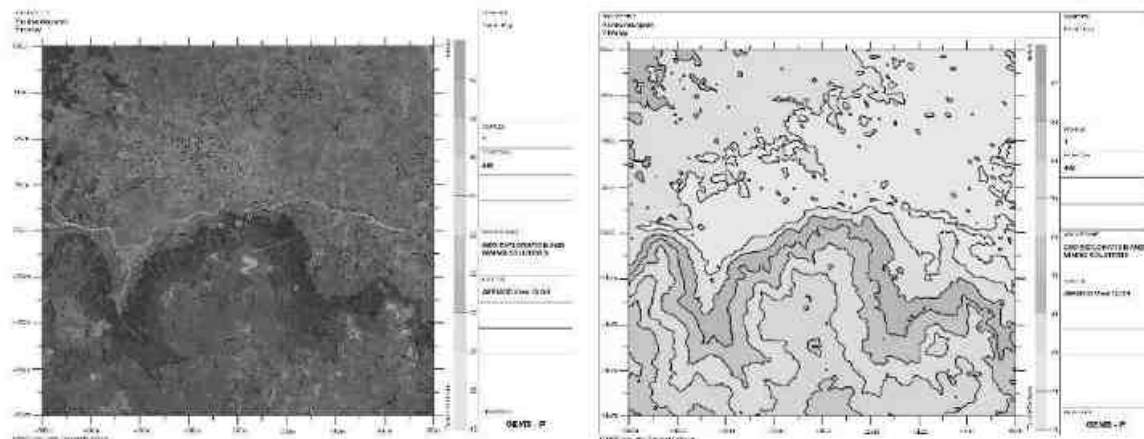


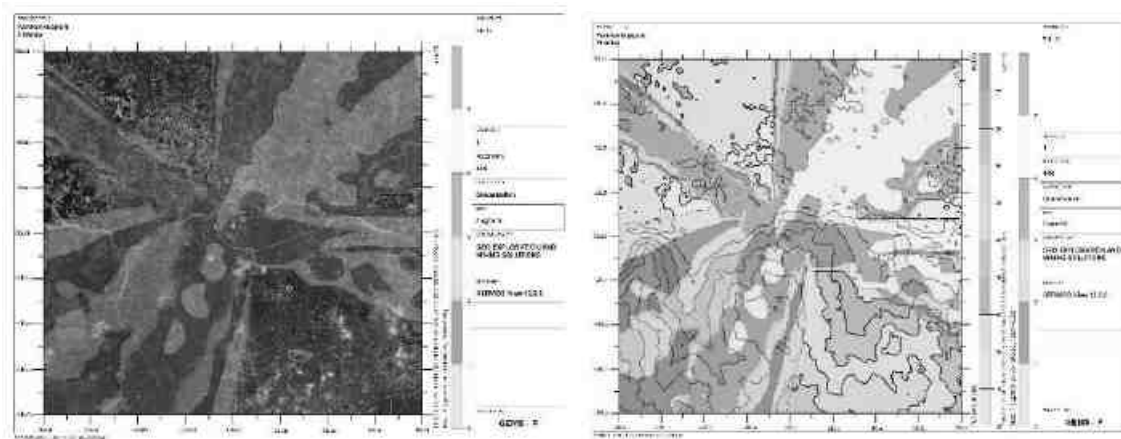
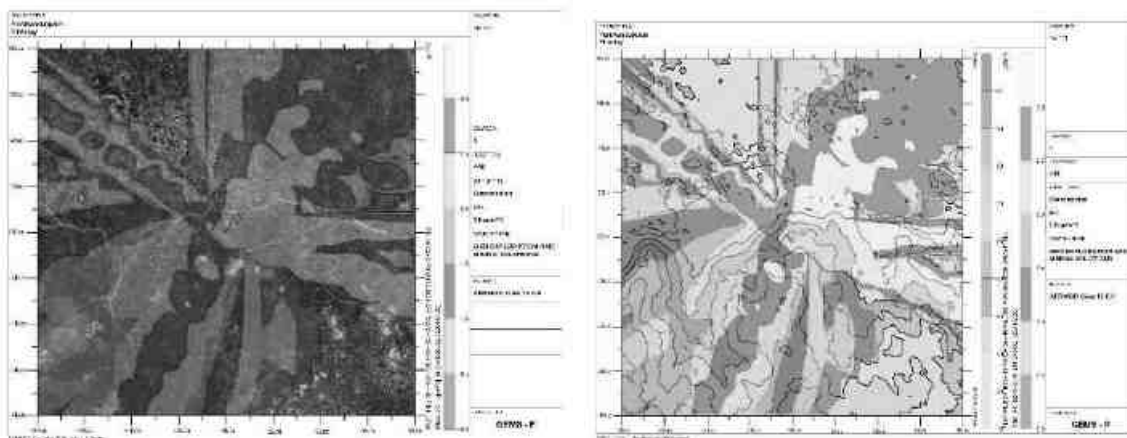
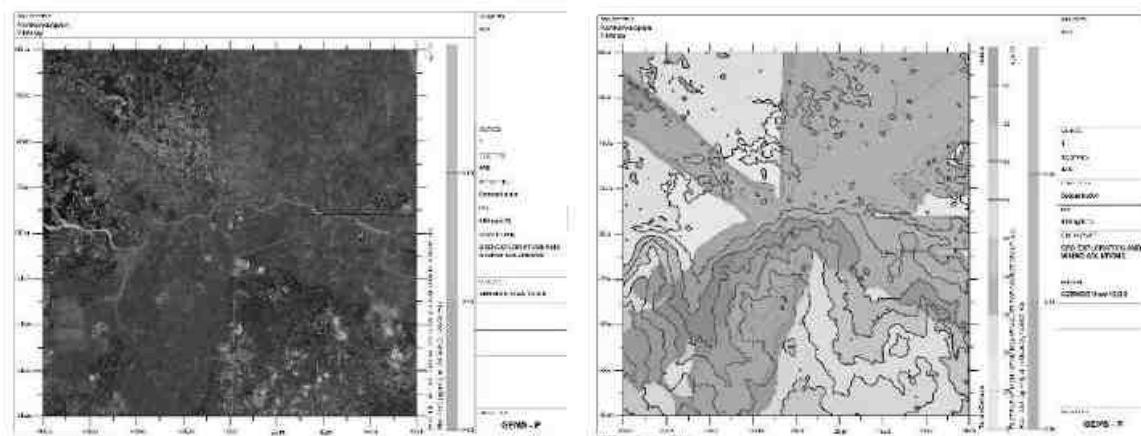
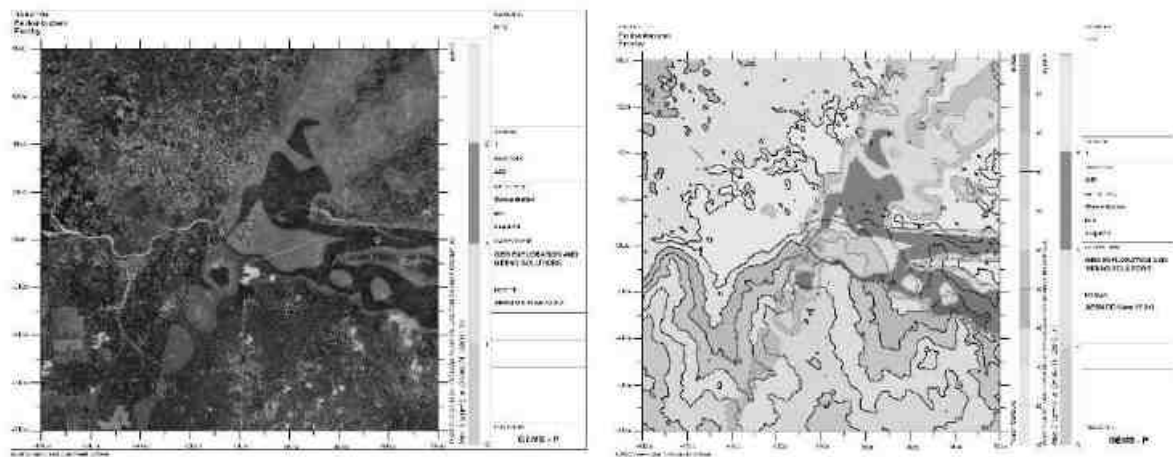
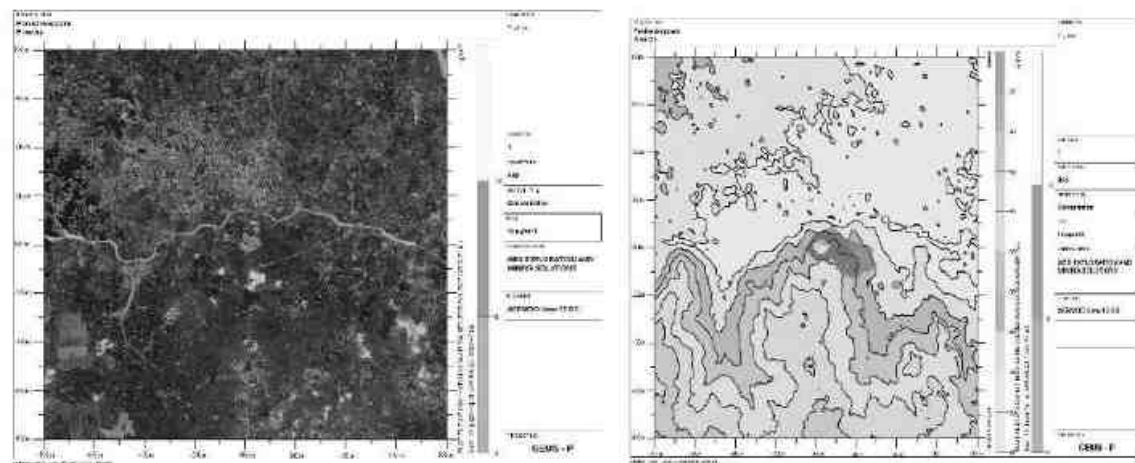
FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀**FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF PM_{2.5}****FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF SO₂**

FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF NO_x**FIGURE 4.6: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST****4.3.2.1 Model Results**

The post project Resultant Concentrations of PM₁₀, PM_{2.5}, SO₂ & NO_x (GLC) is given in Table below:

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ due to mining (µg/m ³)	Total PM ₁₀ (µg/m ³)
AAQ1	11°44'54.50"N 79°33'0.07"E	31	-26	32.0	7.69	39.69
AAQ2	11°45'4.59"N 79°33'14.52"E	472	284	32.7	7.32	40.02
AAQ3	11°44'53.56"N 79°32'36.09"E	-701	-59	34.7	4.89	39.59
AAQ4	11°46'0.21"N 79°32'50.50"E	-266	1999	37.4	4.00	41.4
AAQ5	11°43'25.22"N 79°34'17.44"E	2390	-2778	35.6	0	35.6
AAQ6	11°44'43.62"N 79°36'2.11"E	5571	-368	36.6	6.40	43
AAQ7	11°45'32.85"N 79°29'38.73"E	-6100	1157	35.6	0	35.6

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF PM_{2.5}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³)
AAQ1	11°44'54.50"N 79°33'0.07"E	31	-26	18.4	3.49	21.89
AAQ2	11°45'4.59"N 79°33'14.52"E	472	284	18.9	3.20	22.1
AAQ3	11°44'53.56"N 79°32'36.09"E	-701	-59	22.4	2.58	24.98
AAQ4	11°46'0.21"N 79°32'50.50"E	-266	1999	22.1	2.43	24.53
AAQ5	11°43'25.22"N 79°34'17.44"E	2390	-2778	22.9	0.53	23.43
AAQ6	11°44'43.62"N 79°36'2.11"E	5571	-368	22.2	2.90	25.1
AAQ7	11°45'32.85"N 79°29'38.73"E	-6100	1157	24.4	0.80	25.2

TABLE 4.7: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value due to mining (µg/m ³)	Total SO ₂ (µg/m ³)
AAQ1	11°44'54.50"N 79°33'0.07"E	31	-26	4.8	0.89	5.69
AAQ2	11°45'4.59"N 79°33'14.52"E	472	284	5.0	0.86	5.86
AAQ3	11°44'53.56"N 79°32'36.09"E	-701	-59	5.1	0.67	5.77
AAQ4	11°46'0.21"N 79°32'50.50"E	-266	1999	5.4	0.49	5.89
AAQ5	11°43'25.22"N 79°34'17.44"E	2390	-2778	5.3	0	5.3
AAQ6	11°44'43.62"N 79°36'2.11"E	5571	-368	5.5	0.81	6.31
AAQ7	11°45'32.85"N 79°29'38.73"E	-6100	1157	6.6	0	6.6

TABLE 4.8: INCREMENTAL & RESULTANT GLC OF NO_x

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value due to mining (µg/m ³)	Total NO _x (µg/m ³)
AAQ1	11°44'54.50"N 79°33'0.07"E	31	-26	21.0	5.82	26.82
AAQ2	11°45'4.59"N 79°33'14.52"E	472	284	22.0	5.37	27.37
AAQ3	11°44'53.56"N 79°32'36.09"E	-701	-59	23.0	0.29	23.29
AAQ4	11°46'0.21"N 79°32'50.50"E	-266	1999	23.3	0	23.3
AAQ5	11°43'25.22"N 79°34'17.44"E	2390	-2778	24.5	0	24.5
AAQ6	11°44'43.62"N 79°36'2.11"E	5571	-368	23.1	2.00	25.1
AAQ7	11°45'32.85"N 79°29'38.73"E	-6100	1157	24.8	0	24.8

From the resultant of cumulative concentration i.e., Background + Incremental Concentration of pollutant in all the receptor locations without effective mitigation measures are still within the prescribed NAAQ limits of 100, 80 & 80 µg/m³ for PM₁₀, SO₂ & NO_x respectively. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be further being controlled.

4.4.3 Mitigation Measures

In the study area adequate control measures will be implemented at the time of quarrying operation. Mitigated 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 mitigated measures need to be checked.

The following additional measures will also be adopted such as:

- * Dust generation will be reduced by using sharp teeth of shovels
- * Water sprinkling on haul roads, service roads will help in reducing considerable dust pollution
- * Closed Cabins with AC for shovel and dumpers and dust masks to workers will be provided
- * Weekly maintenance of quarrying equipment's will be carried out
- * Transport of Fire clay in trucks covered with tarpaulin.
- * 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 nearby agriculture area.
- * Comprehensive green belt in the safety zone will be carried out to reduce to propagation of fugitive dust emissions in order to create clean and healthy environment.
- * The vehicles and machinery will be kept in well maintained condition so that emissions will minimize
- * PPE will be provided to all workers
- * Regular health check-up of workers and nearby villagers in the near vicinity of the project area will be carried out and also yearly occupational health assessment of employees will be carried out as per DGMS Guidelines.
- * Ambient Air Quality Monitoring will be conducted on half-yearly basis to assess the quality of ambient air.

4.5 NOISE ENVIRONMENT

In order to assess the baseline noise levels, impact of noise assessment around the project site and on the nearby settlements have been carried out exclusively and objectively in the core and buffer zone covering 10km radius in 7 locations. Following are the sources of noise in this project are generated during excavation, loading and transportation of mineral. These activities will not cause significant impact to the inhabitants of this area because there is no human settlement in close proximity to the project area.

The noise levels in the working environment will be maintained within the standards prescribed by Occupational Health and Safety (OHSA).

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.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - A_{e1,2}$$

Where:

L_{p1} & L_{p2} are sound levels at points located at distances r_1 & r_2 from the source

$A_{e1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

$$L_{p \text{ total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

TABLE 4.10: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	45	46	46.8	47.4	46.3	47.6	46
Incremental Value dB(A)	60.1	60.1	56.6	27.4	25.6	28.1	27.8
Total Predicted Noise level dB(A)	60.2	60.3	57.0	47.4	46.3	47.6	46.1

The incremental noise level is found within the range of 60.1 dB (A) in Core Zone and 25.6 – 56.6 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. 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, it can be seen that the ambient noise levels at all the locations are within permissible limits of Industrial area (core zone) & Residential area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

Mitigation Measures

- * Provision of earplugs to workers exposed to high noise generating activities. Workers and operators at work site will be provided with earmuffs
- * Development of thick green belt around mining area and haul roads to reduce the noise
- * Conducting periodical medical checkup of all workers for any noise related health problems.
- * Proper training to personnel to create awareness about adverse noise level effects
- * Periodic noise monitoring at suitable locations in the mining area and nearby habitations to assess efficacy of adopted control measures

4.6 BIOLOGICAL ENVIRONMENT

4.6. Impact on the Biological Environment

4.6.1. Anticipated Impact on agricultural land associated with flora

Dust emissions generated during fireclay mining operations, particularly from excavation, loading–unloading, and movement of mineral through vehicles along approach roads

- Dust emissions may settle on nearby agricultural lands and vegetation, affecting crop yield and plant health.
- Movement of mineral transport vehicles along approach roads may cause dust deposition on soil and crop surfaces, potentially affecting soil texture and crop health.
- Clearing of vegetation within the lease area results in loss of local flora and minor disturbance to fauna. Dust deposition on plant leaves in the surrounding areas can reduce photosynthetic activity, thereby retarding plant growth.
- Most of the land in the buffer area is undulating terrain with croplands, grass patches, and small shrubs. Hence, there will be no effect on the flora of the region

4.6.2 Mitigation Measures

Mitigation measures such as regular water sprinkling on haul roads, development of peripheral greenbelt, controlled vehicle speed, and proper drainage management, the anticipated impacts on agricultural land are expected to be minimal, localized, and reversible.

4.6.2.1. General Guidelines for Green Belt Development



A drone survey was carried out covering the existing greenbelt and fencing within and around the proposed mine lease area, in accordance with the approved Terms of Reference (ToR). For greenbelt development and plantation purposes in and around the proposed mining lease area, native plant species, fruit-bearing trees, medicinal plants, and dense canopy-forming species shall be selected. The chosen species will be tolerant to prevailing pollution levels and suitable to the respective bio-geographical zone of India, thereby ensuring ecological compatibility and long-term sustainability of the greenbelt.

After commencement of mining operations at the approved production capacity, greenbelt development and plantation activities shall be carried out strictly in accordance with the Terms and Conditions stipulated in the Environmental Clearance (EC). The greenbelt is proposed not only for protecting sensitive receptors and maintaining ecological balance, but also to function as an effective biological filter and sink for particulate matter and gaseous emissions generated from vehicular movement and various mining and allied activities.

4.6.2.2. Proposed Green Belt

Extensive green belt development will be started during the construction phase, which will continue till the operation of the plant. About 500 trees will be planted per hectare all around the plant, approach roads, and township premises. Locally available types of trees that are resistant to pollutants will be planted. In addition to the above, all open spaces available within the premises will be developed as nurseries, parks, gardens, and other forms of greenery. 5 m wide greenbelt will be developed along the plant premises, as per land available.

4.6.2.3. Development of Green Belt

The plantation matrix adopted for the green belt development includes pit of 0.3 m x 0.3 m in size with a spacing of 2 m x 2 m. In addition, earth filling and manure may also be required for the proper nutritional balance and nourishment of the sapling. It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration. Multi-layered plantations comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt.

4.6.3.4. Selection of Plant Species for Green Belt Development

It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration. Multi-layered plantations comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt. Green belt is plantation of trees for reducing the air pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belts have been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution. Regional tree saplings in eco-friendly bags like *Pterocarpus marsupium*, *Pongamia pinnata*, *Limonia acidissima*, and *Cassia roxburghii* will be planted along the Lease boundary and avenues as well as over non-active dumps with intervals 3m in between with the GPS Coordinates. The greenbelt development plan aims to overall improvement in the environmental conditions of the region Native plant species will be preferred.

- The species should be wind-firm and deep-rooted.
- The species should form a dense canopy.
- Fast-growing plants will be planted
- Species tolerance to air pollution like SO₂ and NO₂ should be preferred.
- Plants having large leaf area index will be considered
- Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter).
- Attractive appearance with good flowering and fruit-bearing.
- Birds and insects attract tree species.
- Roadsides will be planted with local vegetation.

Table No 4.1. List of plant species proposed for Greenbelt development

S. No	Scientific name	Tamil Name
1	<i>Aegle marmelos</i>	Vilva maram
2	<i>Albizia lebbbeck</i>	Vaagai maram
3	<i>Cassia fistula</i>	Konrai tree
4	<i>Lannea coromandelica</i>	Othiyam
5	<i>Limonia acidissima</i>	Vila maram
6	<i>Syzygium cumini</i>	Naval maram
7	<i>Toona ciliata</i>	Santhana vembu
8	<i>Ficus hispida</i>	Aththi maram
9	<i>Borassus flabellifer</i>	Panai-maram
10	<i>Madhuca longifolia</i>	Illupai maram

(*Source: Term of Reference-ToR)

Table No 4.2. Species suitable for abatement of noise and dust pollution

S. No	Botanical name	Common name
1	<i>Azadirachta indica</i>	Vembhu maram
2	<i>Ficus religiosa</i>	Arasan maram
3	<i>Ficus hispida</i>	Aththi maram
4	<i>Bombax ceiba</i>	Mul Elavu
5	<i>Syzygium cumini</i>	Naval maram
6	<i>Tamarindus indica</i>	Puliyamaram
7	<i>Mangifera indica</i>	Manga maram
8	<i>Harwickia binata</i>	Anjan maram
9	<i>Delonix regia</i>	Neruppu Kondrai
10	<i>Cassia Fistula</i>	Sara Kondrai

(*Source: Guidance for Developing Green belts Manual, CPCB 2000)

The above-suggested list covers species with thick canopy cover, perennial green nature, native origin, and a large leaf area index. The proposed species will help in forming an effective barrier between the mine site area and the surroundings.

4.6.4. Anticipated Impact on Fauna

- The Removal of sparse vegetation and alteration of land surface within the lease area may lead to displacement of small mammals, reptiles, and avifauna that utilize the area for shelter or foraging.
- Noise generation due to vehicle may affect avifauna.
- The lease area is not inhabited by any wild life, as there is no forest cover, hence there will not be any effect on migration or extinction of wildlife.
- There are no National Park, Biosphere Reserve, Wildlife corridors, and Tiger/Elephant Reserve found within 10 km radius of the project site.

4.6.4.1. Measures for protection and conservation of wildlife species

- Topsoil has a large number of seeds of native plant species in the mining area.
- Topsoil will be used for restoration and suitable surfaces for planted seedlings.
- Checks and controls the movement of vehicles in and out of the mine.
- Undertaking mitigative measures for a conducive environment to the flora and fauna in consultation with Forest Department.
- A dust suppression system will be installed within the mine and periphery of the mine.

- Plantation around the mine area will help in creating habitats for small faunal species and create a better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

4.6.5. Impact on Aquatic Biodiversity

- Mining activities will not disturb the existing aquatic ecology as there is no effluent discharge proposed from the fireclay mine.
- The major lake along the project sites doesn't have a rich biodiversity and almost all the species of both fauna and flora listed are either least concerned or not evaluated.
- There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.

4.6.5.1. Mitigation Measures

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

Table No. 4.3. Overall Ecological impact assessments of Panikankuppam Village, Fireclay quarry, Panruti Taluk, Cuddalore District.

S. No	Attributes	Assessment
	Activities of the project affect the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in the mining lease site. The fauna sighted mostly migrated from the buffer area.
2	Located near an area populated by rare or endangered species	No Endangered, Critically Endangered, or vulnerable species were sighted in the core mining lease area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	Kangiruppu Reserve Forest 6.7km on South west side of the area.
4	The proposed project restricts access to waterholes for wildlife	'No '
5	Proposed mining project impact surface water quality that also provides water to wildlife	'No 'scheduled or threatened wildlife animals are sighted regularly core in the core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity areas.	Surface runoff management such as drains is constructed properly so there will be no siltation effect in the nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities.	'No'
8	The project release effluents into a water body that also supplies water to a wildlife.	There is an Odai passing on the Southwest side of the lease applied area, a safety distance of 50m has been provided to the odai.
9	Mining projects affect the forest-based livelihood/ any specific forest product on which local livelihood depended.	'No'
10	The project likely to affect migration routes.	'No 'migration route was observed during the monitoring period.
11	The project is likely to affect the flora of an area, which have medicinal value	'No'
12	Forestland is to be diverted, has carbon high sequestration.	'No 'There was no forest land diverted.
13	The project is likely to affect wetlands, Fish breeding grounds, and marine ecology.	'No'. Wetland was not present in the near core Mining lease area. No breeding and nesting ground is

	present in the core mining area.
--	----------------------------------

(*Source: EIA Guidance Manual-Mining and Minerals, 2010)

4.7 SOCIO ECONOMIC ENVIRONMENT

The socio-economic impacts of quarrying operation are many. Impacts of a mine project may be positive or Negative. The adverse impacts attribute to physical displacement due to land acquisition, which is followed by loss of livelihood, mental agony, changes in social structure, and risk to food security etc.,

The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations. There is no habitation within the project area and within the radius of 500m from the periphery of the project site.

Therefore, neither villages nor any part of village or any hamlet will be disturbed during the short period of the mine.

Regular medical checkup / eye-camps will be organized for the villagers. Allocation of funds towards public health has been indicated in the CSR/CER activities.

This quarry project will provide job opportunities to 14 workers directly and 20 workers indirectly. Employed for mining work earning wages as per the minimum wages act applicable for un-skilled, semi-skilled and highly skilled categories.

M/s. TANCEM Stoneware Pipe Factory will contribute for the development of the area, nearby schools and basic amenities as per the CSR act 2013. Besides 10% of the royalty as DMF, GST, levis will be given to the concern department for local community development and state/country revenue.

4.8 OCCUPATIONAL HEALTH RISKS

4.8.1 Anticipated Impact

The problem of occupational health, in the operation and maintenance phases is primarily due to dust, which could affect breathing. Health and Safety Measures to control dust inhalation; precautions would be adopted to prevent dust generation at site and dispersing in the environment. Long– term exposure to silica dust may cause silicosis. Workers are likely to get exposed to excessive noise levels during quarrying activities. Occupational Safety hazards related to blasting activities may result in accidental explosions, if not properly mitigated.

Anticipated occupational and safety hazards

- * Health Impact due to Physical activity,
- * Extremes of age, poor physical condition, fatigue, Cardiovascular disease, Skin disorders
- * Noise
- * Burns and shocks due to electricity
- * Respiratory hazards due to Dust exposure
- * Physical hazards

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



-
- * Dust related pneumonia
 - * Segmental vibration

4.8.2 Mitigation measures

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

- * Water sprinkling on haul roads
- * Green belt development to arrest dust and reduce noise propagation
- * Acceptance of good control measures for reducing air pollution,
- * Control of noise levels through good preventive maintenance of machineries, green belt development, provision of earmuffs to workers, etc.,

In addition to above measures, the following remedial steps will be enforced to ensure minimization of occupational health and safety problems.

- * Medical examination of workers at pre-entry level stage of workers, etc., by qualified doctors, with periodical examination of all workers/staff at least once a year, as per DGMS circulars.
- * Conducting tests on staff/workers which include spirometry, audiometry, vision test, X-ray, ECG, etc.,
- * Provision of First aid facility as necessary
- * Organization of medical camps at nearby villages for treatment of patients, especially senior citizens, children and ladies.
- * All staff and workers will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

4.8.3 Post COVID Health Management Plan for Workers

The following Health Management plan will be strictly implemented in the Mines, Mine officials like Mines Manager and Foreman will be Act as a Controller of Health Management of the workers.

- Temperature will be checked to all the workers while arriving to work on each day
- If any persons/employees have fever of 100.4 or higher, chills, shortness of breath will be sent to Hospital and the persons will be employed after fourteen days
- All the persons inside the mine area instructed to wear fabric or disposable pleated masks covering Nose and Mouth
- Social distancing of 6feet will be maintained all the time
- Temporary Hand washing points will be installed near the working places, workers will be initiated to Wash hands frequently with soap and water for a minimum of 20 seconds and advised to avoid touching face. This is an essential contagion-control mechanism

CHAPTER – 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION:

The mining project is site specific and no alternate sites are proposed. Consideration of alternatives to a project proposal is a requirement of EIA process. There is no ore beneficiation, mineral processing proposed in the project. The entire mined out Fire clay mineral will be sold to the nearby ceramic-based industries which are located within a radius of 35km from the quarry site.

Occurrence of minerals is specific site – Fire Clay consists of Al_2O_3 (23-34%), SiO_2 (50-60%) which is used in the ceramic industry. The Fire Clay is clearly inferred from the village road cuttings and open well cuttings.

No workshops, housing, colonies are proposed within the project area. The workers are being employed from the nearby community/ villages; hence, there is no impact on selection of alternates.

5.1 ANALYSIS OF ALTERNATIVE TECHNOLOGY

There are no changes in the method of mining and technology. The methodology will be carried out as per the Mining plan approved by Department of Geology and Mining. The mineral deposits are site specific in nature; hence, question of seeking alternate site does not arise for this project.

CHAPTER – 6: ENVIRONMENTAL MONITORING PROGRAMME

6.0 INTRODUCTION

Success of an environmental management programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters after the project has become operational is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding areas are important for maintaining sound operating practices of the project in line with conformity with environmental regulations, the post project monitoring work forms part of EMP.

Environmental Monitoring programme will be conducted at regular intervals (Half yearly once) for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB. These monitoring reports will be submitted to regulator as per statutory requirements. The entire monitoring work will be carried out by MoEF&CC / NABL recognized laboratories.

6.1 MEASUREMENT & METHODOLOGIES

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC).

The environmental monitoring for the quarry operations will be conducted as follows:

- * Micro-Meteorological data
- * Ambient Air Quality
- * Water quality and water level
- * Ambient and work zone Noise levels
- * Soil Quality and
- * Greenbelt Development

With the knowledge of baseline conditions and continuous post project monitoring, the levels of various environmental attributes can serve as an indicator for any deterioration in environmental conditions due to mining operations and suitable mitigation steps could be taken in time to safeguard the environment.

6.2 MONITORING SCHEDULE AND FREQUENCY

Monitoring programme will be followed till the quarry operation ceases; as per the schedule below.

Table 6.1: Monitoring Schedule

S.No	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	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
2	Air Pollution Monitoring	6 locations (One station in the core zone and one in 500 m radius, two stations in the upwind, two stations on the downwind direction)	24 hours	Weekly two Times once In six Months	PM _{2.5} , PM ₁₀ , SO ₂ and NO _x
3	Water Pollution Monitoring	Mine Pit Water, Nearby project area (Surface water and ground water)	–	Once in Six months	Physio – chemical, microbiological characteristics
4	Noise	Near Mine Equipment / machineries, Mines Office, Operator Cabin, Surrounding Villages in Buffer Area	Hourly – 1 Day	Once in Six months	Leq, Lmax, Lmin, Leq Day & Leq Night
5	Soil	Core Zone and Buffer zone (Grab samples)	–	Once in Six months	Physical and Chemical characteristics
6	Greenbelt	Within the Project Area	2 Day	Monthly	Maintenance

6.3 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

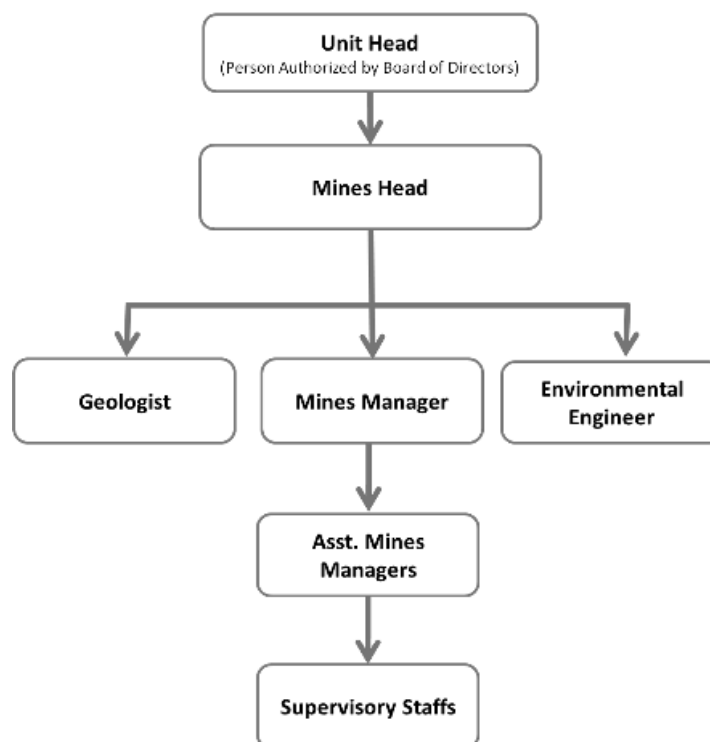
The mitigation measures suggested in Chapter - IV will be implemented to reduce the impact on environment due to the operations of the proposed project. As the mitigation measures with respect to Land, Soil, Water, Air, Noise and Ecological Environment will be implemented immediately as project progress.

6.4 ENVIRONMENTAL MONITORING CELL

An Environmental Management Cell (EMC) will be established under the control of mines manager. A statutory competent qualified person will be appointed, for looking after the environmental monitoring and compliance with the conditions stipulated in the Environmental clearance for the mines. The environmental monitoring programme will be carried out by external agency approved by MoEF/ NABL for conducting the monitoring. The non-compliance of the condition stipulated in the Environmental clearance will be periodically supervised by the Managing director of the company.

The hierarchy of EMC is shown below:

Environmental Monitoring Cell



The Plant Head oversees the environmental administration at the mine through HOD (Mines) who will coordinate with the Manager (Mines) at the mine site who is directly responsible for various environmental activities in the mine. To look after CSR activities, M/s. TANCEM Stoneware Pipe Factory has appointed a CSR (Coordinator). Planning part of the CSR activities are done at corporate level in consultation with the site head while the implementation part is looked after by HOD (HR). In addition to this, staff support is provided by way of employing skilled and unskilled workers for carrying out various activities.

Environmental control measures will span various factors like land degradation, air, water and soil quality, noise levels, effective land reclamation for excavated areas and solid waste dumps, afforestation measures, etc.

The administrative functions of the environment cell are given below:

1. To study the effects of project activities on the environment.
2. To observe the implementation of environmental control measures.
3. To ensure implementation of Plantation Programmes. Regular monitoring of survival rate of plants is carried out to achieve the desired result.
4. To keep records of monitoring etc. in a systematic way, so as to facilitate easy access, when needed by statutory agencies, etc. Also send prescribed returns to statutory authorities.
5. To keep vigil on the efficiency of water management system.
6. Conducting environmental studies and reporting to SPCB.
7. To interact and liaise with State and Central Government Departments.

8. To evaluate the performance of existing pollution control equipment and systems periodically and take timely action to keep the equipment at its optimum performance condition.
9. To ensure the availability of the necessary spares for the pollution control equipment all the times so as to keep the pollutants of the environment within the stipulated limits.
10. To take immediate preventive action in case of some unforeseen environmental pollution attributable to the project.
11. Conducting safety audits and programmes to create safety awareness in workers/ staff.
12. Conducting annual health audits to detect any health problems promptly in the workers/staff. This will reduce occupational health problems.
13. Imparting training on safety and conduct safety drills to educate employees. Firefighting equipment and system has to be kept in 'ready-to-fight' condition.
14. Carrying out socio economic study once in five years in the surrounding areas to find out the benefits derived by the society due to the project and also to fulfill the deficiency, if any, immediately.

The Mines manager will implement the green belt development as per the approved mining plan and besides in consultation with the managing director will submit periodical status report to

1. MoEF & CC – Half yearly status report
2. TNPCB - Half yearly status report
3. IBM quarterly, half yearly annual reports

Besides the Mines manager or mine agent will submit the periodical reports to

1. Director of mines safety,
2. Labour enforcement officer,

6.5 ENVIRONMENTAL POLICY OF THE PROPONENT

M/s. TANCEM Stoneware Pipe Factory had committed to ensure that:

- The proponent assures to operate with an objective of no injuries and accidents at the work place and provide a safe work place for their employees, contractors and others who perform their duties. The proponent shall provide adequate health care to their employees and create process to reduce the adverse effect of the operations on Health of the employees.
- The proponent will develop safe working methods and practices, remove unsafe work conditions and consider all the Sand Health aspects at the early stages of process development to provide safe working atmosphere.
- The proponent will provide safety appliance and continuous training in safety to their employees and contract workmen to ensure safe production and achieve the target of zero accidents. The proponent is committed to supporting actions aimed at increasing employees' safety outside work hours.
- The proponent has assured to protect the environment by control and prevention of pollution and promote green environment.
- The proponent will continuously strive to effectively and economically use oil, coal, water and other natural mineral resources and work continuously to reduce the environmental impacts from our business operations like reduction of emission and use of natural resources and energy.
- The proponent ensures to continuously evaluate and improve the conduct and carryout regular auditing, analysis and studies to eliminate potential concerns and continuously improve upon the Safety, Health and Environmental Standards
- Safety, Health and Environmental Policy will be communicated by the proponent to all employees, contractors and to the public for better understanding and practice

- The proponent, M/s. TANCEM Stoneware Pipe Factory has knowledge of relevant issues regarding Safety, Health and Environment and Provide a foundation for setting objectives and targets. Managements shall fulfill its responsibility to inform, educate and motivate employees and others to understand and comply with this policy and applicable laws.
- The proponent shall use their resources in order to live up to this policy and thereby promote our business.

6.6 BUDGETARY PROVISION FOR ENVIRONMENTAL MONITORING

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF.

The proposed capital cost for Environmental Monitoring Programme is Rs. 76,000/- and the recurring cost is Rs. 76,000/- per annum.

Table 6.3: Environment Monitoring Budget

Sl.No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs 76,000/-	Rs 76,000/-
2	Meteorology		
3	Water Quality		
4	Water Sprinkling		
5	Soil Quality		
6	Noise Quality		
7	Greenbelt		
Total		Rs 76,000/-	Rs 76,000/-

7. ADDITIONAL STUDIES

7.0 GENERAL

The following Additional Studies were done as per items identified by project proponent and items identified by regulatory authority. In addition, items identified by public and other stakeholders will be incorporated after Public Hearing.

- * Public Consultation
- * Risk Assessment
- * Disaster Management plan
- * Open pit slope Stability Analysis

7.1 PUBLIC CONSULTATION:

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct public hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district is submitted along with this Draft EIA / EMP Report and the outcome of public hearing proceedings will be detailed in the Final EIA/EMP report.

7.2 RISK ASSESSMENT

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

Risk assessments will help the mine operators to identify high, medium and low risk levels. Risk assessments will help to prioritize risks and provide information on the probability of harm arising and severity of harm by understanding the hazard, combine assessments of probability and severity to produce an assessment of risk and it is used in the assessment of risk as an aid to decision making.

Any mines have dangers or risk like fires, inundation, failure of machinery, which need to be investigated, addressed and mitigated. Preliminary Risk assessment is based on the philosophy that "Prevention is better than cure". The mining operations will be carried out under supervision of statutory personnel's as per provisions of MCR 1960, MCDR 1988, Mines Rules 1955, Mines Act 1952 & strictly following safety aspects as per MMR 1961 monitored by Directorate General of Mines safety.

7.1.1 Objectives of Risk Assessment

- * Review of literature on Hazard Identification and Risk Assessment
- * Review of accidents in mines and their analysis.
- * Study of risk assessment methodologies.
- * Application of Hazard Identification and Risk analysis for improvement of workplace safety in mines.

7.1.2 Methodology of Risk Assessment:



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



Factors of risks involved due to human induced activities in connection with mining operations are

1. Excavation of mineral
2. Transportation of mineral
3. Fire due to oil spillage
4. Natural Calamities

In order to take care of above hazard/disaster, the following control measures will be adopted;

- All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations;

- Entry of unauthorized persons will be prohibited;
- Provision of Firefighting system and first aid equipment's in the mines office complex and mining area;
- Providing Personnel Protective Equipments (PPE) 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; Under Mines vocational training rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved mine plan and regularly updating the mine plans;
- Cleaning of mine faces will be regularly done;
- Weekly maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads on daily basis;
- Increasing the awareness of safety and disaster through competitions, posters and participating in DGMS Safety Week Programme.

7.1.3 Possible Hazards in Open Cast Mining –

There are various factors, which singularly and severally can cause disaster in a mine. The mining activity is associated with many hazards, which are discussed in the following sub sections:

Blasting –

There is no drilling and blasting proposed for this Fire clay Quarrying Project; therefore, there is no risk of blasting anticipated.

Overburden/ mineral reject/subgrade Dumps –

In this proposed Fire clay Quarrying Project there is no waste anticipated apart from removal of topsoil which is the top layer of 2 m on the Fire clay mineral. Which will be side casted and simultaneously backfilled after excavation of Fire clay and plantation will be carried out on the backfilled area.

Heavy Machinery –

Most of accidents during transport of dumpers, excavators, dozers and other transport vehicles are often attributed to mechanical failures and human errors and can be significantly averted by adapting to following measures:

- Movement of all HEMM and transport vehicle within the project area will be carried out under the direct supervision and control of the mine management head by Mine Owner / Mine Manager;
- All mining machinery and vehicles will be maintained on monthly basis and weekly inspections by a competent person authorized;
- Sign board will be provided at all prominent places recommended by competent person for guidance of the operators/drivers during day/night time; and
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of vehicles will be made man free as far as possible, and will ensure that light and sound device to indicate reversing of trucks/mining machinery is fitted.

Storage of Explosive:

Risk associated with storage of explosive is not anticipated, Since there is no blasting proposed for winning of Fire clay.

Fuel Storage:

Most of the HEMM will operate on diesel. However, no storage is envisaged within the proposed project area. A diesel bowser is proposed for the crawler-mounted machines operating in the mine.



Water Logging:

Water logging in the mine site is not anticipated since the mine depth is proposed upto 23m maximum.

Risk Management Team:

For any type of above risk / hazard, a rescue team will be formed by training the mining staff with specialized training.

Table 7.1: Risk Management Team - Proposed

Sl.No.	Designation	Role
1	1 st Class Mines Manager	Team Leader
2	2 nd Class Mines Manager	Subject Expert
3	Surveyor	Functional Expert
4	Mechanic Engineer	Functional Expert
5	Electrical Engineer	Functional Expert
6	Mine Forman	Member
7	Mining Mate	Member

All risks with certain empirical rank shall require immediate attention and shall be continuously monitored and controlled as per Circular No. DGMS (Tech) (S&T) Circular No.13 of 2002, Dated, Dhanbad, the 31st December, 2002.

List of Duties and Responsibilities –

The duties and responsibilities of the risk management team shall be as per MMR, 1961

Table 7.2: Duties and Responsibilities of Risk Management Team

MMR, 1961 Reg. No.	Duties and Responsibilities
44	Duties & Responsibilities of managers
52	Duties & Responsibilities of surveyors
42	Duties of competent persons
46	Duties & Responsibilities of mine Foremen
47	Duties & Responsibilities of Mining mates

Source: MMR, 1961

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 the affected and provide 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.

Planning –

Possible emergency situations can broadly be classified into vehicle collision, and inundation. Some of the ways of preventing emergencies are as follows:

- Preparation of a Preventive Maintenance Schedule Programme and also covering maintenance schedules for all mining machinery/equipment and instruments as well as transport vehicles as per recommendations of the manufacturers user manuals
- Ensuring the compliance of traffic rules strictly on haul roads within the project area as well as outside the project area
- Establishment of an ongoing training and evaluation programme, incorporating the development of capabilities amongst employees about potential emergencies and ways and means of identifying and averting the same
- Most emergencies do not occur without some incident or an abnormal situation. So there is always sometime of few seconds to few minutes to arrest an incident of abnormal situation from turning in to an emergency

Implementation –

Following key personnel, identified for carrying out specific and assigned duties in case of any kind of emergency, shall be available on call on holidays and off duty also.

- Mine Manager
- Personnel Officer
- Foreman
- Senior Mining Mate
- Essential workers

Responsibilities of Mine Manager



- To take overall charge at the place of incident and activate the Emergency Preparedness Plan according to severity of situation
- Inform doctor to be ready for treatment of affected employees and intimate their relatives.
- To depute staff, carry out following functions -
 - To supervise assembly and evacuation at all points
 - To look after patients casualties and give psychological support
- Inform Police department and District Emergency Authority
- Arrange for chronological records of emergency to be maintained
- Issue authorized statements to news media.

Responsibilities of Mines Foreman

- To take immediate charge at the site of incident and ensure that immediate steps as per Emergency Preparedness Plan are taken and immediately inform Mines Manager
- Shall disseminate the information regarding emergency by blowing of siren
- Supervise assembly and evacuation as per plan and ensure that casualties are receiving proper medical care
- Ensure accounting for personnel and rescue of missing persons.
- Control traffic movement in quarry premises.

Responsibilities of Mining Mate & Trained Workers

- Fire-fighting and spill control till fire brigade takes the charge and thereafter assist the fire brigade.
- Ensuring safety and isolating equipment, materials, urgent repairing or replacement, electrical work etc.
- Controlling movement of equipment, transport vehicles, special vehicle at the mine site.
- Extending first - aid and medical help.
- Assistance at casualty's reception areas to record details of casualties.

Emergency Facilities –

Emergency Control Center (ECC):- For the time being, Mine Office Block is identified as Emergency Control Center. It would have external Telephone, Mobile and Internet facility. All the Site Controller/Incident Controller Officers, Senior Personnel would be located here.

The following information and equipment will be maintained at the Emergency Control Center (ECC):

- Telephone, Mobile & Internet Facility



- Safe contained breathing apparatus;
- Hand tools, wind direction/velocities indications;
- Plan indicating locations of hazard inventories, sources of safety equipment, work road plan, assembly points, rescue location vulnerable zones, escape routes;
- Hazard chart;
- Emergency shut-down procedures;
- Nominal roll of employees;
- List of key personnel, list of essential employees, list of Emergency Co-ordinators;
- Duties of key personnel;
- Address with telephone numbers and key personnel, emergency coordinator, essential employees; and
- Important address and telephone numbers including Government agencies, neighboring industries and sources of help, outside experts, population details around the Mine.

Assembly point

Number of assembly depending upon the mine location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc., would be organized. In view of the size of mine, different locations should be ear marked as assembly points. Depending upon the location of hazard, the assembly points are to be used and fixed with proper sign boards.

Fire Fighting Facilities

Fire-fighting equipment suitable for emergency should be maintained in each operation areas of the mine as per statutory requirements.

Emergency Medical Facilities

Stretchers, gas masks and general first aid materials for dealing with chemical burns, fire burns etc. would be maintained in the First Aid Room as well as in the emergency control room. Private medical practitioners help would be sought. Government hospital would be approached for emergency help. The nearest Hospital and details will be displayed in the notice board.

First aid facilities would be augmented. Names of Medical Personnel, Medical facilities in the area would be prepared and updated. Necessary specific medicines for emergency treatment of Burns Patients and for those affected by toxicity would be maintained.

Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of nearby industrial management's in this regard would be taken on mutual support basis.

7.3 RECLAMATION AND REHABILITATION

7.2.1 Mined out lands:-



Simultaneous backfilling and leveling will be carried out in the mined-out areas during the Mining plan period (1st five years). Plantation will be carried out in the backfilled area as per the Approved Mining plan

7.2.2 Reclamation and Rehabilitation:-

As the part of reclamation, plantation will be carried out in the mined out areas after backfilling, the topsoil side casted while work progress for excavation of Fire clay. Rehabilitation does not arise since there are no habitation within the core zone.

7.2.3 Time Schedule for Abandonment and Abandonment Cost

The measure for closure of mine are proposed in progressive manner. The entire quarried out land will be backfilled simultaneously and plantation will be carried out on the backfilled areas.

7.4 OPEN PIT SLOPE STABILITY ANALYSIS

As described in the mining plan, opencast mining method will be adopted with 23 m bench height only one bench is proposed in this quarrying operation the slope of the bench is 45°. It is proposed only one bench upto the conceptual period of the quarry.

7.5 CUMULATIVE IMPACT STUDY

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA EMP Report.

Table 7.3: List of quarries within 500m Radius

PROPOSED QUARRIES				
CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	M/s.TANCEM Stoneware Pipe Factory , Vridhachalam	133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11	6.59.0 ha	ToR obtained vide.File No.12749 TOR Identification No. TO25B0108TN5192834N Dated.24.11.2025
TOTAL			6.59.0 ha	
EXISTING QUARRIES				
Nil				
EXPIRED/ABANDONED QUARRIES				
CODE	Name of the Owner	S.F. Nos & Village	Extent	Lease Period

EX-1	M/s. VRW Industries, No.96, Vanagaram Village, Chennai	130/1	1.39.0 ha	26.04.1978 to 25.04.1998
EX-2	Thiru.M.Elangovan, S/o. T.K.P Manickam,F-22, Indira Gandhi road, Fairlands, Salem	90/5	0.78.5 ha	05.02.1998 to 04.02.2018
EX-3	M/s.TANCEM Stoneware Pipe Factory , Vridhachalam	133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11	6.59.0 ha	11.04.1994 to 10.04.2014
TOTAL			8.76.5 ha	
TOTAL CLUSTER EXTENT			6.59.0 ha	

Source: AD Letter – Rc.78/Mines/2018 Dated: 02.09.2025

Note:- Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

Since P2 and P3 quarries have applied for lease and only the precise area letter was communicated, they will be included for calculating the total extent of the cluster but not considered for cumulative impact assessment.

Table 7.4: Salient features of proposal “P1”

DESCRIPTION	DETAILS
Name of the project	M/s. TANCEM Stoneware Pipe Factory
Name of Mineral	Fire Clay.
S.F. Nos and Village	S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 Panikankuppam Village, Panruti Taluk,Cuddalore District.
Extent	6.59.0 ha
Classification of Land	It is a government land, which is not fit for vegetation/Cultivation. The applicant (TANCEM) have surface right over the applied area for grant of mining lease and relevant record of A register and adangal Copy.
Village	Panikankuppam
Taluk	Panruti

District	Cuddalore
State	Tamil Nadu
Latitude Between	11° 44' 49.52"N to 11° 45' 01.01' N
Longitude Between	79° 32' 52.03"E to 79° 33' 03.38"E
Toposheet No	58- M/09
Topography of the area	The area is almost a Undulated terrain.
Geological Resources	3,54,625.25 Ts of ROM, 3,54,625.25 Ts of Fire clay (100 % Recovery), 1,39,293 Ts of Topsoil
Mineable Reserves	2,16,091 Tonnes of ROM 2,16,091 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Yearwise Production	98,611 Tonnes of ROM 98,611 Tonnes of Fire clay @ 100% recovery and 94,977 Ts of Topsoil
Proposed Peak production	24,224 Tonnes of ROM 24,244 Tonnes of Fire clay @ 100% recovery and 21,798 Ts of Topsoil
Life of Mine	11 years
Mining Plan Period	5 years
Mining Method	Opencast Mechanized Method of Mining without Drilling and Blasting
Ultimate Depth of Mining	5.5m BGL (at the end of mining plan period)
Employees Required	14 Nos
Ground Water Level	50 m BGL
Drainage Pattern	There is no perennial surface water body within the project area. The drainage pattern of the area is dendritic.
Water Requirement & Source	Total water requirement for dust suppression, plantation and drinking is 2 KLD. Water will be sourced from nearby villages/ quarry pit water and drinking water will be sourced from approved water vendors.
Power Requirement	No electricity is proposed for quarrying activities. Diesel operating machineries will be deployed for quarrying operation. For the mine office and rest shelters solar power is proposed.
500 m Cluster Details	As per the MoEF & CC Notification 2269 (E) Dated 1 st July 2016 one Existing quarry and Three proposed quarries falls in the cluster category

	Total Extent of the cluster is 6.59.0 Ha	
Project Cost	Fixed asset Cost =	Rs 8,75,000/-
	Operational Cost =	Rs 17,70,000/-
	EMP Cost =	Rs 3,80,000/-
	Total Project Cost =	Rs 30,25,000/-

Source: Approved Mining Plan

7.6 WILDLIFE CONSERVATION AND MANAGEMENT PLAN

The plan aims at minimizing all the potential threats to wildlife both within the project area, on the immediate neighboring area and rest of the buffer zone. Although no major incidents of human-animal conflict have occurred in the study area so far. The primary cause of human animal conflict is loss of animals' habitat.

The proposed project shall involve open cast mining for Fire clay. This likely to cause degradation of habitat as well as disturbance to animals. Therefore, the Wildlife Management Plan for the proposed project will involve:

- Development of alternate habitats
- Improvement of habitat
- Minimization of disturbances
- Proper garbage disposal
- Creation of food / prey bases

Development of Alternate Habitats and Habitat Improvement –

This is a long term measure aimed at inducing animals away from human habitations associated with the mine. The success is not guaranteed but this measure offers the best conservation option. This measure involves creation of alternate sources of food, water and roost sites slightly away from the existing & proposed areas of human activity associated with the mine.

From literature and field survey, it has been noted that peafowl roost in tall trees. They feed on seeds, insects, fruits, small mammals and reptiles. Therefore, if plantations of tree species, which provide edible fruits / seeds, are created away from the mine and townships, the peafowl can be induced to keep away from areas of mining activities and human activities. There are tracts of barren lands in the buffer zone some distance away from villages. Some of the barren lands in the Buffer Zone have very sparse vegetation and hence cannot support large populations of animals. These will be improved to provide alternate wild life habitats. The trees proposed for planting are:

1. Prosopis juliflora (seemai karuvel)
2. Acacia leucophloea (Velvelam)
3. Azadirachta indica (Neem)

4. *Holoptelea integrifolia* (aya)
5. *Ziziphus mauritiana* (Elandhai)
6. *Ficus benghalensis* (Alai)
7. *Ficus religiosa* (araca-maram)

The above trees yield edible leaves and / or fruits, preferred by wildlife. They also produce flowers which attract insects (including honey-bees) and birds. Such plantation areas will be kept as far as possible from human habitations and roads. As mentioned earlier, the study area is a semi-arid climate or steppe climate is the climate of a region that receives precipitation below potential evapotranspiration, but not as low as a desert climate. There are different kinds of semi-arid climates, depending on variables such as temperature, and they give rise to different biomes. There are no perennial water bodies.

As part of the habitat improvement programme it is suggested that a few shallow water pools will be dug in areas at a distance from settlements / project installations. These shallow pools should be lined with impervious materials to prevent water loss through percolation. During peak summers, these pools will be filled with clean water brought by water tankers. The water filling will be carried out late in the afternoon (so that animals can drink between dusk and dawn & water loss is comparatively less at night).

Minimization of Disturbances –

In order to minimize disturbances to animals, the following measures will be undertaken:

Protection of vegetation patches

The proposed project area's vegetation is sparse. It is the habitat of animals specially adapted to such habitats. The list of animals found within the Core Zone (mine lease) and the Buffer Zone have been given in Chapter 3. It is necessary that the un-utilized vegetation patches within the proposed project areas be fully protected and / or improved and the utilized land be re-vegetated with indigenous and locally occurring species that can provide food, cover and shelter to wild animals so that they are attracted to recolonize the at the end of the project's life.

The following measures will be undertaken to preserve green cover as much as possible:

- Clearing of vegetation will be done only when absolutely essential
- Improvement of vegetation patches within project area which are not likely be utilized within the plan period will be carried out by planting local species.

Noise reduction

The study area is located in a very hot and semi-arid region. Most animals are active at night or during mornings and late after-noon. They rest in the shade during the hottest part of the day. No Drilling and Blasting will be carried in the proposed project area and this ensures that animals are not disturbed during their feeding hours or resting periods. No Night Shift is proposed and working is only during day time.

Movement of trucks on roads passing through wild animals' habitat are known to reside, creates disturbance. Traffic to and from the project will be regulated such that there is no or minimum movement after dusk and before dawn.

Garbage Disposal

There is likelihood of accumulation of both bio-degradable and non-degradable solid wastes, as about 13 people shall work in the area. This garbage will be removed from the project area, segregated and dispose. Principle of 'reduce, reuse and recycle' will be adopted. The work force will be sensitized not to leave any garbage within the project area. This will sensitize them to avoid bringing polythene, plastics; Tetra Pak etc. into the project area and even if they bring such material never leave them within the project area or its surroundings.

Project personnel will be advised not to offer food to the peafowl which roam about in the area. Care will also be taken to see that leaking oil & lubricants or discarded stuff is not drained in the mine area and contaminate the soil. Leaking / waste oil, lubricants and packaging material will be properly collected and disposed-off. Working procedures will be suitably modified and enforced to ensure that oil is not spilled on to soil during minor repair & maintenance of machinery and vehicles. In case oil is spilled on soil, the oil contaminated soil will be dug out and disposed-off properly.

Creation of Food / Prey bases –

Peafowl feed on a wide variety of shoots, fruits & insects. Plantation of trees, which provide edible fruits / seeds will be taken up as part of the habitat improvement programme. These trees will also attract insects which may be eaten by the peafowl. It is also suggested that suitable habitat be provided for snakes and lizards also. This will enable improvement of prey base for peafowl. The trees planted will attract insects which in turn may attract insectivorous lizards. It is also suggested that small piles of boulders be constructed in alternate habit areas. These rock piles are likely to provide habitat for snakes and lizards which can be preyed upon by peafowl.

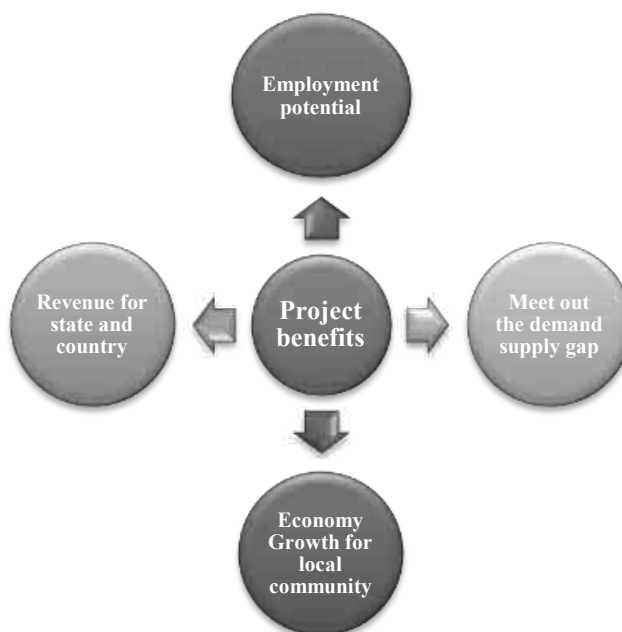
This plan is prepared for 5 years and may undergo revision after completion to that period, based on experience gathered during the plan period and changes that would have taken place change of thrust, if required and prevailing labor and other rates. In addition, a monitoring committee will be set up with Mines Manager as head of the team to look into the maintenance and proper implementation of the plan.

CHAPTER – 8: PROJECT BENEFITS

8.0 INTRODUCTION

The company aims to produce 2,16,091 tons of Fire clay for entire life of quarry and 98,611 tons of Fire clay a period of 5 years. This will enhance the socio-economic activities in the adjoining areas. The enhancement of production will result the following benefits.

- ✚ Improvement in Physical Infrastructure.
- ✚ Improvement in Social infrastructure.
- ✚ Increase in Employment Potential.
- ✚ Revenue to Both Central Govt. & State Govt.
- ✚ Post mining Enhancement of Green cover.
- ✚ Supply – Demand chain of cement will be maintained without demand to the state.



This chapter gives a comprehensive description of various advantages and benefits anticipated from the project to the locality, neighborhood, region and nation as a whole. Fire clay is important and is used as a raw material for ceramic industries. The need for mining of the chemical grade Fire clay from the project (project area) has arisen to meet the current situation of demand supply gap faced by the company.

8.1 PROJECT BENEFITS

Physical and Social infrastructure to the Community

- * Improved road communication,
- * Strengthening of existing community facilities through the existing Community Development Program.
- * Greenbelt will be carried out in the project area to improve the vicinity and environment of mine and its surrounding area.
- * Awareness programme and community activities, like health camps, medical aids, family welfare programmes, immunization camp sports & cultural activities, plantation etc.,

- * Providing essential facilities for the local schools and primary health centers in the nearby villages

8.2 BENEFITS TO LOCAL AND REGIONAL ECONOMY

- * It will generate revenue for the State of Tamil Nadu
- * Royalty, DMF, NMET & GST to the Government
- * CER/CSR Activities will be provided as per law.
- * Direct employment to skilled/unskilled and semiskilled laborers.
- * Indirect employment to local people in different activities such as transportation, food points, plantation activities, water tanker supply, hand equipment's etc.
- * Generation of self-employment through self-help groups.

8.3 EMPLOYMENT POTENTIAL

The local labors shall be engaged for supervising during loading and handling of mineral in mining area, besides, watch and ward and plantation activity with proper maintenance. The total manpower required for material handling and loading, skilled and managerial staff to meet the statutory requirement under MMR 1961 and MCDR 1988 is 14 Nos. The following skilled / unskilled and semi-skilled workers besides managerial and administrative staff shall be employed preferentially from the nearby villages.

8.4 TANGIBLE SOCIAL BENEFITS

There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities.

8.4.1 Corporate Social Responsibility

Corporate Social Responsibility (CSR) activities will be undertaken by the company either to improve the living conditions (economic, social, environmental) of local communities or to reduce the negative impacts of mining activity.

The Project Proponent will take responsibility to develop awareness among all levels of their staff about CSR activities and the integration of social processes with business processes. Those involved with the undertaking of CSR activities will be provided with adequate training and re-orientation.

CSR Cost Estimation

- CSR activities will be taken up in the Panikankuppam Village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit

8.4.2. Corporate Environment Responsibility

For the proposed quarry allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF& CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018. Proponent intends to spent Rs 3,00,000/- towards CER for the Government Municipal Middle School, Seerankuppam near the project site the details are given below:

Table 8.1: CER Cost Estimation

Activity	Amount in Rs
• Renovation/ Construction of Existing Toilet • Providing Environmental Related books to the school Library • Carrying out plantation and maintenance in the school Ground • Any other requirements in consultation with the school Head master	Rs.3,00,000/-

Source: Approved mining plan

Conclusion:-

Due to the project the benefits are given below

- The Direct employment opportunity to the 14 local community people and indirect employment about 20 peoples in various sector.
- The local community will benefit financially like increased income level due to job opportunity.
- Government will benefit through Royalty/ Seigniorage Fee, GST, DMF and NMET etc.,
- The Environment of the area at present is barren and uncultivable land due to the nature of deposit (Fire clay) the land will be turned for the agriculture use.
- The company will undertake awareness programme and community activities like health, camps, medical aids, family welfare camps, medical awareness programme etc., Periodic medical checkups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this will assist to lift the general health status and enhance the standards of the communities of the area around mines.

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

Not Applicable, Since Environmental Cost Benefit Analysis not recommended at the Scoping stage.

CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

The environmental management plan consists of a set of mitigation, management, monitoring and institutional measures to be taken during mining operation.

The main activities in the proposed mining projects involves

1. Removal of Top soil
2. Excavation of Fire clay
3. Transportation of mineral to the own captive plant

The environmental management plan has been developed with a view to bring down the levels of impacts as discussed as above within limits. In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced/augmented so that the overall adverse impacts are reduced to as low level as possible. Measures to be taken for each of the impact areas are detailed in the following Para's:

10.1 AIR POLLUTION MANAGEMENT AND CONTROL

The project is proposed to be carried out without involving drilling and blasting, the mineral will be excavated with the help of Excavator and loaded into the tippers. Therefore, the dust propagation due to Drilling and blasting does not arise.

Greenbelt development programme will be carried out all along the haul roads and backfilled area to control the dust emission during operation. A well Standard Operating Procedure will be practiced in the HEMM to reduce gaseous emission and dust propagation.

Table 10.1: Air pollution management and control

Potential impact	Action	Parameters for monitoring	Timing
Air Emission	Optimum loading of mineral to minimized to the extent possible	Vehicle logs / optimum capacity of vehicle	During operational phase.
	Ambient air quality within the premises of the proposed unit to be monitored.	The ambient air quality will conform to the standards for SPM, SO ₂ and NO _x	As per CPCB and TNPCB requirement.

Controlling of Air Environment.

- * The quarrying activity is proposed to carry out without drilling and blasting.
- * Water will be sprinkled twice a day in the haul roads to wet the surface
- * Overloading of material will be avoided to prevent spillage.
- * The mineral will be covered with tarpaulin to prevent the spillage during transportation and the material will be transported only to the own captive plant.
- * Vehicles will be regularly checked and maintained as per the RTO and TNPCB Norms.

10.2 NOISE AND VIBRATION MITIGATION:**Table 10.2: Noise and Vibration Mitigation**

Potential impact	Action	Parameters for monitoring	Timing
Noise	Noise will be generated only during the movement of HEMM and Tippers, Implement good working practices (equipment selection and siting) to minimize noise and also reduce its impacts on human health (ear muffs, safe distances and enclosures).	Site working practices records, noise reading	During Excavation.
	Noise to be monitored in ambient air in the working place	Noise reading	As per TNPCB/ MoEF & CC norms.
Ground vibration due to Movement of HEMM	Controlled customized working techniques will be implemented under the supervision of Mines Manager	Vibrations to be Modeled and customized.	At the time of working.

Control of Noise and vibration during movement of HEMM and Tippers:

- * Hydraulic Excavator with Sound proof cabin shall be used for the excavation of mineral.
- * In order to reduce the effect of noise pollution, earmuffs will be provided to all operators and employees working at mining site as a safety measure.
- * Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
- * Periodical monitoring of noise level near the project site and nearest village from the mine will be done with the help of sound level meter & records will be maintained.

10.3 WATER MANAGEMENT & POLLUTION CONTROL

There is no processing and mineral beneficiation within in the project area. No workshop is proposed in the quarry area the major machinery repair work will be carried out in the nearby major town hence effluent due to oil and grease is very minimal.

Domestic effluent is mainly sewage only, septic tank with soak pit arrangement will be provided at the mine site.

The proposed depth of the quarry is 8m below the ground level, the quarrying operation will not intersect the ground water table.

SURFACE WATER MANAGEMENT

There is no river stream, nallah or any other water body passing through the project area. During rainy season some natural drains may form in the area. For that, garland drains all along the quarry surface edge keeping a barrier from the mine surface will be constructed to arrest incoming water to and from the mine. The surface run off during the rainy season will be prevented from entering into the active pits by constructing garland drains.

GROUND WATER MANAGEMENT

The water table in the area is 50m BGL. The ultimate depth of the quarry is 5.5m. Water table will not be intersected during any stage of mine life. Hence contamination of ground water is redundant.

DETAILS OF WATER CONSERVATION MEASURES PROPOSED

The rain water collected in the pits after spell of rain will be used for plantation and dust suppression. At the end of life of mine, the land will be leveled and utilized for plantation purpose.



The main aim of mined out areas is to stabilize the land, to protect it from erosion and provide an aesthetic landscape. It is proposed to carry out greenbelt programme as per Approved Mining plan.

10.4 LAND RECLAMATION AND WASTE MANAGEMENT

Details of overburden (OB) removal and stacking.

The thickness of the top soil is about 1.5m. The topsoil will be side casted while work progress for excavation of Fire clay and simultaneously backfilled and plantation will be carried out.

There is no waste dump proposed, the entire mined out Fire clay will be utilized for company owned captive plant.

10.5 BIOLOGICAL ENVIRONMENT

Green Belt Development Plan

About 300 nos. of saplings is proposed to be planted for the present plan period (5 years) in safety barrier and backfilled area i.e., 0.40.0 ha with survival rate 80% and The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

The objectives of the greenbelt development plan are –

- Reclaim the mined out areas by planting trees, which are indigenous in nature,
- Provide a green belt around the periphery of the mining area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, Restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

The proposed project area has low vegetation, however it is proposed to have dense greenbelt with multi rows (Three tier) preferably with long canopy leaves is proposed around the mine site, loading and unloading facilities, and in backfilled area during reclamation process.

Species Recommended for Plantation

Following points have been considered while recommending the species for plantation:

- ❖ Creating of bio-diversity
- ❖ Fast growing, thick canopy cover, perennial and evergreen large leaf area
- ❖ Efficient in absorbing pollutants without major effects on natural growth

Table 10.3: Recommended Species to Plant in the Greenbelt

S.No	Botanical Name	Local Name	Importance
1.	Azadirachta indica	Neem, Vembu	Neem oil & neem products
2.	Millettia pinnata	Pungan	landscaping purposes as a windbreak or for shade
3.	Tamarindus indica	Tamarind	Edible & Medicinal and other Uses
4.	Achras sapota	Sapota	Edible fruits

5.	Ailanthus excels	Pi-Nari Maram	prevent soil erosion & medicinal uses
6.	Albizia lebbeck	Ciriṭam	Shade, timber and scented flowers
7.	Chukrasia tabularis	Malei veppu	Fast growth & thick canopy
8.	Dendrocalamus strictus	Bamboo/ munkil	Mainly as soil binder and bamboo
9.	Ficus benghalensis	Alai	Shade and a source of food for birds
10.	Ficus religiosa	araca-maram	Shade and a source of food for birds
11.	Mangifera indica	Mango/ Ma	Edible fruit
12.	Terminalia catappa	nattuvadumai	Edible nuts

Table 10.4: Year Wise Greenbelt development plan (Mining Plan Period)

Year	Proposed Number of trees (Nos.)	Proposed area of greenbelt (in sq.m)
1 st Year	60	400
2 nd Year	60	400
3 rd Year	60	400
4 th Year	60	400
5 th Year	60	400
Total	300	2000

10.5 OCCUPATIONAL HEALTH & SAFETY:

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The main factors of occupational health in Fire clay mine are fugitive dust and noise. Safety of employees during mining operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and mine rule 29 of Mines rules 1955. To avoid any adverse effect on the health of workers due to dust, heat, noise and vibration sufficient measures have been provided in the mining project. These include:

- Provision of rest shelters for mine workers with amenities like drinking water, toilets etc.,
- Providing of personal protection equipment's to the workers during the course of mining operation.
- Rotation of workers exposed to noisy areas.
- Periodical dust suppression on haul roads to prevent dust emission into the air.
- First-aid facilities in the mining area.

The environmental Management must be integrated in the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. Environmental Management plan covers all phases considering the impacts with mitigation measures and monitoring programme.

Environmental Management plan includes the monitoring programmes and management control strategies for minimizing the adverse impacts

❖ *Air pollution*

-
- ❖ *Water Pollution*
 - ❖ *Noise, vibration, fly rock during , blasting*
 - ❖ *Green belt development*
 - ❖ *Land use planning*
 - ❖ *Mine Closure planning/ Final closure plan*
 - ❖ *Occupational Safety & Health*
 - ❖ *Socio-economic & cultural Environment*

The management ensures that the same will be taken up by the company as discussed in chapter 4 and 6.

Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA

In order to maintain the environmental quality within the standards, regular monitoring network to maintain environmental quality will be implemented.

Budgetary Provision for Environmental Management

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.9 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.9: EMP BUDGET FOR PROPOSED PROJECT

Activities	Mitigation Measure	Provision for Implementation	Capital	Recurring per annum
Air Environment		Lump sum fund allocation for daily maintenance of haul roads and thrice a day water sprinkling by fixed sprinklers or water tankers	20,000	Nil
	Haul road maintenance & Water sprinkling			
	No overloading of trucks/tippers/tractors	Lump sum fund allocation Manual Monitoring through Security guard	5,000	Nil
	Stone carrying trucks will be covered by tarpaulin	Lump sum fund allocation Manual Monitoring through Security guard	10,000	Nil
Noise Environment	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	Nil	Nil
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	Nil	Nil

	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	Nil	Nil
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	Nil	Nil
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	Nil	Nil
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	Nil	20000
		Installation of dust bins	Nil	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	Nil	Nil
Mine Closure	1. Progressive Closure Activity - Surface Runoff managent	Provision made in Operating Cost	Nil	Nil
	3. Greenbelt development along the tank bund and haul roads	Provision made in Operating Cost	Nil	Nil

Implementation of EC, Mining Plan & DGMS Condition	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 mentioning Environmental Conditions	5000	Nil
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of Half Yearly Compliance every 6 Months - Lab Monitoring Report as per CPCB norms	250000	Nil
	Workers will be provided with Personal Protective Equipment's	Lumpsum fund allocation	10000	Nil
	First aid facility will be provided	Lumpsum fund allocation	3000	Nil
	Appointment of Competent person for ensuring the safety operation	Provision made in operational cost	0	Nil
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Lumpsum fund allocation	500000	Nil
TOTAL			8,03,000	22,000

Year Wise Break Up	
I Year	₹ 8,25,000
II Year	₹ 23,100
III Year	₹ 24,255
IV Year	₹ 25,468
V Year	₹ 26,741.14
Total	₹9.25 Lakhs

CHAPTER – 11: SUMMARY AND CONCLUSIONS

11.0 GENERAL

The company had applied Quarrying Lease for Fire clay over an extent of 6.59.0 Hectares of Government Land land in S.F.No 133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11, Panikankuppam Village of Panruti Taluk in Cuddalore District, Tamil Nadu. The application was processed and a total area of 6.59.0 Hectares has been recommended for quarrying lease and precise area communication vide Letter No. 3354387/MMC.2/2022-1, Dated: 18.01.2023 is issued by the Additional Chief Secretary to Government, Industries (MMC.2) Department, Tamil Nadu. As directed in the above letter, this Mining Plan is prepared under Rule 41& 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the Mining Plan was approved by Dept., of Geology & Mining, Guindy, Chennai vide Letter No: 3942/MM7/2020 dated 23.11.2023

11.1 SCOPE OF THE PROJECT

The project falls under B1 Category and as per statutory requirement, the proponent submitted the application for ToR on 18.09.2025. Then the proposal was placed on 634th meeting of the SEAC-I held on 27.10.2025 and 916th SEIAA meeting, dated. 17.11.2025 and the authority decided to grant ToR and issued vide Terms of Reference (ToR) File No.12749 TOR Identification No. TO25B0108TN5192834N, Dated: 24.11.2025.

11.2 PROJECT DESCRIPTION

Table 11.1: Project Profile and Salient Features

S. No.	Particulars	Details
1.	Name of the Project	M/s. TANCEM Stoneware Pipe Factory
2.	Project Proponent	Thiru. T. Ravichandran
3.	Location of the Project	Panikankuppam Village of Panruti Taluk in Cuddalore District, Tamil Nadu.
4.	Lease applied area	6.59.0 Hectares
5.	Topo Sheet No.	58- M/09
6.	Latitude between	11° 44' 49.52"N to 11° 45' 01.01"N
7.	Longitude between	79° 32' 52.03"E to 79° 33' 03.38"E
8.	Type of land (Govt. / Patta land)	Government land
9.	Captive / Non Captive	Captive use
10.	Total capacity of mineable reserves	2,16,091 Tonnes of Fire clay
11.	Peak production proposed	24,224 Tonnes



12.	Ultimate depth	5.5m below ground level
13.	Ground water table	50m below ground level
14.	Forest / Non forest land	Non forest land
15.	Temperature °C (Minimum & Maximum)	25°C to 42°C
16.	Nearest Village/Habitation	150m -North West
17.	Nearest Town	Panruti Town – 1.5km – North
18.	Nearest Roadway	National Highway – Panayapuram to Thanjavur (NH-36) – 80m – East State Highway – Panruti to Cuddalore (SH-68) – 2.2km – North East
19.	Nearest Railway station	Panruti Railway Station – 2.6km – North East
20.	Nearest Airport	Puducherry Airport – 37.3km – North East
21.	Interstate boundary	Pondicherry Interstate boundary – 13.0km – North East
22.	Coastal zone	25.5 km - East
23.	Nearest Water bodies	Odai - 50m Safety Distance has been provided on South West
24.	Forest	Kangiruppu RF – 6.7km – South West
25.	Wildlife Sanctuary	Oussudu Lake Bird Sanctuary – 30.0km – North East
26.	Quarries around 500m radius	Nil within 500m.
27.	Method of Mining	It is a conventional mechanized quarrying operation without drilling and blasting
28.	Bench height and width	Only one bench is proposed, bench height is 5.5m (0.5m Top soil and 1m Fire clay)
29.	Drilling and blasting	No drilling and Blasting is involved in this project
30.	Diesel requirement	Electricity is not required for the mining operation 8,220 Liters of HSD will be utilized for entire life
31.	Employment potential	14 direct, 20 indirect

32.	Cost of the project	Rs. 26.45 Lakhs
-----	---------------------	-----------------

STATUTORY APPROVALS

- The Precise area communication letter to prepare Mining plan and obtain Environmental Clearance issued by Industries (MMC.2) Department, Secretariat, Chennai – 600 009 vide Letter No. 3354387/MMC.2/2022-1, Dated: 18.01.2023
- The Mining Plan was approved by Additional Director of Geology and Mining, Department of Geology and Mining, Guindy, Chennai – 600 032 vide letter No.3942/MM7/2020 Dated 23.11.2023

11.3 DESCRIPTION OF THE ENVIRONMENT

The project is located in the central place of Tamil Nadu on the peninsular shield complex. The Fire clay quarry project is located in Panikankuppam Village of Panruti Taluk in Cuddalore District. There is a good connectivity of road available from the district headquarters which is about 24 km East.

There is no Wild Life sanctuaries, eco sensitive zone,. Critically polluted areas within 10 km radius of the project.

The study was conducted by the consultant as per the EIA notification 2006 considering the environmental settings, project activities and the impacts of the environment.

The following attributes were considered during the EIA studies October – December 2025 (Post Monsoon)

1. Site specific Meteorological studies
2. Air quality monitoring as per the NAAQ standards
3. Noise level measurements
4. Water quality monitoring
5. Soil quality monitoring
6. Land use classification based upon the satellite imagery
7. Biological environment
8. Socio economic data interpretation as per the 2011 census data

11.3.1 Base line environmental study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during October – December 2025 (Post Monsoon) to assess the existing environmental scenario in the area. For the purpose of EIA studies, lease applied was considered as the core zone and area outside the project area boundary up to 10km radius from the lease boundary was considered as buffer zone.

Table 11.3: Environmental Settings of the Project

<u>GENERAL CONDITIONS</u>	
Protected Area Notified Under the Wild Life (Protection) Act, 1972	There is no Protected Area Notified under the Wild life (Protection) Act, 1972 within the radius of 10KM from the project site.
Critically Polluted Areas as identified by	There is no Critically Polluted



the Central Pollution Control Board from Time to Time	Areas as identified by the Central pollution Control Board within the radius of 10KM from the project site.
Notified Eco-Sensitive Areas	There is no Notified Eco-sensitive Areas within the radius of 10m from the project site.
Inter-State Boundaries and International Boundaries	There is no Inter-state Boundaries and International Boundaries within the radius of 10KM from the project site.
Specific Conditions	
If any Industrial Estate / Complex / Export processing Zones / Special Economic Zones / Biotech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e), 5(f), or those Industrial estates with pre-defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates / complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate/complex are complied with (Such estates /complexes must have a clearly identified management with the legal responsibility of ensuring adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the same throughout the life of the complex/estate	The project does not attract specific condition
Reserve forest	Kangiruppu RF – 6.7km – South West

The project proponent submitted an online proposal for Environmental Clearance vides Proposal No. SIA/TN/MIN/551953/2025 Dated: 18.09.2025 and the proposal seeking ToR was placed before the 634th SEAC – TN meeting held on 27.10.2025, the committee observed that the project falls under “B1” Category and schedule 1(a) of The EIA Notification, 2006 and recommended ToR. Further, the proposal was considered as recommended by SEAC in 916th SEIAA – TN meeting held on 17.11.2025.

This EIA report has been prepared in compliance with the ToR awarded to the proponents and as per the Generic structure of the Environmental impact assessment document as in the EIA notification 2006.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.4.1 Land environment

Anticipated Impact



The project is site specific; the mining is proposed to carry out by It is a conventional mechanized quarrying operation without drilling and blasting.

The total area applied for quarry lease is 6.59.0ha out of this about 3.27.3 ha is proposed during this present plan period at the conceptual stage the mined-out area will be 4.29.8 ha.

During the mining activity about 98,611 Tons of Fire clay is being proposed for the first five years. The maximum depth 5.5m below ground level, the proposed depth will not intersect the ground water table.

The topsoil will be side casted as work progress and simultaneously backfilled after excavation. The entire mined out Fire clay will be sold to the nearby ceramic-based industries which are located within a radius of 35Km from the quarry site.

Mitigation Measures

- The quarried out pits will be leveled and utilized for the Avenue plantation
- The non-quarrying area's will be utilized for the greenbelt development.
- The boundaries will be fenced; security will be posted to prevent inherent entry of the public and cattle's.

11.4.2 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, Sandy Clay to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 0.89 – 1.89 g/cm³. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e., ranging from 38.3 – 42.3 %. and 36.5 – 41.2 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 6.76 to 7.2
- The available Nitrogen content range between 282 to 416.8 mg/kg
- The available Phosphorus content range between 3.11 to 6.08 mg/kg
- The available Potassium range between 20.6 to 31.3 mg/kg

Mitigation measures

- Garland drains will be provided periphery of the project area to divert the rain water into the natural gradient.
- Topsoil layer will be side casted while work progress and simultaneously backfilled after excavation of Fire clay and leveled & compacted and plantation will be carried out on the backfilled area.
- The entire mineral will be mined and utilized (100%) hence waste dump is not proposed in the project area.

11.4.3 Water Environment

There are no streams, canal or any water bodies intersecting the project area. There is no ore beneficiation, mineral processing or workshop proposed inside the project area. Mining operation is restricted above the water table, hence the mining operation will not affect the ground water regime.

Anticipated Impact and mitigation measures.

- There is no significant impact anticipated as the project is site specific.
- The only impact will be due to rain for which necessary garland drains will be constructed around the dumps and mined out pits to prevent soil erosion.
- Detail of water requirements in KLD as given below:

Table 11.5: Water Requirement Table

Purpose	Quantity	Source

Dust Suppression	0.8 KLD	Water vendors through water tanker
Green Belt	0.7 KLD	Water vendors through water tanker
Drinking & Domestic Purpose	0.5 KLD	Water vendors through water tanker
Total	2.0 KLD	

Surface Water

Ph:

At the sampling location, pH (7.91) and turbidity were within recommended standards, indicating suitable conditions for sustainable aquatic life (6.5 to 8.5 pH)

Total Dissolved Solids:

Total Dissolved Solids was recorded as 728 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 251 mg/l. Nitrates (as NO₃) was detected 19.3mg/l, while sulphates was detected 58.2 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.27 to 7.53 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 491 – 640 mg/l in all samples. The Total hardness varied between 128 to 180 mg/l for all samples.

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

Total Hardness and TDS exceeds the limits. The local people are consuming for long time, no health implications reported. But still the water can be pretreated and make it fit for consumption.

11.4.4 Air Environment

Impacts and mitigation measures

- The air borne particulate matter generated during excavation, loading and transportation of mineral is the main air pollutant. During Excavation and transportation of mineral water will be sprinkled in the haul roads and working face to control the dust emission.
- The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal, during transportation of mineral the tippers will be covered by tarpaulin to avoid spillage of mineral in the haul roads.
- As per monitoring data, PM10 ranges from 32.0 µg/m³ to 37.4 µg/m³, PM2.5 data ranges from 18.4 µg/m³ to 24.4 µg/m³, SO₂ ranges from 4.8 µg/m³ to 6.6 µg/m³ and NO₂ data ranges from 21.0 µg/m³ to 24.8 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

- All the machineries will be periodically maintained with well experienced mechanic to prevent fugitive emission.
- Well-designed green belt will be planted all along the boundary barrier to suppress dust propagation in the adjoining lands.
- Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act
- Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.

11.4.5 Noise Environment

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 39.3-43.1 dB (A) Leq and during night time were 35.3-36.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 35.8 to 44.1 dB (A) Leq and during night time were from 32.5 to 39.7 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

The thick green belt development is seen all around the project area. Hence, the noise level will get further reduced when quarry comes under operation.

Anticipated impact and mitigation measures.

- Heavy earth moving machineries, movement of trucks, drilling and blasting are the main sources of noise and vibration.
- HEMM will be properly maintained and overhauled periodically to minimize the noise and vibration due to the movement of Hydraulic Excavator.
- Trucks will be periodically maintained as per RTO and TNPCB norms. Emission test will be periodically conducted.
- Overloading will be avoided. Optimum loading shall be practiced for fuel efficiency.
- Planning an effective Green belt along the boundaries will act as acoustic barriers to minimize the noise and vibration to the adjacent areas.

11.4.6 Biological Environment

- The area is devoid of major vegetation and trees, few numbers of Neem and Velvel trees found within the core zone
- The surrounding area is only covered by seasonal agriculture lands, no forest and eco sensitive zone noticed within 10KM radius.
- This small-scale mining of 5.5m depth will not have any significant impact on the biological environment.
- Effective green belt along the boundary barrier is only the positive impact due to this mining activity.
- There is no blocking of any migratory corridors due to mining activity as there are no forest found within the vicinity.
- There is no threat of any red list species found around the project area.

Anticipated Impact

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. Barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

The low concentrations of NO_x due to operation of the proposed mining operations will have insignificant impact on ambient air quality and NO_x concentration will remain within the NAAQ standards. Therefore, the impact of these emissions on the surrounding agro-ecosystem is not envisaged. No medicinal plant identified in core and buffer area.

Therefore, there shall be no impacts due to mining activity on them. Even though there are no impact on bio diversity and flora/fauna status due to project operations, positive impacts will arise due to well-planned reclamation measures for restoration of land status in the area ultimately to productive land category with elaborately planned green belt development activities.

Mitigation measures

To reduce the adverse effects on flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

The safety zone along the boundary barrier on the eastern side has to be utilized for subsequent Afforestation. Appropriate species of Mango, Tamarind, Neem, etc., trees will be planted in a phased manner. Nearly 0.40.0 Ha area is proposed for afforestation by planting. 300 Nos. of trees during plan period is proposed at a survival rate of 80%.

11.4.7 Socio Economic Environment

Anticipated Impact

Employment generation due to the project has generated direct and indirect employment for about 14 persons. Apart from this around 20 people will be indirectly involved for the transportation of minerals to the nearby ceramic-based industries which are located within a radius of 35Km from the quarry site. Preference to the local population for employment in all categories including semi-skilled and unskilled. The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the quarry operations. The mining project will result in social benefits to the surrounding population in the form of standard educational facilities, roads, communication facilities, transportation, marketing, health facilities directly or indirectly. Therefore, due to quarrying, per capita income of local people will be improved.

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, duties, etc., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area.

11.5 ANALYSIS OF ALTERNATIVES

The site has been selected based on geological investigation and exploration as below:



- Occurrence of minerals at the specific site- Fire clay is mainly used as a raw material in the ceramic industry. Fire clay is very well exposed in Panikankuppam.
- The average thickness of Fire clay formation in this area is 5.5m. The fire clay is overlain by top soil and the average thickness of the layer is 1.5m. The Fire clay is in friable form.
- Estimated Geological Reserve is 3,54,625.25 tonnes and the Mineable Reserve in ROM is 2,16,091 tonnes.
- 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 ENVIRONMENTAL MONITORING PROGRAMME

Environmental Monitoring programme will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

S.No	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Meteorology	Continuous monitoring Weather station in Core zone/ nearest IMD station	24 hours	Continuous monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring	7 locations (One station In the core zone and at least one in Nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind direction)	8 hours	Weekly two Times once In six Months	PM _{2.5} , PM ₁₀ , SO ₂ and NOx
3	Water	Mine effluents, Set of Grab samples during pre	–	Once in	Physio –

	Pollution Monitoring	and post monsoon for ground and surface water in the vicinity		Six months	chemical, microbiological characteristics
4	Hydrology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in 6months	Water level monitoring devices may be used
5	Noise	Quarry boundary, High noise generating areas within the lease and at the nearest residential area	24 hours	Once in 6months	Leq, Lmax, Lmin, Leq Day & Leq Night.
6	Ground Vibration	At the nearest habitation (in case of reporting)	–	During Heavy earth moving machineries	Peak Particle Velocity
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Once in Six months	Physical and Chemical characteristics

11.7 PROJECT BENEFITS

The quarry area has well established roads, communications and other facilities. The impact on the civic amenities substantially increased due to mining activity. The following physical infrastructure facilities will further improve due to this quarry.

The project envisages a direct job opportunity to the local persons, and this includes both technical and non-technical persons. Literacy is future expected to increase because of increase income and awareness amongst the people. Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village. District Mineral Fund @30% of the Royalty shall be given to the Dept. of Geology and Mining, Cuddalore District. The State Government will also benefit directly from the mine, through increased revenue from royalties, excise duty and etc.,

In addition, the proponent has to pay Corporate Environmental Responsibility (CER) Rs.3,00,000/- amount to the benefit of local people likely to be affected by this project for development of green belt and maintenance of nearby Govt. School

11.8 CONCLUSION

Panikankuppam Fireclay quarrying activities will be beneficial and important to the Community, local & regional economy. As the environment impacts of the project is sustainable, mitigation and control measures discussed in the previous chapters. The Panikankuppam Fireclay mines will provide and improvements in physical and social infrastructures in the area like:

- Enhance the livelihood to the nearby villages.
- Direct employment to 14 peoples in the mines.
- Indirect employment to 20 people in nearby villages.
- Education facilities like computer, lab equipment, books to the Government schools and providing certain facilities to the local community etc., by way of CSR.
- Periodic medical camps/dental camps/eye camps are conducted every year through which nearby community people shall be benefitted.
- Financial gains for the state and central governments, through collection of various taxes like royalty, cess, DMF & GST etc.,
- Increase in General Awareness of the People.
- Improvement of the General Living Standard of the People in the Vicinity.
- Improvement in Per Capita Income.
- To meet out the demand supply gap of cement to the public.

In short, the working mining projects has benefitted this region directly and indirectly in the fields of potential employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, medical healthcare systems, communicational aspects, infrastructural build-up, etc.,

The project proponent has already provided Direct & indirect employment to the nearby villages and various social welfare measures. Besides that, in future also, such beneficial activities for local community development will form an integral component of their social outreaching activities. On the above facts and baseline study, the proposed activity is recommended for the commencement with proper mitigation measure as suggested.

11.9 EMP BUDGET:

The capital cost of the project is Rs.8.03 Lakhs; and Recurring cost per annum of Rs.0.22 Lakhs is allotted for Environmental management plan to carryout greenbelt development and maintenance, water sprinkling, compliance monitoring like air, water, noise etc., an amount of Rs.3,00,000/- from the project cost will be allotted for CER/CSR

CER/CSR activities will be carried out by providing social and welfare measures to the local community of the nearby villages. The main activities would be like drinking water facilities for the government schools children, public toilets to the local community and government schools, conducting free medical camps, providing solar lights to the villages besides encouraging the local cultural activities of the area. Any other CSR activities as guided by the SEAC during the grant of Environmental Clearance will also be implemented.

12.0 DISCLOSURE OF CONSULTANTS

The Project Proponent's **Thiru.T. Ravichandran - Unit Head & Authorized Signatory** – Proprietor of M/s. TANCEM Stoneware Pipe Factory have engaged M/s Geo Exploration and Mining Solutions, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,

Alagapuram, Salem – 636 004

Tamil Nadu, India

Email: infogeoexploration@gmail.com

Web: **www.gemssalem.com**

Phone: 0427 2431989.

The Accredited Experts and associated members who were engaged for this EIA study as given below –

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. M. Ifthikhar Ahmed	In-house	1 38	A B	WP GEO SC	A A A
2	Dr. P. Thangaraju	In-house	1	A	HG GEO	A A
3	Mr. N. Senthilkumar	Empanelled	31 38	A B	AQ WP RH	A B A
4	Mr. J. R. Vikram Krishna	Empanelled	1 38	A B	SHW RH NV	A A A
5	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	A A B
6	Mrs. Jisha parameswaran	In-house	-	-	SW	B
7	Mr. Govindasamy	In-house	-	-	WP	B
8	Mr. Panneer Selvam	In-house	-	-	EB	B
9	Mr. A. Allimuthu	In-house	-	-	LU	B
10	Dr. T. Sasikala	Empanelled	-	-	SE	B
Abbreviations						
EC	EIA Coordinator					
AEC	Associate EIA Coordinator					
FAE	Functional Area Expert					
FAA	Functional Area Associates					
TM	Team Member					
GEO	Geology					
WP	Water pollution monitoring, prevention and control					
AP	Air pollution monitoring, prevention and control					
LU	Land Use					
AQ	Meteorology, air quality modelling, and prediction					
EB	Ecology and bio-diversity					
NV	Noise and vibration					
SE	Socio economics					
HG	Hydrology, ground water and water conservation					
SC	Soil conservation					
RH	Risk assessment and hazard management					
SHW	Solid and hazardous wastes					
MSW	Municipal Solid Wastes					
ISW	Industrial Solid Wastes					
HW	Hazardous Wastes					

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the EIA/EMP for M/s. TANCEM Stoneware Pipe Factory Fire Clay Quarry over an Extent of **6.59.0ha** in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

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

Name: **Dr. M. Ifthikhar Ahmed**

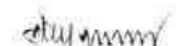
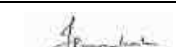
Designation: **EIA Coordinator**

Date & Signature:

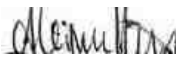


Period of Involvement: **January 2023 to till date**

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	- Identification of different sources of air pollution due to the proposed mine activity - Prediction of air pollution and propose mitigation measures / control measures	Mr. A. Jagannathan	
2	WP	- Suggesting water treatment systems, drainage facilities - Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr. M. Ifthikhar Ahmed	
3	HG	- Interpretation of ground water table and predict impact and propose mitigation measures. - Analysis and description of aquifer Characteristics	Dr. P. Thangaraju	
4	GEO	- Field Survey for assessing the regional and local geology of the area. - Preparation of mineral and geological maps. - Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	Dr. P. Thangaraju	
5	SE	- Revision in secondary data as per Census of India, 2011. - Impact Assessment & Preventive Management Plan - Corporate Environment Responsibility.	Dr. T. Sasikala	
6	EB	- Collection of Baseline data of Flora and Fauna. - Identification of species labelled as Rare, Endangered and threatened as per IUCN list. - Impact of the project on flora and fauna. - Suggesting species for greenbelt development.	Mr. Panneer Selvam	
7	RH	- Identification of hazards and hazardous substances - Risks and consequences analysis	Mr. J. R. Vikram Krishna	



		- Vulnerability assessment - Preparation of Emergency Preparedness Plan - Management plan for safety.		
8	LU	- Construction of Land use Map - Impact of project on surrounding land use - Suggesting post closure sustainable land use and mitigative measures.	Mr. A. Allimuthu	
9	NV	- Identify impacts due to noise and vibrations - Suggesting appropriate mitigation measures for EMP.	Mr. A. Jagannathan	
10	AQ	- Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. - Recommending mitigations measures for EMP	Mr. N. Senthilkumar	
11	SC	Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. M. Ifthikhar Ahmed	
12	SHW	- Identify source of generation of non-hazardous solid waste and hazardous waste. - Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	Mr. J. R. Vikram Krishna	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared this EIA/EMP for M/s. TANCEM Stoneware Pipe Factory Fire Clay Quarry Project over an Extent of 6.59.0 ha in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature& Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

NABET/EIA/25-28/RA 0424 Dated: 25.08.2025

Validity:

Valid till 06.08.2028.

ANNEXURE

**M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)**

S.F. Nos. 133/1A,134/2,134/3 etc.,

Panikankuppam Village,

Panruti Taluk,

Cuddalore District,

Cuddalore District

Cluster Extent – 6.59.0 Ha

Project Proponent

**M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking),**

5th Floor, Aavin Illam,

3A, Pasumpon Muthuramalingam Salai,

Nandanam, Chennai,

Tamil Nadu – 600 035.

LIST OF ANNEXURES

Annexures	DESCRIPTION	PAGE NO
P1- M/s. TANCEM Stoneware Pipe Factory, (A Government of Tamil Nadu Undertaking	COPY OF TERMS OF REFERENCE	1A - 23A
	COPY OF 500M LETTER	24A-26A
	COPY OF APPROVAL LETTER	27A-33A
	COPY OF MINING PLAN WITH PLATES	34A-164A
	COPY OF 300M LETTER	165A
	COPY OF BASELINE MONITORING REPORT	166A-194A
	COPY OF CONSULTANT ACCREDITATION CERTIFICATE	195A



File No: 12749
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA),
TAMIL NADU)



Dated: 24/11/2025



To,

Thiru. T. Ravichandran
M/s. Tamil Nadu Cements Corporation Limited
5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai - 600035. TAMIL
NADU.
swpf.tancem@gmail.com

Subject: Grant of Terms of Reference along with Public Hearing under the provision of the EIA Notification
2006-regarding.

Sir/Madam,

Sub: SEIAA, Tamil Nadu – Proposed Fireclay quarry over an extent of 6.59.0 Ha of in S.F. Nos:
133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7,
135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil
Nadu by M/s. TANCEM Stoneware Pipe Factory - 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/551953/2025, Dated: 18/09/2025.

2. Your application submitted for Terms of Reference dated: 18.09.2025

3. Minutes of the 634th SEAC -I Meeting held on 27.10.2025.

4. Minutes of the 916th Authority meeting held on 17.11.2025

2. The particulars of the proposal are as below:

(i) TOR Identification No.	TO25B0108TN5192834N
(ii) File No.	12749
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals PANIKANKUPPAM VILLAGE, FIRECLAY DEPOSIT QUARRY BELONGS TO M/s. TANCEM Stoneware Pipe Factory.
(vii) Name of Project	tamil nadu cements corporation limited
(viii) Name of Company/Organization	CUDDALORE, TAMIL NADU
(ix) Location of Project (District, State)	SEIAA
(x) Issuing Authority	

(xi) Applicability of General Conditions	no
(xii) Applicability of Specific Conditions	no

1. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

2. The above-mentioned proposal has been considered by SEIAA in the meeting held on 17.11.2025. The minutes of the meeting and all the Application and documents submitted [viz. Form-1 Part A, Part B] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with public hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with public hearing for instant proposal of **M/s. TANCEM Stoneware Pipe Factory** under the provisions of EIA Notification, 2006 and as amended thereof.

5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6. The Terms of Reference with public hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/Regulations or Statutes, as applicable, to the project.

7. This issues with the approval of the Competent Authority.

8. 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 29th August, 2017.

Copy To

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Additional Chief Secretary to Government, Environment and Forests Department, Tamil Nadu.
3. The Additional Chief Secretary to Government, Natural Resources Department, Tamil Nadu.
4. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
5. The Chairperson, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
6. The District Collector, Cuddalore District
7. The Commissioner of Geology and Mines, Guindy, Chennai-32
8. The Assistant Director, Department of Geology & Mining, Cuddalore District
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Integrated Regional office of MoEF&CC, Sastri Bhawan, Nungambakkam, Chennai
11. File Copy

Annexure 1

Specific Terms of Reference s for (Mining Of Minerals)

1. Seac Conditions - Site Specific

S. No	Terms of Reference
1.1	1. The PP shall submit compliance report for the conditions imposed in the precise area

S. No	Terms of Reference
	communication letter. 2. PP should submit affidavit that there will not be any drilling and blasting and only low-capacity equipment will be used for excavating the material. 3. The PP shall ensure the installation of CCTV at the proposed quarry site and ensure its inclusion during the EIA presentation.

2. Seac Standard Conditions

S. No	Terms of Reference
2.1	1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m. 2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site. 3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc. 4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry. 5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report. 6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site. 7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC. 8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level. 9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.

S. No	Terms of Reference
	10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site. 11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences. 12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines, 13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? 14. Quantity of minerals mined out. · Highest production achieved in any one year · Detail of approved depth of mining. · Actual depth of the mining achieved earlier. · Name of the person already mined in that leases area. · If EC and CTO already obtained, the copy of the same shall be submitted. · Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches. 15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). 16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc., 17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan. 18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same. 19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment. 20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. 21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study. 22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind. 23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted. 24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife

S. No	Terms of Reference
	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. 25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided. 26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. 27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided. 28. Impact on local transport infrastructure due to the Project should be indicated. 29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity. 30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific. 31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible. 32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. 33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner 34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period. 36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. 37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations. 38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation. 39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. 40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the

S. No	Terms of Reference
	Project shall clearly indicate environmental, social, economic, employment potential, etc. 41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB. 42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine. 43. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

3. Seiaa Specific Conditions :

S. No	Terms of Reference
3.1	After detailed discussions, the Authority accepts the recommendation of SEAC-I and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity 56,349 m³ of Fireclay with an ultimate mining depth of 5.5m as per the approved mining plan, 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-I & normal conditions & the SEIAA Standard conditions.

4. Seiaa Standard Conditions:

S. No	Terms of Reference
4.1	<u>Cluster Management Committee</u> - Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry. - The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., - The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. - Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. - The committee shall deliberate on risk & emergency management plan, fire safety & evacuation plan and sustainable development goals pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. - The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the Environmental policy devised shall be given in detail in the EIA Report. - The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner. - The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public in the vicinity. <u>Agriculture & Agro-Biodiversity</u> - Impact on surrounding agricultural fields around the proposed mining Area.

S. No	Terms of Reference
	10. Impact on soil flora & vegetation around the project site. 11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP. 12. The Environmental Impact Assessment should study the agro-biodiversity, agro- forestry, horti-cultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. <u>Forests</u> 15. The project proponent shall detailed study on impact of mining on Reserve forests and free ranging wildlife. 16. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 17. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 18. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. <u>Water Environment</u> 19. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 20. Erosion Control measures. 21. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 23. The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment, by the activities. 24. 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. 25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. 27. The EIA shall include the impact of mining activity on the following: - Hydrothermal/Geothermal effect due to destruction in the Environment. - Bio-geochemical processes and its foot prints including Environmental stress. - Sediment geochemistry in the surface streams. <u>Energy</u> 28. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. <u>Climate Change</u> 29. 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.

S. No	Terms of Reference
	30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features. 31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood. <u>Mine Closure Plan</u> 32. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued. <u>EMP</u> 33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs. 34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. <u>Risk Assessment</u> 35. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining. <u>Disaster Management Plan</u> 36. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/unfavorable accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. <u>Others</u> 37. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc. 38. 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. 39. 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.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	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
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	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

S. No	Terms of Reference
	management, mining technology etc. and should be in the name of the lessee
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)
1.5	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
1.6	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
1.7	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
1.8	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
1.9	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
1.10	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
1.11	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
1.12	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 State Expert Appraisal Committees
1.13	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

S. No	Terms of Reference
	indicated. A copy of the forestry clearance should also be furnished
1.14	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
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	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
1.17	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
1.18	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 alongwith 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
1.19	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 Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report
1.22	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

S. No	Terms of Reference
	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
1.23	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
1.24	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
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.26	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
1.27	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
1.28	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
1.29	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
1.30	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
1.31	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

S. No	Terms of Reference
1.32	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
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.34	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
1.35	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
1.36	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
1.37	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
1.38	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
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report
1.43	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
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) 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

S. No	Terms of Reference
	reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF 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. g) 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. h) 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. i) 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



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 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.
- 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 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.
- 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 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 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 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 intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.

31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (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 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
 - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above-mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
 - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.



From,
Thiru.S.Ramehskumar, M.Sc.,
Assistant Director,
Geology and Mining,
Cuddalore District.

To,
Tvl. TANCEM Stoneware Pipe
Factory,
Vridhachalam,
Cuddalore 606 001.

Rc.No.78/Mines/2018, dated: 02.09.2025

Sir,

Sub: Mines and Minerals – 31 Minor Minerals – Fire Clay – Cuddalore District – Panruti Taluk – Panikankuppam Village – Government Poramboke lands – S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/2, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11 – Over an extent of 6.59.0 Hects - quarry lease application preferred by M/s.TANCEM Stoneware Pipe Factory, Vridhachalam – further particulars called for – Regarding.

Ref: Tvl.TANCEM Stoneware Pipe Factory, Vridhachalam, Cuddalore letter No.72/TANCEM/SWPF/Mines/2025, dated: 12.08.2025.

With reference to the letter cited, the details of proposed, existing, expired and abandoned quarries located within 500 meters from the boundary of the applied area in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/2, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11 over an extent of 6.59.0 Hects in Panikankuppam Village of Panruti Taluk and other particulars are furnished below.

A. The details of quarries situated within 500 mts radial distance are as follows.

1. Existing Other Quarries: -

Sl. No.	Name of the Owner	S.F.No	Extent (Hects)	Period
1.	-/Nil/-			

2. Proposed area: -

Sl. No.	Name of the Owner	S.F.Nos.	Extent (Hects)
1.	M/s.TANCEM Stoneware Pipe Factory, Vridhachalam	133/1A (0.63.5), 134/2 (0.39.5), 134/3 (0.26.5), 134/4 (0.16.5), 134/5 (0.34.5), 134/6 (0.50.0), 134/7 (0.35.0), 134/8 (0.75.5), 134/9 (0.13.5), 134/12 (0.18.0), 135/3 (1.04.0), 135/5 (0.11.0), 135/6 (0.09.5), 135/7 (0.10.5), 135/8 (0.13.5), 135/9 (0.05.0), 135/10 (0.14.5), 135/11 (1.18.5)	6.59.00

3. Lease expired and abandoned area: -

Sl. No.	Name of the Owner	S.F.No.	Extent (Hects)	Period
1.	M/s.VRW Industries, No.96 Vanagaram Village, PH Road, Chennai.	130/1	1.39.0	26.04.1978 to 25.04.1998
2.	Thiru.M.Elangovan, S/o.T.K.P.Manickam, F-22, Indira Gandhi Road, Fairlands, Salem	90/5	0.78.5	05.02.1998 to 04.02.2018
3.	M/s.TANCEM Stoneware Pipe Factory, Vridhachalam	133/1A (0.63.5), 134/2 (0.39.5), 134/3 (0.26.5), 134/4 (0.16.5), 134/5 (0.34.5), 134/6 (0.50.0), 134/7 (0.35.0), 134/8 (0.75.5), 134/9 (0.13.5), 134/12 (0.18.0), 135/3 (1.04.0), 135/5 (0.11.0), 135/6 (0.09.5), 135/7 (0.10.5), 135/8 (0.13.5), 135/9 (0.05.0), 135/10 (0.14.5), 135/11 (1.18.5)	6.59.0	11.04.1994 to 10.04.2014

B. Depth of mining and Existing Pit Dimension:

Length 102 M X Breadth 117 M X Depth 5 M

C. Quantity of Minerals Mined:

G.O.(Ms). No.2127, dated: 05.10.1970	
Extent	16.70 Acres
Excavated Volume in Metric Tonnes	77,220 MT
G.O.(Ms). No. 409, dated: 12.10.1993	
Extent	6.59.0 Hects
Excavated Volume in Metric Tonnes	35,142 MT

D. Name of the Person already mined in that leases area and Period.

The Mining lease was granted to Tvl.Tamilnadu Ceramics Limited (TACEL) in S.F.Nos.257, 264, 265, 266, 268, 269, 279 totally 16.70 acres in Panikankuppam Village of Vridhachalam Taluk, South Arcot District vide G.O.Ms.No. 2127 Industries Department dated: 05-10-1970 for a period of 20 years up to 21-03-1991. Further, Tvl. Tamilnadu Cements Corporation Limited (TANCEM) obtained the Mining Lease for the S.F.Nos. 133/1A (0.63.5), 134/1 (0.20.5), 134/2 (0.39.5), 134/3 (0.26.5), 134/4 (0.16.5), 134/5 (0.34.5), 134/6 (0.50.0), 134/7 (0.35.0), 134/8 (0.75.5), 134/9 (0.13.5), 135/3 (1.04.0), 135/5 (0.11.0), 135/6 (0.09.5), 135/7 (0.10.5), 135/8 (0.13.5), 135/9 (0.05.0), 135/10 (0.14.5), 135/11 (1.18.5) oven an extent of 6.61.5 Hectares of Panikankuppam Village, Panruti Taluk, Cuddalore District vide G.O.Ms.No.409 Industries Department dated 12-10-1993 for a period of 20 years up to 10.04.2014.

[Signature]
29/10/25
Assistant Director,
Geology and Mining,
Cuddalore.

[Signature]
02/10/25

COMMISSIONERATE OF GEOLOGY AND MINING

From

Thiru.S.Sudarsanam, M.Sc.,
Additional Director,
Commissionerate of Geology and Mining,
Guindy, Chennai – 600 032.

To

M/s. TANCEM Stoneware Pipe
Factory,
Vridhachalam,
Cuddalore District.

Rc.No.3952/MM7/2020, dated 23.11.2023

Sir,

Sub: Mines and Quarries – 31 Minor Minerals – Fireclay -
Cuddalore District – Panruti Taluk – Panikankuppam
Village - S.F.Nos. 133/1A (0.63.5 hecets.), 134/2 (0.39.5
hecets.), 134/3 (0.26.5 hecets.), 134/4 (0.16.5 hecets.),
134/5 (0.34.5 hecets.), 134/6 (0.50.0 hecets.), 134/7
(0.35.0 hecets.), 134/8 (0.75.5 hecets.), 134/9 (0.13.5
hecets.), 134/12 (0.18.0 hecets.), 135/3 (1.04.0 hecets.),
135/5 (0.11.0 hecets.), 135/6 (0.09.5 hecets.), 135/7
(0.10.5 hecets.), 135/8 (0.13.5 hecets.), 135/9 (0.05.0
hecets.), 135/10 (0.14.5 hecets.) and 135/11 (1.18.5
hecets.) – over an extent of 6.59.0 Hecets. – Government
lands – Quarry lease application preferred by
M/s. TANCEM Stoneware Pipe Factory, Vridhachalam –
Recommended and forwarded by the Assistant
Director, Geology and Mining, Cuddalore – Precise Area
Communicated by the Government – Mining Plan
submitted for approval – Accorded – Regarding.

- Ref: 1) Quarry Lease application of M/s. TANCEM
Stoneware Pipe Factory, Vridhachalam dated.
05.02.2018.
- 2) From the District Collector, Cuddalore Letter
Rc.No.78/Mines/2018, dated 31.07.2020.
- 3) G.O.(D) No.60, Industries (MMC.1) Department,
dated 12.06.2021.
- 4) The Commissioner of Geology and Mining, File
Rc.No.3952/MM7/2020, dated 12.10.2022.
- 5) Government letter No.3354387/MMC.2/ 2022-1,
dated 18.01.2023.
- 6) M/s. TANCEM Stoneware Pipe Factory,
Vridhachalam letter dated 06.04.2023 and
02.08.2023.
- 7) The Additional Director of Geology and Mining,
letter Rc.No.3952/MM7/2020, dated 27.09.2023.
- 8) The Assistant Director, Geology and Mining,
Cuddalore Rc.No. 78/Mines/2018, dated
20.04.2023 and 27.10.2023.

Kind attention is invited to the references cited above.

2) The Government vide reference 5th cited have Communicated Precise Area to the applicant M/s. TANCEM Stoneware Pipe Factory, Vridhachalam with a direction to furnish an approved Mining Plan within a period of 3 months in respect of the area applied for grant of Fireclay quarry lease for quarrying over an extent of 6.59.0 hectares of Government lands in S.F.Nos. 133/1A (0.63.5 hecets.), 134/2 (0.39.5 hecets.), 134/3 (0.26.5 hecets.), 134/4 (0.16.5 hecets.), 134/5 (0.34.5 hecets.), 134/6 (0.50.0 hecets.), 134/7 (0.35.0 hecets.), 134/8 (0.75.5 hecets.), 134/9 (0.13.5 hecets.), 134/12 (0.18.0 hecets.), 135/3 (1.04.0 hecets.), 135/5 (0.11.0 hecets.), 135/6 (0.09.5 hecets.), 135/7 (0.10.5 hecets.), 135/8 (0.13.5 hecets.), 135/9 (0.05.0 hecets.), 135/10 (0.14.5 hecets.) and 135/11 (1.18.5 hecets.) of Panikankuppam Village, Panruti Taluk, Cuddalore District for a period of 10 years as per Rule 43 of Tamil Nadu Minor Mineral Concession Rules, 1959 by incorporating the conditions stipulated in the Government letter dated 18.01.2023.

3) In response to the precise area communication letter issued by the Government in the reference 5th cited, the applicant has submitted draft mining plan duly prepared by the Qualified Person for approval vide reference 6th cited.

4) The Assistant Director (G&M), Cuddalore in the reference 8th cited has forwarded the draft mining plan and corrected copies of Mining Plan which has been examined and verified with the field conditions. The details such as Geological Reserves, Mineable Reserves and the proposed year wise production for the Mining Plan period are as follows:-

Geology of the lease granted area	:	The lands applied for quarry lease is mainly deposited with sandstone and clay of Middle Miocene to lower Pleistocene formations of tertiary age. The applied area is covered by top soil upto a depth of 1 to 1.5 mts and the clay bed of buff to yellowish in colour is occurring
-----------------------------------	---	--

	from a depth of 1.5 mts - 5.5 mts.
--	------------------------------------

Geological Reserves	:	3,54,625.25 Ts	
Mineable Reserves (As per Mining Plan at the rate of 100% of recovery)	:	2,16,091 Ts	
Year wise Production @ 100% (Ts)	:	Year	Quantity in Ts
		1 st year	24,224
		2 nd year	18,522
		3 rd year	18,522
		4 th year	18,522
		5 th year	18,821
		Total	98,611

The details of the quarries situated within 500 mts, radial distance are as follows.

1. Existing Other Quarries:-

Sl.No.	Name of the Owner	S.F.No.	Extent (Hects.)	Period
1.		-Nil-		

2. Proposed area:-

Sl.No.	Name of the Owner	S.F.Nos.	Extent (Hects.)
1.	M/s. TANCER Stoneware Pipe Factory, Vridhachalam	133/1A (0.63.5), 134/2 (0.39.5), 134/3 (0.26.5), 134/4 (0.16.5), 134/5 (0.34.5), 134/6 (0.50.0), 134/7 (0.35.0), 134/8 (0.75.5), 134/9 (0.13.5), 134/12 (0.18.0), 135/3 (1.04.0), 135/5 (0.11.0), 135/6 (0.09.5), 135/7 (0.10.5), 135/8 (0.13.5), 135/9 (0.05.0),	6.59.00

		135/10 (0.14.5) and 135/11 (1.18.5)	
--	--	--	--

3. Lease expired and abandoned area:-

Sl. No.	Name of the Owner	S.F.No.	Extent (Hects.)	Period
1.	M/s. VRW Industries, No.96, Vanagaram Village, PH Road, Chennai	130/1	1.39.0	26.04.1978 to 25.04.1998
2.	M/s. TANCEM Stoneware Pipe Factory, Vridhachalam	133/1A (0.63.5), 134/2 (0.39.5), 134/3 (0.26.5), 134/4 (0.16.5), 134/5 (0.34.5), 134/6 (0.50.0), 134/7 (0.35.0), 134/8 (0.75.5), 134/9 (0.13.5), 134/12 (0.18.0), 135/3 (1.04.0), 135/5 (0.11.0), 135/6 (0.09.5), 135/7 (0.10.5), 135/8 (0.13.5), 135/9 (0.05.0), 135/10 (0.14.5) and 135/11 (1.18.5)	6.59.0	11.04.1994 to 10.04.2014
3.	Thiru. M.Elangovan, S/o. T.K.P. Manickam, F-22, Indira Gandhi Road, Fairlands, Salem.	90/5	0.78.5	05.02.1998 to 04.02.2018

6) The Assistant Director, Geology and Mining, Cuddalore District has forwarded the mining plan submitted by the applicant M/s. TANCEM Stoneware Pipe Factory and recommended for approval subject to the conditions imposed in the Precise Area Communication letter in reference 5th cited.

7) The Government vide G.O.(D) No.60, Industries (MMC.1) Department, dated 12.06.2021 vide reference 3rd cited have authorized the Senior Most Additional Director of Geology and Mining at the Head Quarters to approve the mining plan, modified mining plans and scheme of mining in respect of 31 Minor Minerals.

8) In view of the above, in exercise of the powers conferred under Rule 43 (8) of Tamil Nadu Minor Mineral Concession Rules, 1959, read with G.O.(D) No.60, Industries (MMC.1) Department, dated 12.06.2021 the mining plan in respect of grant of Fireclay quarry lease submitted by M/s. TANCEM Stoneware Pipe Factory is approved subject to the following conditions: -

- i) The Mining plan is approved without prejudice to any other order or direction from any court of competent Jurisdiction.
- ii) A safety distance of 7.5 meters should be provided for the adjoining patta lands of the applied area.
- iii) A safety distance of 50 meters shall be provided and maintained to the odai situated in S.F.Nos.138 & 139 in the western side of the applied area.
- iv) A safety distance of 50 meters shall be provided and maintained to the road situated in the northern side of the applied area.
- v) Quarrying operations shall be carried out without any hindrance to the adjacent lands and Public.
- vi) Quarrying operations shall be carried out strictly in accordance with Act and Rules.
- vii) Quarrying should be restricted within the lease granted area.
- viii) No quarry lease granted shall be renewed.
- ix) No mining Dues Clearance Certificate to be submitted before execution of lease deed as stipulated in Appendix-VIII of the Tamil Nadu Minor Mineral Concession Rules, 1959.

- x) If any mineral, other than Fireclay is discovered while quarrying, the applicant/lessee shall not mine or dispose of such mineral and it should be intimated to the Government within 30 days from the date of discovery of such new minerals as per Rule 36 (3) of Tamil Nadu Minor Mineral Concession Rules, 1959.
- xi) The applicant should fence the lease granted area with barbed wire before execution of lease deed as follows:-
- The pillar post shall be firmly grounded with concrete foundation of height not less than 2 mts with a distance between two pillars shall not be more than 3 mts.
- xii) Difference in seigniorage fee for the actual quantity transported (as per weighment slips) should be reconciled before 15th April of every year.
- xiii) A green belt should be constructed by planting trees along the boundary of the area to control air and noise pollution.
- xiv) Consent from the Tamil Nadu Pollution Control Board should be obtained before commencement of quarrying operation.
- xv) If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules, 1959 and other Rules and Act in force will attract.
- xvi) The mining lease holder shall, after mining operations undertaking re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna, etc.,
- xvii) The applicant company should ensure that all the quarry workers working under its control are registered in the Labour Welfare Board and also enrolled in the ongoing insurance scheme and to submit compliance report to the

District Collector, Cuddalore District before execution of the lease deed.

- xviii) The child labour should not be engaged in the quarry works.
- xix) Quarrying operations and production shall be carried out as per the approved Mining Plan and the applicant shall be liable to pay the cost of mineral if there is any deviation in the quantum indicated in the approved year wise quantum of production and any such cases as on date are to be dealt with as per Court direction.
- xx) The Condition stipulated in Government Letter No. 3354387/MMC.2/2022-1, dated 18.01.2023 shall be adhered.

Encl: Approved Mining Plan.

4.4.1.2023
23.11.2023
Additional Director of Geology and Mining

Copy Submitted to:

The Additional Chief Secretary to Government (FAC),
Natural Resources Department,
Secretariat, Chennai-9. (with AMP)

Copy to:

- 1) The District Collector,
Cuddalore.
- 2) The Director General of Mines Safety,
Lapis Lagoon, AA Block, Shanthi Colony,
Anna Nagar, Chennai. 600 040. (with AMP)
- 3) The Assistant Director,
Geology and Mining,
Cuddalore District. (with AMP)
- 4) Stock File.

MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR PANIKANKUPPAM FIRECLAY DEPOSIT

(PUBLIC SECTOR-A GOVERNMENT OF TAMILNADU UNDERTAKING/MP /N
GOVERNMENT LANDS /CAPTIVE USE)



(Submitted under Rule 19A and Rules 41, 42 & 43 Amendment by the Tamil Nadu
Minor Mineral Concession Rules, 1959)

LOCATION OF THE QUARRY LEASE APPLIED AREA

EXTENT : 6.59.0 Ha
S.F.NOS : 133/1A, 134/2, 134/3, etc.,
VILLAGE : PANIKANKUPPAM
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMIL NADU

MINE OWNER/APPLICANT

M/s. TANCEM Stoneware Pipe Factory,

(A Government of Tamilnadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu - 600 035.

PREPARED BY

S. Prasad, M.Sc.,
Qualified Person

Assistant Manager (Geology),
TANCEM, Ariyalur Cement Works,
Ariyalur Taluk and District,
Tamil Nadu - 621 729.
Cell: 95669 47917

E-mail: ari@tancem.com, acwmines@gamil.com

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu – 600 035.



CONSENT LETTER FROM APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in respect of Fireclay Deposit over an extent 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared by

S. Prasad, M.Sc.,

Qualified Person

I request to the Commissioner, Department of Geology and Mining, Guindy, Chennai to make further correspondence regarding the modification of the Mining Plan with the said Qualified Person at his following address.

S. Prasad, M.Sc.,

Assistant Manager (Geology),
TANCEM, Ariyalur Cement Works,
Ariyalur Taluk and District,
Tamil Nadu – 621 729.
Cell: 95669 47917

I hereby undertake that all the modifications, if any made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

Signature of the applicant

For M/s. TANCEM Stoneware Pipe Factory


(T. Ravichandran)
(Unit Head)
UNIT HEAD

Place: Cuddalore

Date: 27.03.2023

TANCEM STONEWARE PIPE FACTORY
VRIDHACHALAM - 606 001.

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamilnadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu - 600 035.



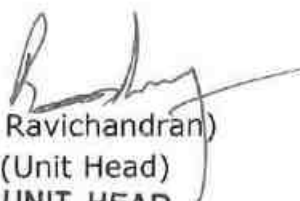
CERTIFICATE OF PROGRESSIVE QUARRY CLOSURE PLAN

It is certified that the Progressive Quarry Closure Plan of Fireclay Deposit of over an extent of 6.59.0 Ha complies with all Statutory Rules, Regulations, Orders made by the Central or State Government, Statuary organization, court etc. which have been taken into consideration and wherever any specific permission is required the applicant will approach the concerned authorities.

The information furnished in the Progressive Quarry Closure Plan is true and correct to the best of my knowledge and records.

Signature of the applicant

For M/s. TANCEM Stoneware Pipe Factory


(T. Ravichandran)
(Unit Head)
UNIT HEAD

TANCEM STONEWARE PIPE FACTORY
VRIDHACHALAM - 606 001.

Place: Cuddalore

Date: 27.03.2023

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamilnadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu - 600 035.



DECLARATION OF THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in respect of Fireclay Deposit over an extent 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared in full consultation with me.

I have understood its contents and agree to implement the same in accordance with Laws applicable to Mines.

Signature of the applicant
For M/s. TANCEM Stoneware Pipe Factory


(T. Ravichandran)
(Unit Head)

Place: Cuddalore

Date: 31.03.2023

UNIT HEAD
TANCEM STONEWARE PIPE FACTORY
VRIDHACHALAM - 606 001.

CERTIFICATE



Certified that I am, **S. Prasad, M.Sc.**, residing and working at Assistant Manager (Geology), TANCEM, Ariyalur Cement Works, Ariyalur (Taluk and District), Tamil Nadu - 621 729, holding a Post Graduate Degree in Geology (M.Sc. Applied Geology) from Bharathidasan University, Tiruchirappalli and I worked in the field of Geology in a role of Geologist.

Rule 15(I)(a) and (b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 stipulates the eligibility for preparing Revised Mining Plans as "(I)(a) a post graduate degree in Geology granted by a university established" and (I)(b) "Professional experience of five years of working in a supervisory capacity in the field of mining after obtaining the degree". Since my qualification and experience are satisfied the Rule (I)(a) and (I)(b) of 15 of the said Rules, I am eligible to prepare Revised Mining Plans for both Major and Minor Minerals.

Accordingly, I am preparing this Mining Plan and Progressive Quarry Closure Plan in respect of Fireclay Deposit over an extent 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State for **M/s. TANCEM Stoneware Pipe Factory**, (A Government of Tamilnadu Undertaking), 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu - 600 035. Since the Mining Plan is prepared as per the provisions contained in Rule 15(I)(a) and (I)(b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Signature of the Qualified Person

S. Prasad, M.Sc.,

Place: Ariyalur

Date: 31.03.2023

S. Prasad, M.Sc.,

Assistant Manager (Geology),
TANCEM, Ariyalur Cement Works,
Ariyalur Taluk and District,
Tamil Nadu – 621 729.
Cell: 95669 47917



CERTIFICATE FROM THE QUALIFIED PERSON

This is to certify that the Provisions of Rule 19 A and Rule 41, 42 & 43 amendment under Tamil Nadu Minor Mineral Concession Rules, 1959 have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan in respect of Fireclay Deposit over an extent 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared for

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu – 600 035.

Whenever specific permissions / exemptions / relaxations and approvals are required, the applicant will approach the concerned authorities of Commissioner, Department of Geology and Mining, Guindy, Chennai – 600 032, Tamil Nadu for such permissions /exemptions/relaxations and approvals.

It is also certified that information furnished in the above Mining plan are true and correct to the best of our knowledge.

Signature of the Qualified Person

S. Prasad, M.Sc.,

Place: Ariyalur

Date: 31.03.2023

S. Prasad, M.Sc.,

Assistant Manager (Geology),
TANCEM, Ariyalur Cement Works,
Ariyalur Taluk and District,
Tamil Nadu – 621 729.
Cell: 95669 47917



CERTIFICATE FROM THE QUALIFIED PERSON

Certified that the Provisions of Mines Act, Rules and Regulations or Orders made there under have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan in respect of Fireclay Deposit over an extent 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared for

M/s. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai,
Tamil Nadu – 600 035.

Whenever specific permissions/exemptions/ relaxations and approvals are required, the applicant will approach the concerned authorities of the Director General of Mines Safety (DGMS), No. 5, IInd Street, Block – AA, Anna Nagar, Chennai-40, Tamil Nadu for such permissions/ exemptions /relaxations and approvals.

It is also certified that information furnished in the Mining Plan are true and correct to the best of my knowledge.

Signature of the Qualified Person

S. Prasad, M.Sc.,

Place: Salem

Date: 31.03.2023

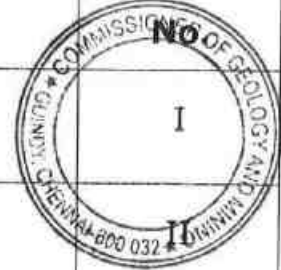
LIST OF CONTENTS



S. No.	Description	Page No
1.0	Introduction	
2.0	General	5
3.0	Geology and Reserves	9
4.0	Mining	15
5.0	Blasting	19
6.0	Mine Drainage	19
7.0	Stacking of Mineral Waste and Disposal of Waste	20
8.0	Use of Mineral	21
9.0	Site Services	21
10.0	Employment Potential	22
11.0	Environmental Management Plan	23
12.0	Safety and Security	29
13.0	Project Cost	29
14.0	Progressive Quarry Closure Plan	30
15.0	Statutory Provisions	33

LIST OF ANNEXURES

S. No.	Description	Annexure No.
1.	Copy of Precise Area Communication Letter	I
2.	Copy of F.M.B Sketch	
3.	Copy of Adangal	III
4.	Copy of 'A' Register	IV
5.	Copy of Village Map	V
6.	Copy of Memorandum and Articles of Association	VI
7.	Copy of List of Board of Directors	VII
8.	Copy of Authorization Letter from the company	VIII
9.	Copy of ID Proof	IX
10.	Copy of Chemical Analysis Report	X
11.	Copy of Educational Certificate of Qualified Person	XI
12.	Copy of Experience Certificate of Qualified Person	XII



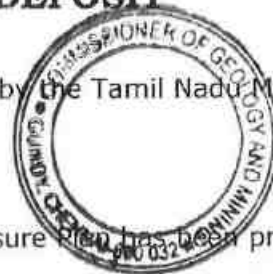
LIST OF PLATES

S. No.	Description	Plate No.	Scale
1.	LOCATION PLAN	I	1:24,00,000
2.	TOPO SKETCH OF QUARRY LEASE APPLIED AREA FOR 10KM RADIUS	IA	1:1,00,000
3.	ROUTE MAP	IB	Not to Scale
4.	SATELLITE IMAGERY PLAN	IC	1:50,000
5.	QUARRY LEASE PLAN	II	1:1,000
6.	SURFACE PLAN	III	1:1,000
7.	GEOLOGICAL PLAN	IV	1:1,000
8.	GEOLOGICAL SECTIONS	IV-A	Hor - 1:1,000 Ver - 1:100
9.	YEARWISE DEVELOPMENT & PRODUCTION PLAN	V	1:1,000
10.	YEARWISE DEVELOPMENT & PRODUCTION SECTIONS	V-A	Hor - 1:1,000 Ver - 1:100
11.	QUARRY LAYOUT & AFFORESTATION PLAN	VI	1:1000
12.	PROGRESSIVE QUARRY CLOSURE PLAN	VII	1:1,000
13.	PROGRESSIVE QUARRY CLOSURE SECTIONS	VII-A	Hor - 1:1,000 Ver - 1:100
14.	ENVIRONMENTAL PLAN	VIII	1:10,000
15.	CONCEPTUAL PLAN	IX	1:1,000
16.	CONCEPTUAL SECTIONS	IX-A	Hor - 1:1,000 Ver - 1:100



MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR PANIKANKUPPAM FIRECLAY DEPOSIT

(Prepared Under Rule, 19 A and rule 41, 42 & 43 amendment by the Tamil Nadu Minor Mineral Concession Rules, 1959)



1.0 INTRODUCTION:

The present Mining Plan along with Progressive Quarry Closure Plan has been prepared to quarry Fireclay Deposit belonging to **M/s. TANCEM Stoneware Pipe Factory**, (A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035, for which precise area communication has been granted as per Govt. letter No.3354387/MMC.2/2022-1, Dated: 18.01.2023 with the conditions to provide.

- i. A safety distance of 7.5 meters should be provided for the adjoining patta lands of the applied area.
- ii. A safety distance of 50 meters shall be provided and maintained to the odai situated in S.F.No.138 & 139 in the western side of the applied area.
- iii. A safety distance of 50 meters shall be provided and maintained to the road situated in the northern side of the applied area.
- iv. Quarrying operations shall be carried out without any hindrance to the adjacent patta lands & Public.
- v. Quarrying operations shall be carried out strictly in accordance with the Act and Rules.
- vi. Quarrying should be restricted within the lease granted area.
- vii. No quarry lease granted shall be renewed.
- viii. No mining Dues Clearance Certificate to be submitted before execution of lease deed as stipulated in Appendix-VIII of the Tamil Nadu Minor Mineral Concession Rules, 1959.
- ix. If any mineral other than the Fireclay is discovered while quarrying, the applicant/lessee shall not mine or dispose of such mineral and it should be intimated to Government within 30 days from the date of discovery of such new mineral(s) as per Rule 36(3) of the Tamil Nadu Minor Mineral Concession Rules, 1959.
- x. The applicant company should fence the lease granted area with barbed wire before the execution of lease deed as follows:-
 - ❖ The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
 - ❖ The applicant company shall incorporate the Differential Global Positioning System (DGPS) readings for the entire boundary Pillars of the area and the same should be clearly shown in the mining plan.
 - ❖ A soft copy of the digitalized map with DGPS readings should be submitted in the Compact Disc (CD) form to the Assistant Director (Geology and Mining), Cuddalore.

- xi. Difference in seigniorage fee for the actual quantity transported (as per weighment slips) should be reconciled before 15th April of every year.
 - xii. A green belt should be constructed by planting trees along the boundary of the area to control air and noise pollution.
 - xiii. Consent from the Tamil Nadu Pollution Control Board should be obtained before commencement of quarrying operation.
 - xiv. If any violation is found during quarrying operation, the penal provisions of the Tamil Nadu Minor Mineral Concession Rules, 1959 and other Rules and Act in force will attract.
 - xv. The mining lease holders shall, after mining operations undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna, etc.
 - xvi. The applicant company should ensure that all the quarry workers working under its control are registered in the Labour Welfare Board and also enrolled in the ongoing insurance scheme and to submit compliance report to the District Collector, Cuddalore District before execution of the lease deed.
- (Please refer Annexure – I).

The applicant ensures to comply all the conditions stipulated by the Government before the execution of lease deed and during the course of quarry operations.

M/s. Tamilnadu Cements Corporation Limited (TANCEM)

The applicant M/s. Tamilnadu Cements Corporation Limited (TANCEM), is a public limited company (A Government of Tamilnadu undertaking) having its registered office at 35, Anna Salai, LLA Building, II Floor, Chennai – 600 002.

Thiru.T.Ravichandran, Unit Head of the Company and he is the Authorized Signatory. The organization is having very good knowledge and experience in Limestone mining for more than 4 decades. Copy of Certificate of Incorporation, list of Board of Directors & Board of Resolution is enclosed in Annexure Nos. VI, VII & VIII.

The company is engaged in the manufacture of cement and primarily caters to the needs of Government Departments. Apart from this mining lease, the Company also holds mining leases in the Ariyalur, Virudhunagar and Cuddalore District of Tamil Nadu and the details of the same are itself.

Limestone being the main raw material, the Company acquired and reserved enough limestone bearing lands in and around Ariyalur and Alangulam which are sufficient to run the cement plants.

The installed capacity of the Ariyalur cement unit is 5 lakh tonnes per annum. It is a modern dry process plant. TANCEM is modernizing the capacity of Ariyalur Works from 5 lakh tones per annum to 15 lakh tones per annum.

This Mining Plan and Progressive Quarry Closure Plan has been prepared by keeping and considering all the parameters stipulated by the Government of Tamil Nadu before and during the course of quarry operations.

The area applied for lease is over an extent of 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State.



It is a government land, which is not fit for vegetation/ Cultivation. The applicant (TANCEM) have surface right over the applied area for grant of mining lease and relevant record of 'A' Register and Adangal copy are enclosed as Annexure Nos. III & IV.

The area under consideration was in quarrying operations earlier. The quarry lease was first granted in favour of **M/s. TANCEM Stoneware Pipe Factory**, for quarrying Fireclay over an extent 6.61.5 Hectares of Government lands in S.F.Nos.133/1A, 134/1, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11 of Panikankuppam Village, Panruti Taluk, Cuddalore District for twenty years from 22.03.1971 to 21.03.1991 by The District Collector, Cuddalore District vide **G.O.Ms.No.2127, Dated: 05.10.1970.**

The applicant has applied a quarry lease again, over an extent 6.61.5 Hectares of Government lands in S.F.Nos.133/1A, 134/1, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10, 135/11 of Panikankuppam Village, Panruti Taluk, Cuddalore District for twenty years expired on 10.04.2014 by The District Collector, Cuddalore District vide G.O.Ms.No.409, Dated: 12.10.1993.

Now, the applicant once again applied for quarrying Fire Clay, over an extent of 6.59.0 Hectares of Government lands in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State. In the above S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/6, 134/7, 134/8, 134/9, 134/12, 135/6, 135/7, 135/8, 135/9 & 135/10 only virgin area and S.F.Nos.134/5, 135/3, 135/5 & 135/11 having existing quarry pit. This location has been fireclay accrued and it will be seen in a nearby existing quarry pit.

The area has a gradient towards south with 1.5m thickness of over burden (i.e., Topsoil) and followed by fireclay deposit throughout the area. The altitude of the area ranges from maximum 69m above MSL. Open cast semi mechanized mining should be adopted to win the Fireclay Mineral occurring in this area.

1.1 Details of lease particulars holding this company are given as under:

The other mining leases held by the company are given below:

Table-1

Sl. No	Mining lease Govt. Order & Date	Area in Ha	Location	Type of mineral	Working/ Non-Working	Status of approval of MP/MS	Date of expiry & Date of expiry	Remarks
1	871/MMD2, 20.08.1990	420.25.0	Virudhunagar	Limestone	Non-Working	TN/TNL/MP/L ST/1122-SZ 10.02.2004	04.02.1998	Renewal application submitted
2	215 ind, 18.09.1995	180.83.0	Virudhunagar	Limestone	Non-Working	TN/VDN/LST/ MS/74/SZ, 13.03.2005	01.08.1989 23.11.2005	Renewal application submitted
3.	427 ind, 19.03.1980	268.80.0	Virudhunagar	Limestone	Non-Working	TN/VDN/LST/ MS/74/SZ, 13.03.2005	08.06.2001	Renewal application submitted
4.	3(D) 107 ind, 11.07.1997	7.55.5	Tirunelveli	Limestone	Non-Working	TN/TNL/MP/L ST-149/SZ, 18.05.2006	30.12.2004	Renewal application submitted
5.	344, 10.03.1980	240.61.5	Ariyalur	Limestone	Non-Working	TN/PBR/MS/L ST-1257-SZ, 19.01.2001	26.04.2001	Renewal application submitted
6.	456, 16.05.1985	194.29.5	Ariyalur	Limestone	Non-Working	TN/PBR/LST/ MS-86-SZ, 29.03.2001	12.11.2005	Renewal application submitted
7.	469, 21.05.1985	66.11.5	Ariyalur	Limestone	Non-Working	TN/PBR/LST/ MS-86-SZ, 29.03.2001	12.11.2005	Renewal application submitted
8.	624, 23.09.1998	110.68.5	Ariyalur	Limestone	Working	TN/TCR/MP/L ST-916-SZ, 18.10.2000	13.07.2001	-
9.	409/ind, 12.10.1993	6.61.5	Cuddalore	Clay	Non-Working	TN/SA/FC-15-SZ, 25.02.1991	April 1994 & March 2013	Renewal application submitted
10.	198/ind, 26.12.1986	12.30.0	Ariyalur	Clay	Non-Working	TN/TCR/FC/M S-108-MDS, 04.07.2001	Oct 1986 & March 2006	Renewal application submitted
11.	729/ind, Dated 19.07.1980	24.32.5	Pandapuli	Limestone	Non-Working	TN/TNL/LST/ MS-1206-MDS, 19.05.2015	14.08.1969 & 13.08.1999	Renewal application submitted
12.	G.O.(2D) 23	4.64.5	Ariyalur	Limekankar	Non-Working	1341/MM10/2 018/LK/Ari, Dtd: 18.04.2018	10 Years	-
13.	G.O.(2D) 24	3.96.5	Ariyalur	Limekankar	Non-Working	1342/MM10/2 018/LK/Ari, Dtd: 18.04.2018	10 Years	-
14.	6983/MMC.2 /2018-1, Dtd: 29.06.2018	2.18.5	Ariyalur	Limekankar	Fresh Lease applied	Mining Plan under preparation	10 Years	-
15.	6977/MMC.2 /2018-1, Dtd: 29.06.2018	4.17.0	Ariyalur	Limekankar	Fresh Lease applied	Mining Plan under preparation	10 Years	-
Total		1547.35.0						

2.0 GENERAL:**2.1 NAME OF THE APPLICANT WITH ADDRESS:**Name and address of the Nominated Owner:

Name : Tvl. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)

Registered Office Address : 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai,
Nandanam,
Chennai,
Tamil Nadu – 600 035.

Telephone Number : 044 28525461, 28525471

Fax : 044 28523991

Email : md@tancem.com, co@tancem.com

Website : www.tancem.in

Name and address of the Authorized Signatory:

Name of the applicant : Thiru. T. Ravichandran, DGM (Tech) / Unit Head,
Tvl. Tamil Nadu Cements Corporation Limited.,
(A Government of Tamil Nadu Undertaking)

Address : Ariyalur Cements Works,
Ariyalur District,
Tamil Nadu.

Telephone Number : 04329 228531

Fax : 04329 228776

Email : ari@tancem.com, acwmines@gamil.com

(Refer Annexure No. VIII)

2.2 STATUS OF THE APPLICANT:

The applicant, Tvl. Tamil Nadu Cements Corporation Limited (TANCEM) is a public limited company (A Government of Tamil Nadu undertaking) having its Registered Office at 735, Anna Salai, LLA Building, II Floor, Chennai 600 002.

Thiru. T. Ravichandran, Unit Head of the Ariyalur Unit and Tvl. TANCEM Stoneware Pipe Factory, Virudhachalam and he is an Authorized Signatory. The organization is having very good knowledge and experience in Limestone mining for more than 4 decades. Copy of Certificate of Incorporation, list of Board of Directors & Board of resolution is enclosed as Annexure Nos. VI, VII & VIII.

The company is engaged in the manufacture of cement and primarily caters to the needs of Government Departments. Apart from this mining lease, the Company also holds mining leases in the Ariyalur, Virudhunagar and Cuddalore Districts of Tamil Nadu and the details of the same are listed enclosed as Annexure No. VII.

List of directors of the company:

Table - 2

S. No.	Name of the Director	Address	Designation
1.	Thiru. S. Krishnan, I.A.S.,	Additional Chief Secretary to Government Industries, Investment Promotion and Commerce Department, Secretariat, Chennai - 600 009.	Additional Chief Secretary
2.	Thiru. C. Kamaraj, I.A.S.,	M/s. Tamilnadu Cements Corporation Limited, 5th Floor Aavin Illam, No.3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai - 600 035.	Managing Director
3.	Dr. Darez Ahamed, I.A.S.,	Rural Development and Panchayat Raj, Saldapet, Chennai - 600 35.	Commissioner
4.	Thiru. J. Jayakanthan, I.A.S.,	Geology and Mining, Guindy, Chennai - 600 032.	Commissioner
5.	Thiru. R. Lilly, I.A.S.,	Special Secretary to Government Industries, Investment Promotion and Commerce Department, Secretariat, Chennai - 600 009.	Special Secretary
6.	Thiru. V. Dakshinamoorthy, I.A.S.,	TWAD Board, Chepauk, Chennai - 600 005.	Managing Director
7.	Thiru. Pratik Tayal, I.A.S.,	Deputy Secretary to Government Finance Department, Secretariat, Chennai - 600 009.	Deputy Secretary
8.	Thiru. R. Viswanath	Engineer in Chief (Buildings) CE (Buildings), Public Works Department, Chepauk, Chennai-5.	Director
9.	Thiru. D. Rajendran	Director (Generation), TANGEDCO, 10th Floor, Eastern Wing, 144, Anna Salai, Chennai - 600 002.	Director
10.	Dr. G. Natarajan	(Independent Director), 288, TTK Road, Alwarpet, Chennai - 600 018	Independent Director
11.	Thiru. P. Krishnamurthi	(Independent Director), 1B, Suvarna Lok 34, Melony Road, T. Nagar, Chennai - 600 017	Independent Director

2.3 MINERAL WHICH THE APPLICANT INTENDS TO QUARRY:

The applicant intends to quarry Fireclay Only.

2.4 NAME AND ADDRESS OF THE QUALIFIED PERSON WHO PREPARED THE MINING PLAN:

Name : **S. Prasad., M.Sc.,**
 Qualified Person (As per Rule 15(I)(a) and (I)(b) MCR, 2016)

Address : Assistant Manager (Geology),
 TANCEM, Ariyalur Cement Works,
 Ariyalur (Taluk and District),
 Tamil Nadu - 621 729.

Cell : 95669 47917

E-mail id : ari@tancem.com, acwmines@gamil.com

Please refer Annexure Nos. XI & XII.

2.5 NAME AND ADDRESS OF THE PROSPECTING AGENCY:**Primary Data:**

The Geological Survey of India and Tamil Nadu State Mines and Geology Department have already carried out regional exploration studies, regional mapping of all the mineral deposits of Tamil Nadu.

Name and Address of the Agency:

- (i) State Geological Department,
O/o. The Director of Geology and Mining,
Thiru Ve Ka Industrial Estate,
Guindy, Chennai-32.

**Secondary Data:**

For preparing this mining plan, the Qualified Person and his team members made a detailed geological study of the area and demarcated clearly the Fireclay deposit with a mine surveyor. Based on the existing pit and their dimension is [102m x 117m x 5m (d)], all the datas required for exploration studies were carried out. Since it is shallow deposit of small extent of 5.5mtrs were considered for calculating the reserves.

Since the existing pit, nearby working mines and Geological investigations evidences sufficient data to calculate the resources & reserves in the mining lease applied area upto 5.5mtrs depth. No further prospecting was carried out.

2.6 DETAILS OF THE AREA

The area is marked in the Survey of India, Topo Sheet No. 58-M/09. The details of the land covered by the area are given below.

Table-3

District & State	Taluk	Village	S.F. Nos.	Area in Hect.	Ownership occupancy
Cuddalore & Tamil Nadu	Panruti	Panikankuppam	133/1A	0.63.5	Government land
			134/2	0.39.5	
			134/3	0.26.5	
			134/4	0.16.5	
			134/5	0.34.5	
			134/6	0.50.0	
			134/7	0.35.0	
			134/8	0.75.5	
			134/9	0.13.5	
			134/12	0.18.0	
			135/3	1.04.0	
			135/5	0.11.0	
			135/6	0.09.5	
			135/7	0.10.5	
			135/8	0.13.5	
			135/9	0.05.0	
			135/10	0.14.5	
			135/11	1.18.5	
Total extent				6.59.0	

The area lies in the North Latitude 11°44'49.52"N to 11°45'01.01"N and East Longitudes of 79°32'52.03"E to 79°33'03.38"E on WGS 84 datum.

2.7 WHETHER THE AREA RECORDED TO BE IN FOREST DEPARTMENT:

The area does not falls under forest land of any category. It is a Government Land.

2.8 PERIOD FOR WHICH THE MINING AREA IS REQUIRED:

Ten years only.

2.9 INFRASTRUCTURE:

The lease applied area is located at a distance of about 2 km Southwest from Panikankuppam Village, 2km Southwest from Panruti town and 100m West from Viluppuram – Kumbakonam National Highway Road (NH-36).



Table-4

S. No.	Particulars	Location	Direction	Approximate Distance in Km
1	Nearest Post office	Panruti	NE	2
2	Nearest Town (D.H)	Panruti	NE	2
3	Nearest Police Station	Panruti	NE	2
4	Nearest Govt. Hospital	Panruti	NE	2
5	Nearest School	Panruti	NE	2
6	Nearest DSP Office	Panruti	NE	2
7	Nearest Railway Station	Panruti	NE	2
8	Nearest Airport	Trichy	SW	141
9	Nearest Seaport	Chennai	NE	167

Please refer Location Plan (Plate No. I), Route Map (Plate No. IA) & Key Plan (Plate No. IB).

Drinking water, rest shed, store room, public convenience and office are proposed to constructed in temporary semi-permanent structure within the lease applied area. Please refer Plate No. VI.

2.10 TOPOSHEET NO. WITH LATITUDE & LONGITUDE OF ALL CORNER BOUNDARY POINT/PILLAR:

The Area falls in Topo sheet No. 58-M/09 of Geological Survey of India.

Table-5

BOUNDARY CO-ORDINATES on WGS-1984 from SW Corner					
S. Nos.	Latitude	Longitude	S. Nos.	Latitude	Longitude
1	11° 44' 50.36"N	79° 32' 52.82"E	16	11° 45' 00.84"N	79° 33' 02.73"E
2	11° 44' 51.63"N	79° 32' 52.27"E	17	11° 44' 59.35"N	79° 33' 02.73"E
3	11° 44' 51.69"N	79° 32' 52.18"E	18	11° 44' 59.28"N	79° 33' 03.38"E
4	11° 44' 52.19"N	79° 32' 52.11"E	19	11° 44' 56.45"N	79° 33' 03.22"E
5	11° 44' 53.69"N	79° 32' 52.03"E	20	11° 44' 55.74"N	79° 33' 03.19"E
6	11° 44' 53.45"N	79° 32' 54.07"E	21	11° 44' 54.51"N	79° 33' 03.08"E
7	11° 44' 54.38"N	79° 32' 54.15"E	22	11° 44' 52.78"N	79° 33' 02.72"E
8	11° 44' 54.81"N	79° 32' 54.21"E	23	11° 44' 53.19"N	79° 32' 59.08"E

9	11° 44' 55.48"N	79° 32' 54.28"E	24	11° 44' 52.79"N	79° 32' 59.03"E
10	11° 44' 55.66"N	79° 32' 54.31"E	25	11° 44' 52.87"N	79° 32' 58.22"E
11	11° 44' 55.46"N	79° 32' 56.83"E	26	11° 44' 49.52"N	79° 32' 57.87"E
12	11° 44' 58.55"N	79° 32' 57.25"E	27	11° 44' 49.82"N	79° 32' 55.94"E
13	11° 45' 00.50"N	79° 32' 57.51"E	28	11° 44' 50.18"N	79° 32' 55.97"E
14	11° 45' 00.41"N	79° 32' 58.94"E	29	11° 44' 50.20"N	79° 32' 53.66"E
15	11° 45' 01.01"N	79° 32' 59.01"E			

Please refer Quarry Lease Plan - Plate No. II.



3.0 GEOLOGY AND RESERVES

3.1 PHYSIOGRAPHY:

The area is almost an undulated terrain. The general drainage pattern of the area is dendritic pattern. Only mining activity is being carried out in and around the area. In some areas agriculture is done with lift irrigation. The main crops being millet, paddy, pulses etc. are grown as seasonal crops. There is no Forest or Animal Sanctuaries near the area. There is no thick vegetation. Water table is found at a depth of 50m. The area exhibits a subtropical climate and the temperature that goes upto 42°C in summer and falls down to 25°C in December – January. The wind direction is NE-SW and vice-versa. Average annual rainfall is about 985mm in Northeast and Southwest monsoon season.

3.2 REGIONAL GEOLOGY, LOCAL GEOLOGY & GEOLOGICAL SUCCESSION:

The main rock formations met in the area are sandstone and clay. They are grouped under Middle Miocene to Lower Pleistocene formations of Tertiary.

Sandstone:

The sandstone which are Tertiary in age (generally designated as Cuddalore sandstone) are fresh water sediments transported and deposited over the Archean base. They are overlain by alluvium and coastal sands. The general strikes of the formation is North – South. They have a gentle easterly or E.S.E. dip, 2° to 5°. The well-developed current bedding stand evidence to the shallow nature of the basin with fluctuating currents. Thin beds of grits made of well-rounded quartz pebbles prove that the sediments should have been transported over a fairly long distance from the place of the origin.

The sandstone is generally coarse grained, brownish or reddish in colour and soft and gritty. They are made up of grains of quartz and partially altered feldspars with layers of well-rounded pebbles of quartz. The thickness of sandstone varies from 5 to 20m, sand likely to increase further down.

The Tertiary sandstone is cut by prominent vertical joints in the north-south directions and less prominent joints in the east-west directions. These may be attributed to the compaction of beds and also their uplift. The numerous streams and gullies in the area have taken advantage of the joint pattern to cut deep ravines in the sandstones.

Fireclay:

The clays around Panikankuppam hamlet and west of the area are free from major contaminations and are generally white, pale grey in colour, whereas the clay found east of the area towards Cuddalore are highly contaminated with ferruginous impurities and are generally buff to yellowish in colour. The latter type unlike the former may not be able to withstand high temperature and may be of low fusing type.

The clay bed occurs as flat lensoid bodies ranging in thickness from 1.5 to 6.0m, it occurs discontinuously and are found to pinch and roll in thickness. The variation in the level as well as in thickness of the clay deposit appears to be due to the uneven nature of the floor of the basin in which they were deposited. Also, the fact that the basin was the shallow coastal one subjected to strong currents and floods which could produce such depressions in the floor of the basin where the fire clay particles could settle down, explain the discontinuous and irregular nature of the clays.

The clay beds are arranged roughly in Northeast – Southwest direction from Karukkal in the South west of Cuddalore over within the Tertiary beds near Neyveli also. There are two clay beds in Neyveli, one about 22m below the surface and the other about 73m below ground level (at bottom of the lignite bed). The clay beds of Panruti area may be correlated to the top bed of Neyveli area.

Samples collected from the lease area have analysed high alumina and low iron, which make the clay useable for stoneware manufacture. Alumina is in the range of 21.55 to 30.57 and iron from 3.0 to 4.7. There is wide variation in the grade and the quality of clay deteriorates from West to East.

The clay deposit belongs to the transported type and carry small amounts of quartz and sand particles while in others it is comparatively free. The clay in general is white or buff coloured. As already referred the general quality of clay is not uniform throughout the area. It deteriorates gradually from West to East. Clay has high alumina and low iron which is very much suitable for manufacturing stoneware pipes.

Clays are generally underlain by a thin layer of pink lithic materials which on chemical analysis was found to contain small quantity of iron in ferrous state. The ferrous iron may perhaps be considered responsible for the brown colourisation in the stoneware pipes manufactured. There are no intrusions in the clay and no waste rock is encountered mixed with clay. It is pure and useable as such.

The fire clay is overlain by a thick bed of red soil having thickness ranging from 1.5 to 13.2m. This soil is soft in nature and can be dozed off.

The general succession of the rock types is as follows:

Brown sandy clay/soil	-	Pleistocene to recent
Laterite/Gravel/Boulder bed	-	Tertiary
Sands Stone/Clay/Shale	-	Upper Gondwana
Charnockite and gneiss	-	Archean

The physical attitude of the clay deposit and limits of the pit, which occur in the area are demarked as follows:

		Pit-I	Pit-II
Length (m)	-	243	165
Width (m)	-	189	120
Depth (m)	-	5.5m with average topsoil 1.5m	
Strike direction	-	NE - SW	
Dip Amount & Direction	-	NW15°	

Major geological disturbances are totally absent in this area. Recovery of minerals is estimated as 100% of the total excavation of the ore body.

The recovery percentage is based on the knowledge gained from the working quarry in this belt also it is an existing quarry. The average chemical analysis of fireclay sample is given below (Refer Annexure No. X):

Table-6

Fireclay	
Parameters	Composition %
Al ₂ O ₃	22.35
SiO ₂	60.25
Fe ₂ O ₃	0.78
CaO	1.34
MgO	1.29
Na ₂ O	0.10
K ₂ O	0.07
LOI	13.00
TiO ₂	0.08

Study of petrographic characters of rock and study of useful minerals:

The clays are white to pale brown in colour and show the frequent occurrence of alternate bands of red and reddish-brown lamina. Less frequent interlayers of thin to thick ferruginous siltstone are also present. These observations indicate the influence/existence of seasonal floods that brought in a significant detrital influx to the depo-center of this member, although this member was deposited in deeper regions of the basin (regions far below the base of a storm weather wave).

The prevalence of a faulted basin topography which might have hosted a narrow shelf and a sudden steep slope could explain the bypassing of silts and sands to the basinal setting.

3.3 DETAILS OF EXPLORATION:

Already Carried Out:

The area has been already regionally explored by Geological Survey of India (1985), State Department of Geology and Mining (1993).

Based on the existing pit with following dimension is [102m x 117m x 5m (d)], the Qualified Person made a detailed geological study of the area and demarcated clearly the Fireclay deposit with a mine surveyor.



Proposed to be carried out:

Since, the existing pit and Geological investigations evidences sufficient data, no further exploration is proposed during the Mining plan period.

Future Programme of Exploration:

No trial pits, Trenches and Boreholes are proposed during the present plan period.

3.4 METHOD OF ESTIMATION OF RESERVES:

The quarry lease applied area is an undulated terrain. The estimation of mineral reserves is done by cross sections method. For Reserve calculation the length and width of the deposit is shown in the Geological plan & cross sections (Please Ref. IV & V). The recovery percentage of Fireclay in this mine is 100% which is well inferred knowledge gained by the adjacent quarry in this belt and also by the field tests carried out in the lease applied area and analysis done in NABL Laboratories. The bulk density has been reckoned as 1.75.

Clay below Al_2O_3 less than 20%, Fe_2O_3 more than 3.5% and CaO less than 0.7% is considered as waste.

The geological plan demarcating the commercially viable Fireclay body has been prepared in 1:1000 scale (Plate No. IV). Totally four sections have been drawn, two sections are drawn along the strike direction as (X-Y) & (X1-Y1) Length wise and other two sections are drawn Perpendicular to strike as (A-B) & (C-D) Width wise which is suitably chosen to cover the maximum area, in the scale of Horizontal 1:1000 & Vertical 1: 100 respectively (Plate No. IV-A).

The details of estimation of geological resources and mineable reserves with reference to the geological plan & cross section and Conceptual Plan & Section as shown in (Plate No. IV, IV-A, IX & IX-A).

Table-7

Depth of estimation of the reserves and resources during the present mining plan period

5.5m [1.5m Topsoil + 4m Fireclay]	(XY-AB Section) Northern side from RL 65.0m to RL 60.5m & Southern side from RL 68.0m to RL 63.5m
	(X1Y1- CD Section) Northern side from RL 64.0m to RL 58.5m & Southern side from RL 63.0m to RL 57.5m

No trial pits, Trenches and Boreholes are proposed during the present plan period.

3.5.1 GEOLOGICAL RESOURCES:

Maximum Length : 243m (max)
 Maximum Width : 189m (max)
 Maximum Depth : 5.5m [1.5m Topsoil + 4m Fireclay]

Table-8

Geological Resources

Section	Bench	L (m)	W (m)	D (m)	Volume (cum)	Bulk density	ROM (Ts)	Clay Recovery @100% (Ts)	Topsoil (Ts)
XY-AB	I	243	189	1.5	68890.5	2	-	-	137781
	II	243	189	1.5	68890.5	1.75	120558.38	120558.38	-
	III	243	189	1.5	68890.5	1.75	120558.38	120558.38	-
	IV	243	189	1	45927	1.75	80372.25	80372.25	-
Total							321489	321489	137781
X1Y1-CD	I	63	8	1.5	756	2	-	-	1512
	II	67	10	1.5	1005	1.75	1758.75	1758.75	-
	III	98	40	1.5	5880	1.75	10290	10290	-
	IV	100	43	0.5	2150	1.75	3762.5	3762.5	-
Total							17325	17325	-
Grand Total							33136.25	33136.25	1512
							354625.25	354625.25	139293

Total Geological Resources ROM

= 3,54,625.25 Ts

Total Recoverable Reserves @100% (Fireclay)

= 3,54,625.25 Ts

Topsoil

= 1,39,293 Ts

The Geological resources computed based on the geological cross sections up to the economically workable depth of 5.5m [1.5m Topsoil + 4m Fireclay] below from the ground profile at the rate of 100% recovery (Fireclay) yields 3,54,625.25Ts and 3,54,625.25Ts of ROM. The total geological resources are computed as 5.5m depth for economically viable at present market scenario.



3.5.2 MINEABLE RESERVES:

The available mineable reserves are calculated by deducting safety distances and bench loss.

Maximum Length : 183m (max)
 Maximum Width : 173m (max)
 Maximum Depth : 5.5m [1.5m Topsoil + 4m Fireclay]

Table-9

Mineral Reserves

Section	Bench	L (m)	W (m)	D (m)	Volume (cum)	Bulk density	ROM (Ts)	Clay Recovery @100% (Ts)	Topsoil (Ts)
XY-AB	I	183	173	1.5	47488.5	2	-	-	94977
	II	179	168	1.5	45108	1.75	78939	78939	-
	III	176	165	1.5	43560	1.75	76230	76230	-
	IV	173	162	1	28026	1.75	49046	49046	-
Total							204215	204215	94977
X1Y1-CD	III	31	28	1.5	1302	1.75	2278	2278	-
	IV	31	29	0.5	449.5	1.75	787	787	-
	IV	95	106	0.5	5035	1.75	8811	8811	-
Total							11876	11876	-
Grand Total							216091	216091	94977

Total Mineable Reserves ROM = 2,16,091 Ts
 Total Recoverable Reserves @100% (Fireclay) = 2,16,091 Ts
 Topsoil = 94,977 Ts

Mineable reserves have been computed as 2,16,091Ts at the rate of 100% recovery and 2,16,091Ts of ROM (under a bench depth of 5.5m [1.5m Topsoil + 4m Fireclay]). The mineable reserves are calculated by deducting the mineral locked up area under safety distance and bench loss. Hence the remaining area is taken for calculation of mineable reserves up to 5.5m depth (Refer plate No. IV).



4.0 MINING:**4.1 SALIENT DESCRIPTION OF THE PRESENT MINING METHODS:**

The mining is proposed carried out with simple opencast mining method; excavator with low capacity will be deployed for the loading and development activities and by engaging labours with help of crow bars, hand shovel, pick-axes and cane baskets. The excavator will be utilized for breaking the hard strata like Sandstone and Grit with the help of Rock Breaker for removing the overburden only since no deep hole drilling or blasting is carried out.

The operation will be confined to general shift only i.e., from 8.00 AM to 5.00 PM with one hour lunch interval between 12.00 noon and 1.00 PM.

The Topsoil as a thickness of 1.5m, first bench in Topsoil is formed with 1.5m height and width and face kept at 45° slope. In mineral two benches are maintained with 1.5m height and width and one bench is maintained with 1m height and width with 60° slope. (Refer Plate No. V).

During the present mining plan period, the advancement of the pit will be from the center and Eastern side of the quarry lease area and progress towards Northern side of the lease area upto 5.5m [1.5m Topsoil + 4m Fireclay] [(XY-AB Section) Northern side from RL65.0m to RL60.5m & Southern side from RL 68.0m to RL 63.5m & (X1Y1- CD Section) Northern side from RL 64.0m to RL 58.5m & Southern side from RL 63.0m to RL 57.5m]. During the present scheme period, the quarry operations are proposed to be carried out in from 1st bench to 3rd benches.

Average annual production is about 19,722 tonnes of ROM with 98,611Ts refractory grade (100% of ROM) with 300 working days in a year.

The Overburden is Topsoil. During the mining plan period the generated topsoil will be separately preserved as temporary soil dump on the Northern side with maximum dimension of (L)150m x (W)23m x (H) 13.76m and it will be backfilled in the quarried out pit during the 5th year.

Proper foot paths, ramps etc., will be established between benches for easy access of men and transport of waste and mineral.

Haul roads with ramps consisting safety gradients are formed and transport of waste and mineral.

If there is any considerable increase or decrease in the recovery factor a Modified Mining Plan will be prepared and submitted to relevant authorities for subsequent clearance and approval.

4.2 YEAR WISE DEVELOPMENT AND PRODUCTION FOR THE FIRST FIVE YEARS:

Maximum Length : 183m (max)

Maximum Width : 173m (max)

Maximum Depth : 5.5m [1.5m Topsoil + 4.0m Fireclay] *(3.5m depth of fire clay already excavated)

Table-10

Years	Section	Bench	L (m)	W (m)	D (m)	Volume (cum)	Bulk density	ROM (Ts)	Clay Recovery @100% (Ts)	Topsoil (Ts)
I Year	X1Y1-CD	III	31	28	1.5	1302	1.75	2278	2278	-
		IV	31	29	0.5	449.5	1.75	787	787	-
		IV	95	106	0.5	5035	1.75	8811	8811	-
		I	32	173	1.5	8304	2	-	-	16608
	II	28	168	1.5	7056	1.75	12348	12348	-	
	Total							24224	24224	16608
II Year		I	42	173	1.5	10899	2	-	-	21798
		II	42	168	1.5	10584	1.75	18522	18522	-
		Total							18522	18522
III Year	XY-AB	I	42	173	1.5	10899	2	-	-	21798
		II	42	168	1.5	10584	1.75	18522	18522	-
		Total							18522	18522
IV Year		I	42	173	1.5	10899	2	-	-	21798
		II	42	168	1.5	10584	1.75	18522	18522	-
		Total							18522	18522
V Year		I	25	173	1.5	6487.5	2	-	-	12975
		II	25	168	1.5	6300	1.75	11025	11025	-
		III	18	165	1.5	4455	1.75	7796	7796	-
		Total							18821	18821
Grand Total								98611	98611	94977



Table-11
Summary of yearwise 1st to Vth Year

Years	ROM (Ts)	Clay Recovery @100% (Ts)	Topsoil (Ts)
I YEAR	24224	24224	16608
II YEAR	18522	18522	21798
III YEAR	18522	18522	21798
IV YEAR	18522	18522	21798
V YEAR	18821	18821	12975
Total	98611	98611	94977



Total ROM	=	98,611 Ts
Total Recoverable Reserves @100% (Fireclay)	=	98,611 Ts
Topsoil	=	94,977 Ts

The year wise quantum of work proposed and the details of estimation of production quantity and generation of waste are furnished with reference to 5 years wise development plan (Plate No. V).

The average annual production for the first five years which is about 19,722 Ts @100% recovery.

4.3 PROPOSED RATE OF PRODUCTION WHEN THE MINE IS FULLY DEVELOPED:

The proposed rate of production and expected life of quarry will be discussed after carrying out the future exploration studies which would be proposed in ensuing plan period, the mineral resource and reserves as per the UNFC norms will be reassessed accordingly and the same will be discussed in the ensuing plan for subsequent clearance and approval.

4.4 MINEABLE RESERVES AND ANTICIPATED LIFE OF MINE:

Available mineable reserves as on 29.03.2023

Total Mineable Reserves @ 100%	= 2,16,091 tonnes
Proposed annual production @ 100%	= 19,722 tonnes
Anticipated life of the mine	= 2,16,091 / 19,722
	= 11 years

An optimum depth of 5.5m [1.5m Topsoil + 4m Fireclay] has been established as economically viable depth for the safe and scientific quarrying. The Mineable Reserves are calculated by excluding the quarry loss due to formation of benches with suitable height & width, ultimate depth of quarry, the Mineral Reserve held up within the safety distances all along the lease boundary.

The Mineable Reserves @100% for this Fireclay quarry is thus arrived as **2,16,091 Ts** from ROM **2,16,091 Ts** for an assumed depth of 5.5m [1.5m Topsoil + 4m Fireclay].

The average production of Fireclay from this quarry is 19,722 Ts per year (100%) and Mineable recoverable reserves 2,16,091 Ts considering at the rate of 100% recovery for the entire life of the quarry.

Based on the above, and taking into consideration of the available Mineable reserves, **the life of quarry will be about 11 years** (considering 5.5 meters depth at present scenario) at 100% recovery, if the quarry is being worked continuously with an average annual production of 19,722 Ts per year. The life of the quarry may extend after carrying out the detailed exploration which is likely to be carrying out in the ensuing plan period. The Exact life will be discussed in the ensuing mining plan. This calculation is based on the plan approved by Director of Mines Safety leaving Benches and Safety barriers.

4.5 CONCEPTUAL MINING PLAN

Conceptual mining plan is prepared with an object of long-term systematic development of benches; lay outs, selection of permanent ultimate pit limit, depth of mining and ultimate pit, selection of sites for construction of infrastructure, etc.,

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

The ultimate pit dimension of the quarry is given below.

ULTIMATE PIT DIMENSIONS

Table-12

Description	Dimension in mts (max)	
	At the end of life of Quarry (max)	
	XY-AB	X1Y1-CD
Length (m)	183	102
Width (m)	173	111
Depth (m)	5.5	5.5

However, during extraction of minerals each bench will be of 1.5 mts height with 60° slope for proper benches. The quantum of excavation is estimated to be 19,722Ts per year of ROM for depth of 5.5m [1.5m Topsoil + 4m Fireclay]. The overburden is estimated as 94,977Ts and recoverable reserves as 2,16,091Ts.

The life of the quarry may extend after carrying out the detailed exploration which is likely to be carrying out in the ensuing plan period. The Exact life will be discussed in the ensuing plan period. During the mining plan period the generated topsoil (94,977m³) will be separately preserved as temporary soil dump on the Northern side with maximum dimension of (L)150m x (W)23m x (H) 13.76m and it will be backfilled in the quarried out pit during the 5th year.

4.6 METHOD OF MINING

The lease applied area is proposed to work in opencast method. The proposal of mining is started from the center and South portion of the lease applied area starting from South and progress towards North side.

4.7 EXTENT OF MECHANIZATION:

The mining is carried out with simple opencast mining method; excavator with low capacity will be deployed for the loading and development activities and by engaging labours with help of crow bars, hand shovel, pick-axes and cane baskets. No drilling and blasting is carried out. Loading is carried out manually and also by excavator and transportation of mineral from the mine to the plant is done by hired tippers.

Details of hauling/transport equipment:

Table-13

S. No.	Type	Nos	Capacity	Make	motive Power
1.	Excavator	1	0.5 m ³	TATA Hitachi	Diesel Drive
2.	Tipper	2	10 tons	Tata	Diesel Drive

The machineries are deployed for quarrying of fireclay, tippers of 10/5 tonnes capacity are used for transporting the ROM from the pit head to processing plant, excavator with low capacity will be deployed for loading and development activities.

The above machineries are adequate to meet out the simultaneous development and production schedule drawn out in this plan of quarrying.

5.0 BLASTING:

No Drilling and Blasting. Excavator with low capacity will be deployed for the loading and development activities to win the mineral, The excavator will be utilized for removing the overburden only since no deep hole drilling or blasting is carried out. Hence the Blasting is not applicable.

6.0 MINE DRAINAGE:**a) Elevation of the Area and Water Table Fluctuation:**

The area is an undulated terrain gentle slope towards South; the rainwater will not affect the mining processes.

If raining, the rainwater will go to the nearby wells located in adjacent fields in all directions.

The water table is touched at a depth of 50m. The water table fluctuation is verified by observing the water levels in the above seasons in the nearby wells.

There will be no effluent discharge from quarry as Fireclay is not toxic. The Fireclay mineral consisting of no chemical effluent and toxic elements. Hence the quality of water would not be affected by mining activities.

b) Depth of Working:

The working in Fireclay deposit proposed to reach a depth of 5.5 meters from general ground level.



c) Quantity and Quality of Water Likely to be encountered:

In the entire lease period, the water table will not pose any problem. However, to deal with storm water and seepage water, a diesel pump of 5.H.P capacity is proposed.

7.0 STACKING OF MINERAL WASTE AND DISPOSAL OF WASTE**i) Nature of Quality of Topsoil:**

The topsoil is reddish gravelly in nature. It occurs to a depth of (avg) 1.5m.

ii) Nature of Over Burden:

The over burden is a red gravelly soil having thickness of 1.5m of the applied area.

**Proposed generation of Topsoil for First Five years:**

Table-14

Years	Topsoil (Ts)
I YEAR	16608
II YEAR	21798
III YEAR	21798
IV YEAR	21798
V YEAR	12975
Total	94977

iii) Nature of Waste:

The entire lease applied area consists of Fireclay deposit with 100% recovery. Except overburden there is no generation of waste in this quarry.

iv) Nature of Rejects likely to generate during first five years:

The entire lease applied area consists of Fireclay deposit with 100% recovery. Hence, generation of waste in this quarry does not arise.

v) Sub Grade Mineral:

There is no sub grade mineral in this quarry.

vi) Land Chosen for Disposal of Waste / Manner of Disposal of Waste / Yearwise:

There is no generation of Mined waste in the lease area, hence waste management and disposal of waste does not arise.

vii) Manner of Disposal of Waste:

There is no generation of Mined waste in the lease area, hence waste management and disposal of waste does not arise.

Except topsoil there is no waste anticipated during the entire life of quarry. About 94,977 Ts of Topsoil that will be separately preserved as temporary soil dump on the Northern side with maximum dimension of (L)150m x (W)23m x (H) 13.76m and it will be backfilled in the quarried out pit during the 5th year.

8.0 USE OF MINERAL:**a) End Use of Mineral:**

The fire clay is used in ceramic industries for manufacturing of Porcelain tiles, ceramic tiles and Stone ware pipes. The mined out clay will be sold out to the nearby ceramic manufacturing industry.

Chemical Specifications:

Al_2O_3 : 22.35%

Fe_2O_3 : 0.78%

Physical specification:

Colour : Pale brown

Details of Blending:

The mined out Fireclay will be directly sold out to the nearby ceramic manufacturing industry. Hence, blending of ore does not arise.

a) ii) Captive Consumption:

Non-Captive.

b) iii) Export or Industrial use:

The mined out clay will be sold out to the nearby ceramic manufacturing industry, hence export of mineral does not arise.

9.0 SITE SERVICES:

Site services in the form of office, storeroom, first aid room, restroom, toilet etc. are proposed to be constructed in semi-permanent structures within the lease applied area. Please refer Plate No. VI.



10.0 EMPLOYMENT POTENTIAL:

The following manpower is proposed for the Fireclay quarry to carry out the day-to-day quarrying activities aimed at the proposed production target and also to comply with the statutory provisions of the metalliferous mines regulations, 1961.

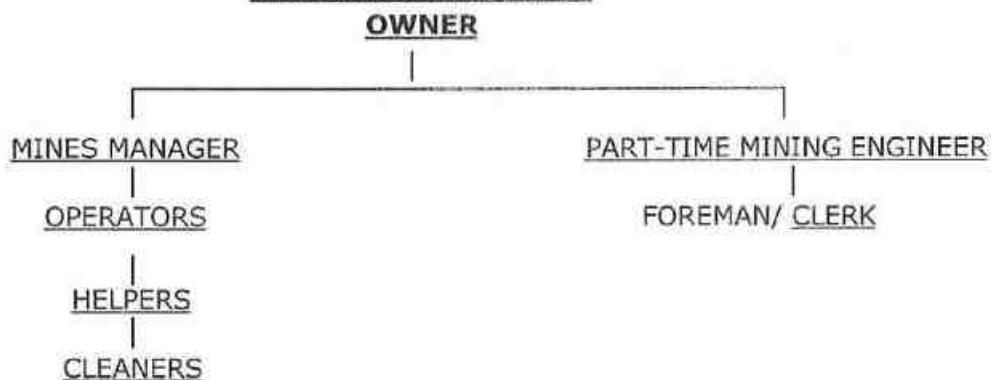
- | | | |
|---|---|---|
| 1. Mines manager (with valid statutory qualification) | : | 1 |
| 2. Mines mate (with valid statutory qualification) | : | 2 |
| 3. Machinery operators (Certified) | : | 2 |

WORKERS:

- | | | |
|-------------------|---|-----------|
| a. Skilled labour | : | 4 |
| b. Semi-skilled | : | 2 |
| c. Unskilled | : | 3 |
| Total | : | 14 |



The above manpower is adequate to meet out the production schedule and the machinery strength envisaged in the mining plan and also to comply with the statutory provisions of the Mines Safety Regulations.

ORGANISATION CHART

The proposed output per man shift:

Table-15

Average ROM Production expected per year for the first five years		24,735 Ts	
No. of days likely to be worked		300 days	
Average ROM production per day under UNFC 111 for insitu deposit		82 Ts	
OMS =	Daily Production	82	= 6 Ts
	No. of Workers	14	

The above manpower is adequate to meet out the production schedule and the machinery strength envisaged in the mining plan and also to comply with the statutory provisions of the Mines Safety Regulations.

11.0 ENVIRONMENTAL MANAGEMENT PLAN:**A. BASELINE INFORMATION:**

The following observations are made for environmental management plan.

i) Existing Land Use Patterns:

The area is an undulated terrain. The altitude of the area is 65Mts above MSL. The area is sloping towards South.

It is a dry, unirrigated land. Only seasonal cultivation is done. In some areas, agriculture is done with lift irrigation. The main crops being groundnut, maize, etc.

**ii) Water regime:**

Water table is found at a depth of 50m. Average annual rainfall is about 985mm during NE monsoon. The working in Fireclay deposit proposed to reach a depth of 5.5meters from general ground level.

There will be no effluent discharge from mine, Fireclay is not toxic. The Fireclay mineral consisting of no chemical effluent and toxic elements. Since, the quality of water would not been affected by mining. The mine waste will not produce any toxic effluent.

iii) Flora and Fauna:

There is no thick vegetation except some bushes here and their and no existence of fauna.

iv) Quality of Air, Ambient Noise Level and Water:

Villagers use open well water for drinking and other domestic purpose for ages without any adverse health effects. The mining is carried out with simple opencast mining method; excavator with low capacity will be deployed for the loading and development activities and by engaging labours with help of crow bars, hand shovel, pick-axes and cane baskets. The excavator will be utilized for breaking the hard strata like Sandstone and Grit with the help of Rock breaker for removing the overburden only since no deep hole drilling or blasting is carried out; hence noise will be with permissible limit.

v) Climatic conditions:

The area receives rain during NE monsoon. Water table is found at a depth of 50m. The area exhibits a subtropical climate and the temperature that goes upto 42°C in summer and falls down to 25°C in December – January. The wind direction is NE-SW and vice-versa. Average annual rainfall is about 985mm in northeast and southwest monsoon season.

vi) Human settlement:

The hamlets in an around the mining lease applied area are:

Table-16

S. No	Name of the Village	Direction	Approximate Distance	Approximate Population
1.	Panikankuppam	Northeast	2km	4,000
2.	Melamambattu	Southeast	3km	4,000
3.	Maligam Pattu	Southwest	3km	4,000
4.	Anguchettipalayam	Northwest	4km	8,400

**vii) Public buildings, Monuments and Places of Worships:**

There is no public building, places of worship or archaeological or national monuments near the area.

viii) Weather the area falls under notified area under water act, 1974:

The area falls under notified area under water Act, 1974.

B. ENVIRONMENT IMPACT ASSESSMENT:

Mining in this area does not produce any harmful effluent, which will affect the atmosphere or water regime. However, the important factors in the Environment impact assessment statement include,

i) Land

The area is an undulated terrain surrounded by dry lands, there is no thick vegetation or population in and around the Quarry.

ii) Air Quality:

Air Quality impact will be minimal due to periodical water sprinkling will be proposed in the haul road and mine pit, hence generation of dust is very minimal. During the quarry operations, excavators with low capacity will be deployed for bench formation purposes and for loading. There is no proposal for drilling and blasting, hence impacts on Air quality will be minimal and well within the prescribed standards. It is proposed to carry out the air quality monitoring as per the statutory standards.

iii) Water Quality:

The proposed quarry operation does not intersect the water table. If rain water enter in to the pit the same will be drained out by 5HP motor pumps in the constructed garland drain with check dam to the settling tank and the same will be disposed to the nearby water body.

iv) Noise Levels:

The mining activity is proposed to be carried out in the soft fire clay beds with simple opencast mining; excavator with low capacity will be deployed for the loading and development activities. The excavator will be utilized for breaking the hard strata like Sandstone and Grit with the help of Rock breaker for removing the overburden only since no deep hole drilling or blasting is carried out; hence noise level is minimal in the quarry.

v) Vibration levels:

The mining activity is proposed to be carried out in the soft fire clay beds with simple opencast mining; excavator with low capacity will be deployed for the loading and development activities. The excavator will be utilized for breaking the hard strata like Sandstone and Grit with the help of Rock breaker for removing the overburden only since no deep hole drilling or blasting is carried out; hence vibration is minimal in the quarry.

vi) Water Regime:

There are no surface water bodies nearby this area. Mining operation will not produce any toxic effluent in the form of liquid. There will be no chance for ground water pollution. The area is small. Mining will not reach such a depth whereas no depression in water table will be created. Hence, the impact will be nil.

vii) Socio-Economics:

As the mining activity is done manually, several unskilled persons get self-employment. Due to this mining activity, tea shops, Food court, workshops, et., will come up in this area. The mining provides self-employment and business opportunities to those persons. Since, economical status of the local peoples will improve due to this project.

viii) Historical and Monuments:

There is no public building, places of worship or archaeological or Historical monument situated within 300m radius of the area. Hence, question of damage due to blasting or any other cause does not arise.

C) ENVIRONMENT MANAGEMENT PLAN:**i) Temporary storage of Topsoil and Utilization of Topsoil:**

The topsoil is reddish gravely in nature. It occurs to a depth of (avg) 1.5m from the surface. About 94,977Ts of Topsoil will be generated during the present mining plan period the same will be separately preserved as temporary soil dump on the Northern side with maximum dimension of (L)150m x (W)23m x (H) 13.76m and it will be backfilled in the quarried out pit during the 5th year.

ii) Year wise proposal for reclamation of land affected by mining activities during and at the end of mining lease period:

The quarried out topsoil will be utilized for backfilling in the part of the pit during the fifth year. If unable to excavate the entire proposed mineral reserves during this plan period, the reclamation and rehabilitation will be discussed in the Final Mine Closure Plan.

iii) Abandonment of Quarries:

It is a fresh mining lease applied area. Hence, there is no proposal at present to abandonment the mine. When the entire mineral reserve would be exhausted, the mined-out pit will be partially backfilled with the preserved topsoil also tree sapling carried out over the backfilled area and remaining area will be utilized for water storage, the water storage will be kept as temporary reservoir for charging the nearby wells. Barbed wire Fencing will be constructed around the quarry to prevent inadvertent entry of public and cattle.

**iv) Programme of Afforestation:**

There is vast scope for planting trees in the non-mineralized area along the boundary barrier. Yearly 50 Neem/year will be planted along East and Southern boundary and the same will be watered and manured by a person appointed for this purpose.

Table-17

Year	No. of plantations	Survival rate (%)	Expected Survival	Area to be covered in sq.m	Type of species
I	50	80%	16	400	Neem
II	50	80%	16	400	Neem
III	50	80%	16	400	Neem
IV	50	80%	16	400	Neem
V	50	80%	16	400	Neem

v) Stabilization and Vegetation of Dumps:

First the Topsoil will be simultaneously backfilled in the quarried out pit and there is no generation of Mined waste in the lease area, hence waste dump at end of the life of the quarry does not arise. As shown the quarry layout and afforestation plan (Refer Plate No. VI).

vi) Measures to Control Erosion / Sedimentation of Water Course:

Construction of Garland drain with check dam, settling tank will be constructed around the quarry to prevent erosion / sedimentation during rainy season. The mining operation is proposed to carry out upto a depth of 5.5mts in general from the ground level. Water table is found at a depth of 55m during summer and 50m during rainy season. The mining operation will not affect the quality of water. There is an Odai passing on the Southwest side of the lease applied area, a safety distance of 50m has been provided to the odai (Refer Plate No. II). There is no other major nullah, stream, river near the area. Hence, control measures for watercourse does not arise.

vii) Treatment and Disposal of water from Mine:

The quarry operation carried out only 5.5m depth and does not intersect the water table and this fire clay quarry operation not required huge volume of water. Since mining operation does not generate any harmful waste, question of treatment and disposal of water from mine does not arise. If Rain water will accumulate the quarry pit the same will be drained out to the nearby water body with 5HP motor pumps after settling of dust particles through the proper Settling Tank.

**viii) Measures for Minimizing Adverse Effects on Water Regime:**

Mining operation will not reach water table, which will require pumping of ground water or lowering ground water table. Mining operation or mineral waste does not produce any harmful effluent in the form of liquid, which will affect the water regime.

ix) Protective Measures for Ground Vibrations:

The mining activity is proposed to be carried out in the soft fire clay beds with simple opencast mining; Excavator with low capacity will be deployed for the loading and development activities and also by engaging labours with help of spades, axes, shovels and loose tools are engaged. No drilling and blasting is carried out. Besides, the noise generated during the movement of machineries will be under control and vibration will be minimal and well within the prescribed limit. Any how:

- a) Row of trees with thick flora will be planned to act as acoustic barriers along the roadside and mine periphery.
- b) Ear muffs/ear plugs will be provided to workers at noise prone zone.
- c) A noise data will be maintained in future for all noise prone activities and noise.
- d) Measures for Protecting Historical Monuments.

There are no historical monuments in and around the mine area and hence protecting measures does not arise.

The human settlement is away from the mine lease applied area in the 5km Radius. Hence protecting measures does not arise. Socio economic benefits arising out of mining.

x) Socio Economic Benefits Arising out of Mining:

It is not applicable. No adverse changes are visualized in the traditional way on the habitants in the nearby villages.

D). MONITORING SCHEDULES FOR DIFFERENT ENVIRONMENTAL COMPONENTS:

Periodical Environment Monitoring, at least for one season, will be carried out for the following:

a. Air

Weather parameters like Temperature, Wind Direction, Relative Humidity and Rainfall will be monitored regularly.

**b. Noise**

Using sound pressure level meter, the sound level will be monitored once in a month to check that it is within the prescribed limits and efforts will be taken to keep it as low as possible.

c. Water

There is no effluent generation in the form of liquid or solid from the quarry. Odai is passing on the Southwestern side, a safety distance of 50m has provided to the Odai. There is no other major nullah, river near the area. Periodically water samples will be collected and analyzed as per statutory norms.

d. Land

As there is no waste generated in the lease area. The quarried out pit will be used for storing rainwater and proposed fencing will be made around the worked pits. The plantation of variety of trees is proposed to plant on the boundary barrier and non-quarrying areas. Afforestation will be carried out as discussed earlier. The green belt development will be closely monitored using parameters like no. of trees, soil quality, growth rate etc.

e. Monitoring Schedule

Environmental monitoring of Air Quality, Air pollution source, Water quality, Impact of noise, Impact of soil, Impact on flora and fauna. Degradation of land, Impact on Healthy, Safety and solid waste, Rehabilitation and Afforestation, Socio-economic factors etc., will be monitored by the Mines Manager/permit manager. He will keep a close watch on the performance of the pollution control equipment, emissions from the source and the quality of surrounding environment in accordance with the monitoring programme. He will also be responsible for the development and maintenance of green belt.

12.0 SAFETY AND SECURITY:

A security is present during the operation of the quarry and even after its closure, hence, there will not be any problem as applicant and his representation will continue to be available. To prevent inadvertent entry of public and for safety reasons a well-designed Iron Gate at the entrance, will be kept locked when there is no work in the quarry. In case of emergency Tele Phone No: 04329 228531 of T. Ravichandran, DGM (Tech) / Unit of Geo. & Env. may be contacted for immediate steps by the applicant.

Parapet walls have been constructed on all sides of the openings. Watchman has been posted round the clock.

In case of emergency, the jeep provided at the mine, will be used for transport of person etc. Hospital facilities are available in Panruti at a distance of 2km Northeast side from the lease applied area.

13.0 PROJECT COST:

Table-18

A. Fixed Asset Cost		
Sl. No	Description	Amount (Rs.)
1.	Labour Shed	1,00,000
2.	Sanitary Facility	70,000
3.	Fencing Cost [1300 m x Rs.300/-]	3,90,000
4.	Garland Drain Construction [1050 m x Rs.300/-]	3,15,000
Total Cost		8,75,000

B. Operational Cost		
Sl. No	Description	Approximate Cost Rs.
1.	Excavator, Tippers, crow bars, hand shovel, pick-axes and cane baskets (Rental basis)	15,00,000
2.	Drinking Water Facility	60,000
3.	Safety Kits	60,000
4.	Water Sprinkling	1,00,000
5.	Afforestation	50,000
Total Operational Cost		17,70,000

C. EMP Cost		
Sl. No	Description	Amount (Rs.)
1.	Water Quality test	90,000
2.	Air Quality test	2,60,000
3.	Noise level monitoring	10,000
4.	Ground Vibration monitoring	20,000
Total EMP Cost		3,80,000
TOTAL PROJECT COST (A+B +C)		30,25,000

The applicant indents to involve Corporate Environment Responsibility (CER) activity like providing R.O. Drinking water facilities & Garden Maintenance to nearby school, providing Greenbelt development in either side of the village roads and maintenance of village Pond, Lake etc., (after obtaining permission from the local authorities) at 2.0% from the total project cost, the cost would be around **Rs.61,000/-**

Total Project cost = Rs. 30,25,000/-

CER Cost (2.0%) = Rs. 61,000/-

Total Cost = Rs.30,86,000/-

(The Total cost of the project including EMP Cost is Rupees thirty lakh eighty-six thousand only).



14.0 PROGRESSIVE QUARRY CLOSURE PLAN:

14.1 INTRODUCTION:

The Progressive Quarry Closure Plan for Panikankuppam Fireclay Quarry, over an extent of 6.59.0 hectares in S.F.Nos.133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11 in Panikankuppam Village, Panruti Taluk, Cuddalore District, Tamil Nadu State has been prepared for **M/s. TANCEM Stoneware Pipe Factory**, (A Government of Tamilnadu Undertaking), Virudhachalam, Cuddalore District, Tamil Nadu State.

14.2 NAME AND ADDRESS OF THE APPLICANT:

Name and address of the Nominated Owner:

Name	:	Tvl. TANCEM Stoneware Pipe Factory, (A Government of Tamilnadu Undertaking)
Registered Office Address	:	5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.
Telephone Number	:	044 28525461, 28525471
Fax	:	044 28523991
Email	:	md@tancem.com, co@tancem.com
Website	:	www.tancem.in

Name and address of the Authorized Signatory:

Name of the applicant	:	Thiru.T.Ravichandran, DGM (Tech) / Unit Head, Tvl. Tamil Nadu Cements Corporation Limited., (A Government of Tamil Nadu Undertaking)
Address	:	Ariyalur Cements Works, Ariyalur-621 729, Ariyalur District, Tamil Nadu.
Telephone Number	:	04329 228531
Fax	:	04329 228776
Email	:	ari@tancem.com , acwmines@gamil.com

14.3 EXTENT OF LEASE APPLIED AREA:

S.F.Nos.	:	133/1A, 134/2, 134/3, 134/4, 134/5, 134/6, 134/7, 134/8, 134/9, 134/12, 135/3, 135/5, 135/6, 135/7, 135/8, 135/9, 135/10 & 135/11
Extent	:	6.59.0 Ha
Village	:	Panikankuppam
Taluk	:	Panruti
District	:	Cuddalore
State	:	Tamil Nadu
Ownership	:	Government lands

**14.4 PRESENT LAND USE PATTERN:**

The area granted for mining lease is a Government lands and is not covered in forest area category.

a) The present and post mining land use pattern is given as under:

Table-19

S. No	Description	Present Area(ha)	Area to be required at the present Mining Plan Period (ha)	Area at the end of life of quarry (ha)
1	Area under quarrying	1.02.5	3.27.3	4.29.8
2.	Dumps	Nil	*Nil	Nil
3.	Site Services	Nil	0.01.0	0.01.0
4.	Roads	0.03.0	0.02.0	0.05.0
5.	Green Belt	Nil	0.20.0	0.40.0
6.	Un utilized area	5.53.5	2.03.2	1.83.2
7.	Total	6.59.0	5.53.5	6.59.0

*Topsoil dump proposed on the Northern side, but it will be removed and utilized for backfilling during this plan period. Hence, waste dump area is not proposed in the land use pattern during this plan period.

b) The post mining land use and progress of reclamation of worked out pits in the quarry is given as under:

Table-20

Area already reclaimed (Ha.)	Area proposed for reclamation during present plan period (Ha.)	Area at the end of life of Quarry (Ha.)
Nil	1.30.0	1.30.0

14.5 METHOD OF MINING:

The mining is proposed carried out with simple opencast mining method; excavator with low capacity will be deployed for the loading and development activities and by engaging labours with help of crow bars, hand shovel, pick-axes and cane baskets. The excavator will be utilized for breaking the hard strata like Sandstone and Grit with the help of Rock breaker for removing the overburden only since no deep hole drilling or blasting is carried out.

The operation will be confined to general shift only i.e., from 8.00 AM to 5.00 PM with one hour lunch interval between 12.00 noon and 1.00 PM.

The Topsoil as a thickness of 1.5m, first bench in Topsoil is formed with 1.5m height and width and face kept at 45° slope. In mineral two benches are maintained with 1.5m height and width and one bench is maintained with 1m height and width with 60° slope. (Refer Plate No. V).

During the present mining plan period, the advancement of the pit will be from the center and Eastern side of the quarry lease area and progress towards Northern side of the lease area upto 5.5m [1.5m Topsoil + 4m Fireclay] [(XY-AB Section) Northern side from RL65.0m to RL60.5m & Southern side from RL 68.0m to RL 63.5m & (X1Y1- CD Section) Northern side from RL 64.0m to RL 58.5m & Southern side from RL 63.0m to RL 57.5m]. During the present scheme period, the quarry operations are proposed to be carried out in from 1st bench to 3rd benches.

Average annual production is about 19,722 tonnes of ROM with 98,611Ts refractory grade (100% of ROM) with 300 working days in a year.

The Overburden is Topsoil. During the mining plan period the generated topsoil (94,977m³) will be separately preserved as temporary soil dump on the Northern side with maximum dimension of (L)150m x (W)23m x (H) 13.76m and it will be backfilled in the quarried out pit during the 5th year.

Proper foot paths, ramps etc., will be established between benches for easy access of men and transport of waste and mineral.

Haul roads with ramps consisting safety gradients are formed and transport of waste and mineral.

If there is any considerable increase or decrease in the recovery factor a Modified Mining Plan will be prepared and submitted to relevant authorities for subsequent clearance and approval.

14.6 MINERAL PROCESSING:

No Mineral processing is involved.

14.7 REASONS FOR CLOSURE OF MINE:

It is a fresh Quarry lease. The reason for closure is too earlier discuss. The exploration was not carried out as per the UNFC Norms. The reason for closure will be discussed after the exploration program in the mining plan.

14.8 STATUTORY OBLIGATIONS:

Except general conditions, no special conditions were imposed while granting the precise area communication letter.

15.0 STATUTORY PROVISIONS:

This mining plan along with Progressive Quarry Closure Plan for Fireclay is prepared as per the Rules, 19 A and rule 41, 42 & 43 amendment by the Tamil Nadu Minor Mineral Concession Rules, 1959. The provisions of the Mines Act, Rules and Regulations and orders made there under shall be complied with, so that the safety of the quarry, machinery and person will be well protected. Permission, relaxation or exemption wherever required for the safe and scientific quarrying of the deposit will be obtained from the Department of Mines Safety. Any violation pointed out by the inspecting authorities shall be rectified as per the guidelines of the Department.

Signature of the Qualified Person



S. Prasad, M.Sc.,

Place: Salem

Date: 31.03.2023

h. 4/11/2023
23.11.2023

ADDITIONAL DIRECTOR

Department of Geology & Mining
Guindy, Chennai - 600 032.

23/11/2023

This Mining Plan is Approved
Subject in the Conditions/Stipulation
Indicated in the Mining Plan Approval

Letter No./3952/MM7/2020 Dated 23.11.2023

Topographical View and Environmental Status of the Lease Applied Area



Existing Quarry Pit in the Lease Applied Area







Industries, Investment Promotion &
Commerce (MMC.2) Department,
Secretariat, Chennai - 600 009.

Letter No. 3354387/MMC.2/2022 - 1, dated 18.09.2023

From
Thiru S.Krishnan, I.A.S.,
Additional Chief Secretary to Government.

To
M/s. TANCEM Stoneware Pipe Factory,
Vridhachalam,
Cuddalore District.

Sir,

Sub: Industries, Investment Promotion and Commerce
Department - Mines and Minerals - Minor Mineral - Quarry
Lease Application of M/s. TANCEM Stoneware Pipe Factory (a
unit of TANCEM), Cuddalore for quarrying Fireclay over an
extent of 6.59.0 hectares of Government lands in
S.F.Nos.133/1A (0.63.5 hectares), 134/2 (0.39.5 hectares),
134/3 (0.26.5 hectares), etc., in Panikankuppam Village,
Panruti Taluk, Cuddalore District - Precise Area
communicated - Approved Mining Plan and Environmental
Clearance Certificate - Requested - Regarding.

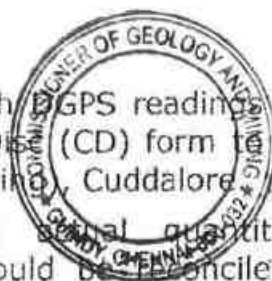
- Ref: 1. Your Quarry Lease application dated 05.02.2018.
2. From the District Collector, Cuddalore District, File
Rc.No.78/Mines/2018, dated 31.07.2020.
3. From the Commissioner of Geology and Mining, File
Rc.No.3952/MM7/2020, dated 12.10.2022.

I am directed to invite your attention to the references second and third cited wherein the District Collector, Cuddalore and the Commissioner of Geology and Mining have recommended your quarry lease application for quarrying Fireclay over an extent of 6.59.0 hectares of Government lands in S.F.Nos.133/1A (0.63.5 hectares), 134/2 (0.39.5 hectares), 134/3 (0.26.5 hectares), 134/4 (0.16.5 hectares), 134/5 (0.24.5 hectares), 134/6 (0.50.0 hectares), 134/7 (0.35.0 hectares), 134/8 (0.75.5 hectares), 134/9 (0.13.5 hectares), 134/12 (0.18.0 hectares), 135/3 (1.04.0 hectares), 135/5 (0.11.0 hectares), 135/6 (0.09.5 hectares), 135/7 (0.10.5 hectares), 135/8 (0.13.5 hectares), 135/9 (0.05.0 hectares), 135/10 (0.14.5 hectares), 135/11 (1.18.5 hectares) in Panikankuppam Village, Panruti Taluk, Cuddalore District for a period of

10 years under Rule 43 of the Tamil Nadu Minor Mineral Concession Rules, 1959.

2. In this connection, I am directed to inform that the above said area for quarrying Fireclay is approved as precise area by Government. Therefore, I request the applicant company to furnish an approved mining plan for the above said precise area by incorporating the following conditions to the Government through the Commissioner of Geology and Mining within a period of 3 months as per sub-rule 13 of Rule 19-A of the Tamil Nadu Minor Mineral Concession Rules, 1959:-

- i. A safety distance of 7.5 meters should be provided for the adjoining patta lands of the applied area.
- ii. A safety distance of 50 meters shall be provided and maintained to the odal situated in S.F.Nos.138 & 139 in the western side of the applied area.
- iii. A safety distance of 50 meters shall be provided and maintained to the road situated in the northern side of the applied area.
- iv. Quarrying operations shall be carried out without any hindrance to the adjacent lands and Public.
- v. Quarrying operations shall be carried out strictly in accordance with the Act and Rules.
- vi. Quarrying should be restricted within the lease granted area.
- vii. No quarry lease granted shall be renewed.
- viii. No mining Dues Clearance Certificate to be submitted before execution of lease deed as stipulated in Appendix-VIII of the Tamil Nadu Minor Mineral Concession Rules, 1959.
- ix. If any mineral other than the Fireclay is discovered while quarrying, the applicant/lessee shall not mine or dispose of such mineral and it should be intimated to Government within 30 days from the date of discovery of such new mineral(s) as per Rule 36(3) of the Tamil Nadu Minor Mineral Concession Rules, 1959.
- x. The applicant company should fence the lease granted area with barbed wire before the execution of lease deed as follows:-
 - a) The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
 - b) The applicant company shall incorporate the Differential Global Positioning System (DGPS) readings for the entire boundary Pillars of the area and the same should be clearly shown in the mining plan.



- c) A soft copy of the digitalized map with DGPS reading should be submitted in the Compact Disc (CD) form to the Assistant Director (Geology and Mining), Cuddalore.
- xi. Difference in seigniorage fee for the actual quantity transported (as per weighment slips) should be reconciled before 15th April of every year.
 - xii. A green belt should be constructed by planting trees along the boundary of the area to control air and noise pollution.
 - xiii. Consent from the Tamil Nadu Pollution Control Board should be obtained before commencement of quarrying operation.
 - xiv. If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules, 1959 and other rules and Act in force will attract.
 - xv. The mining lease holders shall, after mining operations undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna, etc.,.
 - xvi. The applicant company should ensure that all the quarry workers working under its control are registered in the Labour Welfare Board and also enrolled in the ongoing insurance scheme and to submit compliance report to the District Collector, Cuddalore District before execution of the lease deed.

3. I am also directed to request the applicant company to obtain and produce Environmental Clearance Certificate from the appropriate authority as per rule 42 of the Tamil Nadu Minor Mineral Concession Rules, 1959 for grant of quarry lease.

Yours faithfully,

J. Ramanan 18-1-23

for Additional Chief Secretary to Government

Copy to:

The Commissioner of Geology and Mining,
Guindy, Chennai - 600 032.

The District Collector,
Cuddalore District.

Lease Applied Area-

அளவுப்படிபடி. பின் 23

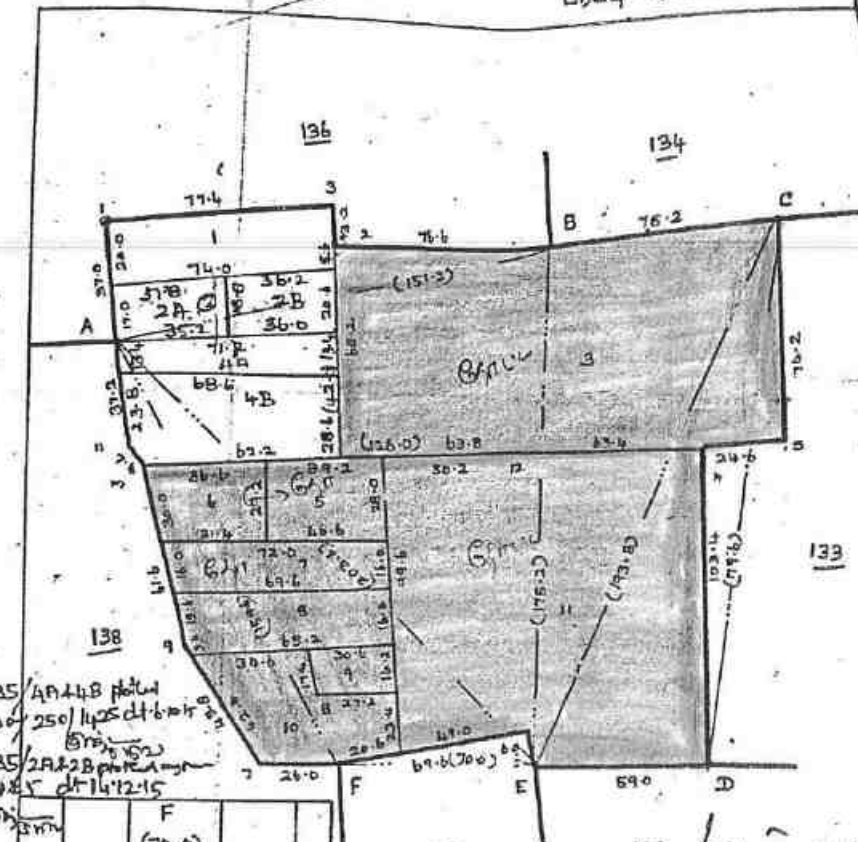
மாஸ்டர். திட்டம் தீர்மானம்

வட்டம். பண்ணை

எண். 57
சுரமம் பெயர்.

புல எண். 135

பரப்பு: ஹெக்டேர் 3



புல எண். 135/4A+4B பரப்பு
சுரமம் 250/1425 dt 6.12.15
மாஸ்டர்-135/2A+2B பரப்பு
புல எண். 135/430/1425 dt 14.12.15

138			139			132		
1	14.4	102.6	1	12.4	174.4	1	71.2	9.6
2	11.8	75.2	2	9.6	177.6	2	B	
3	37.0	1.4	3	26.2	58.8	3	A	
4		A	4	22.4	13.2	4	(203.6)	
5			5		F	5	51.2	
6			6			6	E	
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
16			16			16		
17			17			17		
18			18			18		
19			19			19		
20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		
32			32			32		
33			33			33		
34			34			34		
35			35			35		
36			36			36		
37			37			37		
38			38			38		
39			39			39		
40			40			40		
41			41			41		
42			42			42		
43			43			43		
44			44			44		
45			45			45		
46			46			46		
47			47			47		
48			48			48		
49			49			49		
50			50			50		
51			51			51		
52			52			52		
53			53			53		
54			54			54		
55			55			55		
56			56			56		
57			57			57		
58			58			58		
59			59			59		
60			60			60		
61			61			61		
62			62			62		
63			63			63		
64			64			64		
65			65			65		
66			66			66		
67			67			67		
68			68			68		
69			69			69		
70			70			70		
71			71			71		
72			72			72		
73			73			73		
74			74			74		
75			75			75		
76			76			76		
77			77			77		
78			78			78		
79			79			79		
80			80			80		
81			81			81		
82			82			82		
83			83			83		
84			84			84		
85			85			85		
86			86			86		
87			87			87		
88			88			88		
89			89			89		
90			90			90		
91			91			91		
92			92			92		
93			93			93		
94			94			94		
95			95			95		
96			96			96		
97			97			97		
98			98			98		
99			99			99		
100			100			100		

அளவு. 1 மீ. : 2000 மீ.கி

தயாரித்த
R. நான்
28.8
10.2

செய்த
1.1.2000
15/20
1.1.2000

Lease Applied Area-

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12
								கு.பெ. தொ. ஏ.ஸ். கு.பெ.			
132	9	255-2	ர	4	...	8-2	5	4 20	0 68.0	2 86	274 கு. கித்தே தரிபம்மாள் (1) ஆ. பெரியநாயகம் (2) ஆ. அருளப்பன் (3) டால்மியா சிமெண்ட் வரம்பு கூட்டமைப்பு டால்மியா (4)
									2 74.0	11 49	
133	1	260-1	ர	4	...	...	...	...	0 78.0	...	
	2	264 258-2	ர	4	...	8-2	5	4 20	0 17.0	0 71	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	3	-1	ர	4	...	8-2	5	4 20	0 16.0	0 67	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	4	-3	ர	4	...	8-2	5	4 20	0 19.0	0 80	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	5	-4	ர	4	...	8-2	5	4 20	0 16.0	0 67	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	6	-6	ர	4	...	8-2	5	4 20	0 60.0	2 52	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	7	260-2	ர	4	...	8-2	5	4 20	0 16.5	0 69	367 கு. சின்னப்பன்
	8	-3 -2 -3	ர	4	...	8-2	5	4 20	0 16.0	0 67	275 ஆ. யாசப்
	9	261	ர	4	...	8-2	5	4 20	0 16.0	0 67	276 ஆ. பெரியநாயகம்
	10	261	ர	4	...	8-2	5	4 20	0 18.0	0 76	276 ஆ. பெரியநாயகம்
	11	263	ர	4	...	8-2	5	4 20	0 61.5	2 58	48 டால்மியா சிமெண்ட் பாரத் வரம்பு கூட்டமைப்பு நிறுவனம் டால்மியா புரம்
	12	262-1	ர	4	...	8-2	5	4 20	0 07.0	0 29	271 ஆ. பெரியநாயகம்
	13	-2	ர	4	...	8-2	5	4 20	0 08.0	0 34	277 இ. அனாதலாஸ்
									3 49.0	11 37	
134	1	268-1	ர	4	...	...	...	...	0 33.5	...	...
	2	392 268-2	ர	4	...	...	...	...	0 39.5	...	...
	3	-5 269-1	ர	4	...	...	...	...	0 26.5	...	...
	4	-2	ர	4	...	...	...	...	0 16.5	...	...
	5	266-1	ர	4	...	...	...	...	0 34.5	...	...
	6	-2	ர	4	...	...	...	...	0 50.0	...	...

2-வது கட்ட

C. Jayaram
புதுச்சேரி சிமெண்ட்
பாண்டிச்சேரி - வட்டம்
கடலூர் - வட்டம்

8A 3379/143
ds 14/6/2021

3 2/10
21

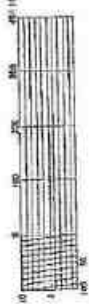
76. பணிக் குப்பம்																	
1	2	3	4	5	6	7	8	9	10	பை.							
134	7	266-3	சு	புற	...	...	...	...	0 35.0	...	...	...	...	...	...	...	வெட்டுக்குறி
	8	268-3	சு	புற	...	...	...	...	0 75.5	...	...	...	...	...	...	...	வெட்டுக்குறி
		-4															
		-6															
		-7															
		-8															
	9	-7	சு	புற	...	...	...	...	0 13.5	...	...	...	...	...	...	...	வெட்டுக்குறி
	(10)	267-1	சு	பு	...	8-2	5	4	20	0 96.5	4 05	278	அ. சேனாக்கால்				
		394															
	(11)	267-4	சு	பு	...	8-2	5	4	20	0 18.0	0 76	279	வ. பெரியநாயகம்				
										4 39.0	4 81						
135	1	272-2	சு	பு	...	8-2	5	4	20	0 15.0	0 63	280	கே. ராமையன்				
	2	-2	சு	பு	...	8-2	5	4	20	0 13.0	0 55	281	வா. குளப்பிச்சாலை (1) க. சத்தனம் (2)				
		-3															
	3	265-1	சு	புற	...	...	...	...	1 04.0	...	...	...	...	...	...	...	வெட்டுக்குறி
		-2															
		-3															
	(4)	278	சு	பு	...	8-2	5	4	20	0 27.5	4 15	299	கொ. தனக்கோடி				
	5	279-7	சு	புற	...	...	...	...	0 11.0	...	...	...	...	...	...	...	வெட்டுக்குறி
	6	-1	சு	புற	...	...	...	...	0 09.5	...	...	...	...	...	...	...	வெட்டுக்குறி
	7	-2	சு	புற	...	...	...	...	0 10.5	...	...	...	...	...	...	...	வெட்டுக்குறி
	8	-3	சு	புற	...	...	...	...	0 13.5	...	...	...	...	...	...	...	வெட்டுக்குறி
		-4															
	9	-4	சு	புற	...	...	...	...	0 05.0	...	...	...	...	...	...	...	வெட்டுக்குறி
	10	-4	சு	புற	...	...	...	...	0 14.5	...	...	...	...	...	...	...	வெட்டுக்குறி
	11	257-1	சு	புற	...	...	...	...	1 18.5	...	...	...	...	...	...	...	வெட்டுக்குறி
		-2															
		279-5							3 42.0	2 33							
		-6															
136	(1)	276-1	சு	பு	...	8-2	5	4	20	0 15.0	0 63	282	அ. நாராயணன்				
	(2)	-2	சு	பு	...	8-2	5	4	20	0 21.0	0 88	283	அ. அந்தோணி (1) நா. சத்தனம் (2) கு. குப்பன் (3) கு. கோவிந்தன் (4)				
		-3															
		-4															
	3	275	சு	பு	...	8-2	5	4	20	0 17.0	0 71	295	ரா. நடேசன்				
	4	275	சு	பு	...	8-2	5	4	20	0 16.0	0 67	294	கா. குப்புசாமி				
	(5)	274	சு	பு	...	8-2	5	4	20	0 25.0	1 05	285	கே. தேவசாபம்				
	6	273	சு	பு	...	8-2	5	4	20	0 10.0	0 42	286	அ. ராசு				
	7	273	சு	பு	...	8-2	5	4	20	0 07.5	0 31	281	பெ. சுவாமிமுத்து				

1/2000000000/

PANIKUJPPAM
ANIKURUTTI
CUDALORE DISTRICT

Traverse 543 Hectares 79.0 Area
Arable 566 Hectares 81.5 Area

Scale 1:2000



No. 31
ANGICHETTIPALAIYAM



No. 56
MALIGAMBATTU

LEASE APPLIED AREA



MEMORANDUM AND ARTICLES OF ASSOCIATION OF

TAMIL NADU CEMENTS CORPORATION LIMITED

For TAMIL NADU CEMENTS CORPORATION LIMITED

Lakshmi Manian

Dr. LAKSHMI MANIAN
COMPANY SECRETARY

REGD OFFICE : 5th Floor, Aavin Illam,
No.3A, Pasumpon Muthuramalinganar Salai
Nandanam, Chennai - 600 035
CIN:U40200TN1976SGC007081
GST IN:33AABCT1819J1ZH
Ph:2852 5461/71
E-mail: tancemcs@gmail.com
WEBSITE: www.tancem.in

Form I.R.

CERTIFICATE OF INCORPORATION
No.7081 of 1976



I hereby certify that TAMIL NADU CEMENTS CORPORATION LIMITED is this day incorporated under the Companies Act. 1956 (No.1 of 1956) and that the Company is Limited.

Given under my hand at CHENNAI this Eleventh
Twenty second
day of February one thousand nine hundred and seventy
Magha
six One thousand eight hundred and ninety seven (Saka).

The Registrar of Companies
Tamil Nadu

Sd.
(A.G. SIRSI)
Registrar of Companies,
Tamil Nadu.



MEMORANDUM OF ASSOCIATION
OF
TAMIL NADU CEMENTS CORPORATION LIMITED

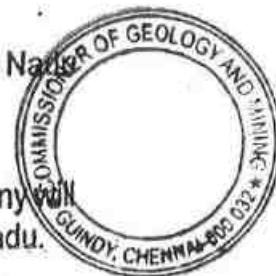
For TAMIL NADU CEMENTS CORPORATION LIMITED

Lakshmi Maneean

DR. LAKSHMI MANEEAN
COMPANY SECRETARY

**MEMORANDUM OF ASSOCIATION
OF
TAMIL NADU CEMENTS CORPORATION LIMITED**

- I. The name of the Company is Tamil Nadu Cements Corporation Limited
- II. The registered office of the Company will be situated in the State of Tamil Nadu.
- III. The objects for which the Company is established are the following :
 - A. The main objects to be pursued by the Company on its incorporation are :



1. To take over from the Tamil Nadu Industrial Development Corporation Limited the Cement Factory at Alangulam, Ramnad District with all its assets and liabilities and also the project relating to the establishment of a Cement Factory at Ariyalur, Tiruchirapali District with all the rights and liabilities at an agreed price by mutual consent between the Company and Tamil Nadu Industrial Development Corporation Limited.
2. To produce, manufacture, purchase, refine, prepare, process, import, export, sell and generally to deal in cement, portland cement, alumina cement, lime and limestone, clinker and / or bye-products thereof and building materials generally and in connection therewith to acquire, erect, construct, establish, operate and maintain cement factories, limestone quarries, workshops and other works.
3. To purchase, take on lease, or otherwise acquire the undertaking, business and property or any part thereof any company or companies carrying on business as manufacturers of cement in India or otherwise, or any other business which the Company is entitled to carry on.
4. To carry on all or any of the business of manufacturers and sellers and dealers and workers in cement of all kinds, concrete, asbestos, gypsum, coal, jute hessian cloth, gunny bags, paper bags, lime, plasters, whiting, clay, bauxite, soapstone, ochres, paints, fixing

materials, gravel, sand, bricks, tiles, pipes, pottery, earthen ware, artificial stone and manufacturers', builders' and dyers' requisites and conveniences of all kinds.

5. To work mines or quarries and to prospect for, search for, find win, get, work, crush, smelt, manufacture or otherwise, deal with, limestone, chalk, clay, ores, metals, minerals, oils, stones or deposits or products and generally to carry on the business of mining in all its branches.



6. To carry on the trade or business of engineers, founders, smiths, metal workers, machinists, manufacturers of plant and machinery required or utilised by cement factories, quarries and mines.

B. The objects incidental or ancillary to the attainment of the main objects are :

1. To acquire by concession, grant, purchase, barter, lease, licence or otherwise, either absolutely or conditionally and either solely or jointly with others, any lands, buildings, easements, way leaves, privileges, rights, licences, powers and concessions and in particular any water rights or concessions for the purpose of obtaining motive power, and any machinery, plant, utensils, goods, trade-marks and other movable and immovable property of any description which the Company may think necessary or convenient for purposes of its business or which may seem to the Company capable of being turned to account.

2. To search for ores and minerals, mines and to win the ore and minerals either by itself after obtaining the necessary licence from Government or to permit any person, firm or company, who has the required valid licence for mining purposes, to mine in or over any land belonging to the Company, either by way of Lease or under a Lease and Licence Agreement.

3. To use, cultivate, work, manage, improve, carry on develop and turn to account the undertaking, lands, mines rights, privileges, property and assets of any kind of the Company or any part thereof.

4. To enter into partnership or into any

arrangement for share of profits, union of interests, co-operation, joint adventure, reciprocal concession or otherwise, with any government; Local Body, authority person, or company carrying on or engaged in or about to carry on or engage in any business or transaction which this Company is authorised to carry on or engage in or in any business or transaction capable of being conducted so as, directly or indirectly, to benefit the Company and to take or otherwise acquire shares and securities of any such Company and to sell, hold re-issue with or without guarantee, or otherwise deal with the same.



5. To acquire, be interested in, construct, maintain, carry out, improve, work, alter, control and manage any roads, bridges, tunnels, water-works, water-rights, canals, irrigation works, gas works, coal mines, electric works, reservoirs, water courses, furnaces, stamping works, smelting works, and factories, warehouses and other works and conveniences which the Company may think conducive to any of the objects or which may seem calculated, directly or indirectly, to promote the Company's interests and to contribute to and take part in constructing, maintaining, carrying on, improving, working, controlling and managing of any such works or conveniences.

6. To enter into any arrangements with any Government or State or authorities municipal, local or otherwise, that may seem conducive to the Company's objects or any of them, and to obtain from any such government or State or authority any rights, privileges and concessions which the Company may think desirable to obtain and to carry out, exercise, and comply with any such arrangements, rights, privileges and concessions.

7. To undertake and carry on any business, transaction or co-operation commonly undertaken or carried on by promoters of companies, concessionaires, contractors for public and other works or merchants.

8. To be interested in, promote and undertake the formation and establishment of such institutions, business, pools, combines, syndicates - industrial, trading or manufacturing - as may be considered to be conducive to the profit and interest of the Company and to acquire, promote and/or subsidise interests in any industry or undertaking and to carry on any other business

(industrial, trading, manufacturing or other) which may seem to Company capable of being conveniently carried on in connection with any of the objects of the Company or otherwise calculated, directly or indirectly, to render any of the Company's properties or rights for the time being profitable.



9. To purchase or otherwise acquire and undertake the whole or any part of the business, property, rights, and liabilities of any person, firm or Company, carrying on any business which this Company is authorised to carry on or possessed of any property or rights suitable for any of the purposes of the Company and to purchases, acquire, apply for, hold, sell and deal in shares, stock, debentures or debenture stock of any such persons firm or company, and to conduct, make or carry into effect any arrangement in regard to the winding up of the business of any such person, firm or company.

10. To amalgamate with any company or companies having objects altogether or in part similar to those of this Company.

11. To pay all costs, charges, and expenses of, and incidental to, the promotion and formation, registration and establishment of this Company and the issue of its capital, including any under-writing or other commissions, broker's fee and charges in connection therewith.

12. To pay for any properties, rights or privileges acquired by the Company in shares or debentures of the Company, or partly in shares or debentures and partly in cash, or otherwise, to give shares or stock or debentures of this Company in exchange for shares or stock of debentures of any other company.

13. To remunerate or make donations to (by cash or other assets, or by the allotment or fully or partly paid shares, or by a call or option on shares, debentures, debentures stock or securities of this or any other Company, or in any other manner, whether out of the Company's capital, profits or otherwise) any person or persons for services rendered or to be rendered in introducing any property or business to the company, or placing or assisting to place or guaranteeing the

subscription of any shares, debentures, debenture stock or other securities of the Company or for any other reason which the Company may think proper.

14. To procure the registration or other recognition of the Company in any country, State or place and to establish and regulate agencies for the purpose of the Company's business.

15. To apply or join in supplying to, and obtain from, any Parliament or Legislative Authority, Government, local municipal or other authority or body, or with any landholders or other persons for any Acts of Parliament or other Acts of Legislature, laws, decrees, concessions, orders, rights or privileges or authority that may seem conducive to the Company's object or any of them or may seem expedient, to obtain any provisional order or Act or Parliament for enabling the Company to carry any of its objects into effect or for effecting any modification of the Company's constitution, or for any other purpose which may seem expedient and to oppose any proceedings or applications or legislation or grant or withdrawal of any rights, privileges or concessions or any imposition or alteration or cancellation of any taxes or duties or tariff, which may seem calculated directly or indirectly to prejudice the Company's interests.

16. To open and keep a register or registers in any country, State, territory or dominion whether it may be deemed advisable to do so and to allocate any number of the shares in the Company to such register or registers.

17. To undertake and execute any trusts the undertaking where of may seem desirable either gratuitously or otherwise.

18. To draw, make, issue, accept and to endorse, discount and negotiate promissory notes, hundies, bills of exchange, bills of lading, delivery orders, warrants, warehouse keeper's certificates and other negotiable or commercial or mercantile instruments connected with the business of the Company.

19. To invest, apply for and acquire, or otherwise employ moneys belonging to or entrusted to the Company whether or not immediately required in such



manner upon securities and shares of without security, upon such terms as may be thought proper, and from time to time to vary such transactions in such manner as the Company may think fit.

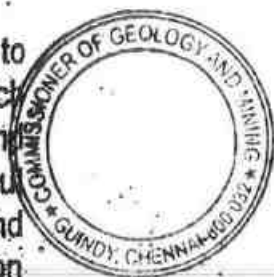
20. To lend or deposit moneys belonging to or entrusted to or at the disposal of the Company to such person or Company and in particular to customers and others having dealings with the Company, with or without security, upon such terms as may be thought proper and to guarantee the performance of contracts by such person or Company, but not to do the business of banking defined in the Banking Regulations Act, 1949.

21. To make advances upon or for the purchase of materials, goods, machinery, stores and other articles required for the purpose of the Company.

22. To borrow or raise money, with or without security or to receive money or deposit, at interest or otherwise in such manner as the Company may think fit and, in particular by the issue of debenture or debenture stock convertible into shares of this or any other Company, and on security of any such money so borrowed, raised or received, to mortgage, pledge or charge the whole or any part of the property, assets or revenue of the Company, present or future, including its uncalled capital and to purchase, redeem, or pay off any such securities. The Company shall not do the business of Banking as defined in the Banking Regulations Act, 1949.

23. To Sell and in any other manner deal with or dispose of the under taking or property of the Company or any part thereof for such consideration as the Company may think fit, and in particular for shares, debentures and other securities of any other company having objects altogether or in part similar to those of the Company and to promote any other company or companies for the purpose of its or their acquiring all or any of the property, rights or liabilities of this Company.

24. To improve, manage, work, develop, exchange, lease, mortgage, turn to account, abandon or otherwise deal with all or any part of the property, rights and concessions of the Company.



25. To place to reserve or to distribute as dividend or bonus among the members or otherwise to apply, as the Company may from time to time think fit, any moneys received by way of premium or debentures issued at a premium by the Company and any moneys received in respect of dividends, accrued on forfeited shares and profits arising from the sale by the Company of forfeited shares or from unclaimed dividends, subject to the provisions of law in that behalf.

26. Except in the matter of distributing the profits of the Company by way of dividends, to distribute any of the property of the Company amongst members in specie or kind, subject to the provisions of law in that behalf.

27. To provide for the welfare of employees or Ex-employees of the Company or its, predecessors in business and the wives, widows and families or the dependents or connections of such person by building or contributing to the building of houses, dwellings or chawls, or by grants of money, pension, allowances, bonus, payments towards insurance or other payment; or by creating and from time to time subscribing or contributing to, aiding or supporting provident and other associations, instruction, funds, or trusts, or conveniences and by providing or subscribing or contributing towards places of institution and recreation, hospitals and dispensaries, medical and other attendance and other assistance as the Company shall think fit, and to subscribe or contribute or otherwise to assist or to guarantee money to charitable, benevolent, religious, scientific, national or other institutions or objects or for any exhibition, or for any public, general or useful objects, to any political party or for any political purpose to any individual or body.

28. To do all or any of the above things and all such other things as are incidental or may be thought conducive to the attainment of the above objects or any of them in any part of the world, and as principals, agent, contractors, trustees or otherwise and by or through trustees, agents or otherwise and either alone or in conduction with others, and so that the word "Company" in this Memorandum when applied otherwise than to this Company shall be deemed to include any authority, partnership or other body of persons whether incorporated or not and whether domiciled in India or elsewhere.



29. To apply for, purchase or otherwise acquire any patents, brevets d'invention, licences concessions, and the like, conferring any exclusive or non-exclusive or limited rights to use any secret or other information as to any invention which may seem capable of being used for any of the purposes of the Company, or the acquisition of which may seem calculated, directly or indirectly to benefit the Company, and to use, exercise, develop, grant licences in respect of or otherwise turn to account to the property rights or information so acquired.



30. To establish, promote, subsidise and otherwise assist any company or companies, syndicate or other concern for the purpose of setting up any industry or running and industrial undertaking, acquiring any property or furthering any of the objects of this Company.

31. To construct maintain and alter any buildings, or works, necessary or convenient for the purpose of the Company.

32. To construct, improve, maintain, develop, work, manage, carry out or control any roads, ways, tramways, railways, branches or sidings, bridges, reservoirs, water courses, wharves, manufactories, ware houses, electric works, shops, stores and other works and conveniences, which may seem calculated directly or indirectly to advance the Company's interest and to contribute to, subsidise or otherwise assist or take part in the construction, improvement, maintenance, working, management, carrying out or control, thereof.

33. To develop and turn to account any land acquired by the Company or in which it is interested, and in particular by-laying out and preparing the same for building purposes, constructing, altering, pulling down, decorating maintaining fitting up, and improving buildings and by planting, paving draining (farming cultivating and letting on building lease or building agreement) and by advancing money to and entering into contracts and arrangements of all kinds with builder and others.

34. To apply for and take out, purchase or otherwise acquire any trade mark, patents, patent rights inventions, copy right, designs of secret processes, which may be useful for the Company's objects, and to grant

licences to use the same, and to work, develop, carry out, exercise and turn to account the same.

35. To issue, or guarantee the issue of, or the payment of interest on the shares, debentures, debentures stock, or other securities or obligations, of any company or association and to pay or provide for brokerage commission and underwriting in respect of any such issue.

36. To receive grants, loans, advances or other money's or deposit, or otherwise from State or Central Government, Banks, companies, Trusts, or individuals with or without allowance of interest thereon.

37. To acquire by subscription, purchase or otherwise, and to accept and take hold and sell, shares or stock in any company, society or undertaking, the objects of which shall, either in whole or in part, be similar to those of this company or such as may be likely to directly or indirectly promote or advance the interests of this Company.

38. To establish, maintain, subscribe to or subsidise or become member of training institutions, research laboratories, research institutions, and experimental workshops for scientific and technical research and experiments.

39. To install and work, pilot, proto-type or semiscals units or full commercial plants to develop a particular invention or inventions.

40. To act as agent for Government or other authorities or any manufacturers, merchants and others and to transact and carry on agency business of every kind and of any description.

41. To employ or pay experts, foreign consultants, etc., in connection with the planning and development of all or any of the business connected with the Company's operations.

42. To create any depreciation fund, 'reserve fund, sinking fund, insurance fund, or and special or other fund, whether for depreciation or for repairing, replacing, improving, extending or maintaining any of the property of the Company or for redemption of debentures or



redeemable preference shares or for special dividends or for equalising dividends or for any other purpose whatsoever, and to transfer any such fund or part thereof to any of the other funds therein mentioned.

43. To use trade marks or trade names or brands for the products and goods of the Company and adopt such means of making known the business and products of the Company or of any company in which the Company is interested as may seem expedient and in particular by advertising in newspapers, magazines, periodicals by circulars, by purchase and exhibition of works of art or interest, by opening stalls and exhibitions, by publication and distribution of books and periodicals, calendars, almanacs, and diaries, by distributing samples and by granting prizes, rewards and donations.

44. To apply the assets of the Company in any way in or towards the establishment, maintenance or extension of any association, institutions or fund in any way connected with any particular trade or business or scientific research, industry or commerce.

45. To appropriate, use or let out land, belonging to the company for streets, parks, pleasure grounds, allotments and other conveniences and to present any such land so laid to the public or to any persons or Company conditionally or unconditionally as the Company thinks fit.

46. To establish, maintain and operate technical training institutions and hostels for technical staff of all categories of officers, workers, clerks, technical and other personnel likely to be useful to or assist in any business which the Company is authorised to carry on.

47. To let out on lease or on hire, all or any of the property of the Company either immovable or movable including and all and every description of apparatus or appliances.

48. To establish agencies or branches in India and elsewhere and to regulate and discontinue the same.



(C) The other objects of the Company not indicated in (A) and (B) are :-

1. To carry on the business of iron and steel and tool makers, metal workers, mechanists, iron and steel converters, metallurgists, and to buy, sell, manufacture, repair, convert, alter, let on hire and deal in machinery, implements, rolling stock, and metal and hardware of all kinds and too undertake and execute any contracts or other works, involving supply or use of any machinery or any tool and to carry out any ancillary or other works comprised therein.



2. To carry on the businesses manufacturers of and dealers in paper of all kinds, and articles made from paper or pulp, and materials used in the manufacture or treatment of paper, including cardboard, railway and other tickets, mill boards, and wall and ceiling papers.

3. To carry on the business of manufacturers, producers, refiners, developers and dealers in all kinds of metals, materials, minerals, chemicals, substances and products, whether natural or artificial including in particular, but without limitation, plastics, resins and goods and articles made, from the same, and compounds, intermediates, derivatives and by-products thereof.

4. To carry on the business of engineers and manufacturers of agricultural and other machinery, plants, implements and tools, equipments, apparatus and accessories, rolling stock and other like goods and the production and working of metals and minerals of all kinds and the production manufacture and preparation of any other materials which may be usefully or conveniently combined with the engineering or manufacturing business of the Company.

IV. The liability of the members is limited.

V. The share capital of the Company is Rs.11200 crores divided in totl, 20,000 equity shares of Rs.1,000/- each Subject to the provisions of the Act, the Company has the power from time to time to increase or reduce its capital as equity and

preference shares and to attach to any class or classes of such shares, any preferences, rights, privileges, or priorities in payments of dividends, or distribution of assets or otherwise over any other shares, or to subject the same to any restrictions or limitations of conditions, and to vary the regulation of the Company as far as necessary to give effect to the same and upon the sub-division of a share apportion the right to participate in profits in any manner.



We, the several persons, whose names and addresses are subscribed hereto, are desirous of being formed into a Public Limited Company in pursuance of this Memorandum of Association and we respectively agree to take the number of shares in the capital of the Company set opposite to our respective names.

Sl. No.	Names, addresses, Description and Occupation of subscribers	No. of Equity Shares taken by each subscriber	Signature of subscribers	Signature of Witnesses and their addresses, description and occupation.
1.	C.V.R. PANIKAR, S/o. Thiru I.A. Panikar Chairman & M.D. TIDCO, 150-A, Anna Salai, Chennai - 2.	ONE	(Sd.) C.V.R. PANIKAR	(Sd.) A. Duraipandian Spl. Officer in Tamil Nadu Cements, 150-A, Anna Salai, Chennai - 2.
2.	S. GUHAN S/o. Dr. K.S. Sanjivi Finance Secretary Govt. of Tamil Nadu	ONE	(Sd.) S. GUHAN	"
3.	A. PADMANABAN S/o. D. Anandam Secretary (Industries) Govt. of Tamil Nadu	ONE	(Sd.) A. PADMANABAN	"
4.	A.S. PADMANABAN S/o. A.P. Subramaniam General Manager Alangulam Tamilnadu Cements Ramanathapuram Dt.	ONE	(Sd.) A.S. PADMANABAN	(Sd.) S. Ramamurthy, Production Manager, Tamilnadu Cements, Alangulam
5.	K.P. GEETHAKRISHNAN S/o. Dr. K.R. Parthasarathy Director (Finance) THDCO 150-A, Anna Salai, Chennai - 2.	ONE	(Sd.) K.P. GEETHAKRISHNAN	(Sd.) G. Muthukrishnan Deputy Secretary TIDCO, Chennai - 2.
6.	K. PALANIMANICKAM S/o. Kulandaiya Development Manager TIDCO 150-A, Anna Salai, Chennai - 2.	ONE	(Sd.) K. PALANIMANICKAM	(Sd.) A. Duraipandian Special Officer for Tamilnadu Cements, 150-A, Anna Salai, Chennai - 2.
7.	A.M. THANGARAJ S/o. Thiru E. Asirvatham Secretary, TIDCO 150-A, Anna Salai, Chennai - 2.	ONE	(Sd.) A.M. THANGARAJ	"
Total		Seven		

Date this day of ninth February, 1976.





**ARTICLES OF ASSOCIATION
OF
TAMIL NADU CEMENTS CORPORATION LIMITED.**

ARTICLES OF ASSOCIATION OF TAMIL NADU CEMENTS CORPORATION LIMITED

Definitions : - In these articles unless the context otherwise requires-

- I. "The Company" means the Tamil Nadu Cements Corporation Limited
- II. "The Act" means the Companies Act, 1956 (Central Act of 1956)
- II. "The Office" means the Registered Office for the time being of the Company;
- IV. "Governor of Tamilnadu" means the "Government of Tamilnadu" or "Governor of Tamilnadu"
- V. "The Register" means the register of members to be kept pursuant to Section 150 of the Act.
- VI. "Dividend" includes bonus.
- VII. "Capital" means the capital for the time being raised or authorised to be raised for the purpose of the Company.
- VIII. "Shares" means the shares or stock into which the capital is divided and the interest corresponding with such shares or stock.
- IX. "Board" means Board of Directors.
- X. "The Directors" means the Directors for the time being of the Company.
- XI. "Persons" includes any Company or Association or Body of individuals whether incorporated or not.
- XII. "Month" means a calendar month
- XIII. "In writing" and "Written" include printing lithography and other modes representing or reproducing words in a visible form.
- XIV. "Executor" or "Administrator" means a person who has obtained probate or letters of administration as the case may be, from a competent court.
- XV. "Regulation of the Company" means the regulations for the time being in force for the management of the Company.



XVI. "Seal" means the common seal for the time being of the Company.

XVII. "The Chairman" means the Chairman of the Board of Directors for the time being of the Company.

Unless the context therein requires the words or expressions contained in these articles shall bear the same meaning as in the Act.



Company to be a Public Company.

2. The Company is a Public Limited Company :

(a) The right of transfer of shares shall be restricted as hereinafter provided.

Table. A' to apply :

3. The regulations contained in Table 'a' in the first Schedule to the Act shall apply to the company except in so far as they have been specifically excluded by/or under these Articles.

Company to be governed by these Regulations.

4. The regulations for the management of the Company and for the observance of the members thereof and their representatives shall subject to any exercise of the statutory powers of the Company in reference to the repeal or alteration of or addition to its regulations by special resolution as prescribed or permitted by the Act, be such as are contained in these Articles.

Capital

5. The Capital of the Company is Rs.112,00,00,000 (Rupees One hundred and twelve crores) divided into 11,20,000 (Eleven lakhs and twenty thousand) equity share of Rs.1000/- (Rupees One thousand)-each.

Company's shares not to be purchased.

6. No part of the funds of the Company shall be employed in the purchase of or in loans upon the security of the Company's shares.

Allotment of Shares.

7. Subject to the provisions of the Act and these Articles and to the rights of the Government, the shares shall be under the control of the Board of Directors who may allot or otherwise dispose of the same to such persons on such terms and conditions as they think fit.

Subject to the provisions, if any in that behalf of the Memorandum of Association of the Company and without prejudice to any special rights previously conferred on the holders of existing shares in the Company, any share in the Company, may be issued with such preferred, deferred or other special rights, or such restrictions, whether in regard to dividend, voting rights of share capital or otherwise, as the Company may from time to time by special resolution determine, and any preference share may with the sanction of a special resolution be issued on the terms that it is, or at the option of the Company is liable to be redeemed.

8. The Company may at any time pay a commission to any person for subscribing or agreeing to subscribe whether absolutely or conditionally for any shares, debentures or debenture stock of the Company or procuring or agreeing to procure subscriptions (whether absolute or conditional) for any shares debentures or debenture stock of the Company so that if the commission in respect of shares shall be paid or payable out of capital or out of profit, the statutory conditions and requirements shall be observed and complied with and the amount or rate of commission shall not exceed 5 per cent of price at which the shares are issued and 2 1/2 percent of the price at which debentures or debenture stock are issued in each case subscribed or to be subscribed. The commission may be paid or satisfied in cash or in shares, debentures or debenture stock of the Company.

Commission



9. Every person whose name is entered as a member in the register shall without payment of any fee or charge, be entitled to a certificate under the seal of the Company specifying the share or shares held by him and the amount paid thereon.

Share Certificates.

Provided that, in respect of a share or shares held jointly by several persons, the Company shall not be bound to issue more than one certificate and delivery of a share Certificate to one of several joint-holders shall be sufficient delivery to all.

10. Every certificate of shares shall specify the number and denoting numbers of the share in respect of which it is issued and the amount paid up thereon and shall be signed by at least two Directors subject to Companies (Issue of Share Certificates) Rules, 1960.

Particulars on Share Certificates

11. If any Share Certificate is defaced, torn or old, decrepit, worn out, or there is no further space on the back thereof for endorsement of transfer, then upon the surrender thereof to the Company, it may order the same to be cancelled and issue a new certificate in lieu thereof.

Issue of new share Certificate in place of one defaced, new or old, decrepit, worn out or lost or destroyed.

If any share Certificate is lost or destroyed, it may be renewed on obtaining prior consent of the Board and on payment of a fee of 50 Paise and in such reasonable terms. If any, as to evidence and indemnity and the payment of out-of-pocket expenses incurred by the Company in investigating evidence, as the Directors think fit.

12. The Board of Directors may, from time to time make calls upon the members in respect of any moneys unpaid on their shares and specify the time or times of payments and each member shall

Calls on Shares

pay to the Company at the time or times so specified the amount called on his shares.

Provided, however, that the Board of Directors may, from time to time at their discretion extend the time fixed for the payment of any call.

When interest on call payable

13. If the sum payable in respect of any call be not paid on or before the day appointed for payment thereof, the holder for the time being, or the allottee of the share in respect of which a call shall have been made, shall pay interest on the same at such rate not exceeding 6 per cent per annum, at the Board of Directors shall fix from the day appointed for the payment thereof to the time of actual payment, but the Board of Directors may waive payment of such interest, wholly or in part.

Forfeiture of shares.

14. (1) If a member fails to pay any call, or installment of a call, on the day appointed for payment thereof, the Board may at any time thereafter during such time as any part of the call or installment remains unpaid, serve a notice on him requiring payment of so much of the call or instalment as is unpaid to get with any interest which may have accrued.

(2) The notice aforesaid shall

(a) name a further day (not being earlier than the expiry of fourteen days from the date of service of the notice) on or before which the payment required by the notice is to be made; and

(b) State that, in the event of non-payment on or before the day so named, the shares in respect of which the call was made will be liable to be forfeited.

(3) If the requirements of any such notice as aforesaid are not complied with any share in respect of which the notice has been given may, at any time, thereafter before the payment required by the notice has been made, be forfeited by a resolution of the Board to that effect.

(4) A forfeited share may be sold or otherwise disposed on such terms and in such manner as the Board thinks fit.

(5) At any time before a sale or disposal of the forfeited shares as aforesaid, the Board may cancel the forfeiture on such terms as it thinks fit.

15. (1) A person whose shares have been forfeited shall cease to be a member in respect of the forfeited shares but shall not with-standing the forfeiture, remain liable to pay to the Company all moneys which on the date of forfeiture, were presently payable by him to the Company in respect of shares.

(2) The liability of such persons shall cease if and when the Company shall have received payment in full of all such money in respect of the shares.

16. (1) A duly verified declaration in writing that the declarant is a Director, the Manager or the Secretary of the company and that a share in the Company has been duly forfeited on a date stated in the declaration shall be conclusive evidence of the facts therein stated as against all persons claiming to be entitled to the share

(2) The Company may receive the consideration, if any, given for the share or any sale or disposal thereof and may execute a transfer of the share in favour of the person to whom the share is sold or disposed of.

(3) The transferee shall thereupon be registered as the holder of the share.

(4) The transferee shall not be bound to see to the application of the purchase money, if any nor shall his title to the share be affected by any irregularity or invalidity in the proceedings in reference to the forfeiture sale or disposal of the shares.

17. The provisions of these articles as to forfeiture shall apply in the case of non-payment of any sum which by terms of issue of a share becomes payable at a fixed time whether on account of the nominal value of the share or by way of premium as if the same had been payable by virtue of a call duly made and notified.

18. The Board of Directors may, if they think fit, receive from any member willing to advance the same, all or any part of the moneys due upon the shares held by him beyond the sums actually called for and upon the moneys so paid in advance or so much thereof as from time to time exceeds the amount of calls then made upon the share in respect of which such advance had been made, the Company may pay interest at such rate not exceeding 6 percent per annum as the members paying such sum in advance and the directors agree upon. The Board of Directors may, at any time, repay the amount so advanced upon giving to such member three months notice in writing.

**Effects of
forfeiture.**



**Declaration of
forfeiture.**

**Provisions regarding
forfeiture to apply in
the case of non-
payment of sum
payable at a fixed
time.**

**Payment in
anticipation of
calls may carry
interest.**

**Joint holders
Liability to pay**

19. The joint holders of a share shall be jointly and severally liable to pay all calls in respect thereof.

**Company's Lien on
share**

20. The Company shall have the first and paramount lien on every (not being a fully paid share) for all moneys (Whether presently payable or not) called or payable at a fixed time in respect of that share, and the Company shall also have a lien on all shares (other than fully paid shares) standing registered in the name of a single person, for all moneys presently payable by him or from his estate to the Company, but the Board of Directors, may, at any time, declare any share to be wholly or in part exempt from the provisions of this article. The Company's lien, if any, on the share shall extend to all dividends payable thereon.

Enforcement of lien

21. The Company may sell, in such manner as the Board of Directors think fit, any shares on which the Company has a lien, but no sale shall be made unless a sum in respect of which the lien exists is presently payable, nor until the expiration of fourteen days after a notice in writing stating and demanding payment of such part of amount in respect of which the lien exists as is presently payable has been given to the registered holder for the time being of the share, or the persons entitled thereto by reason of his death or insolvency.

**Application of
proceeds of sales**

22. The proceeds of the sale shall be received by the Company and shall be applied in payment of such part of the amount in respect of which the lien exists as is presently payable, and the residue if any shall (subject to a like lien for sums not presently payable as existed upon the shares prior to the sale) be paid to the persons entitled to the shares at the date of the sale. The purchaser shall be registered as the holder of the shares and he shall not be bound to see to the application of the purchase money, nor shall his title to the shares be affected by any irregularity or invalidity in the proceedings in reference to the sale.

**Registration of
Shares**

23. Subject to section 111 of the Act, the Board of Directors may in their absolute discretion refuse to register any proposed transfer of shares.

**Notice of refusal to
register transfer**

24. If the Board of Directors refuse to register the transfer of any shares they, shall within two months of the date on which the instrument of transfer is delivered to the Company send to the transferee and the transferor notice of the refusal.

**Company not bound
to recognise any**

25. Save as herein otherwise provided, the Board of Directors shall be entitled to treat the person whose name appears

on the register of members as the holder of any share, as the absolute owner thereof and accordingly shall not (except as ordered by a court of competent jurisdiction or as by law required) be bound to recognise any benami trust or equity or equitable contingent or other claim to or interest in such share on the part of any persons, whether or not it shall have express or implied notice thereof.

26. The instrument of transfer of any share in the Company shall be executed both by the transferor and transferee and the transferor shall be deemed to remain holder of the share until the name of the transferee is entered in the register of members in respect thereof.

27. No instrument of transfer shall be recognised by the Board unless :

- (a) The instrument of transfer is in the prescribed form and complies with all the formalities prescribed under section 108 (1A) of the Act.
- (b) The instrument of transfer is accompanied by the certificate of shares to which it relates and such other evidence as the Board may reasonably require to approve the title of the transferor to make the transfer.
- (c) The instrument of transfer is in respect of only one class of shares.

28. Every instrument of transfer shall be left at the office for registration, accompanied by the certificate of shares to be transferred, and such evidence as the Company may require to prove the title of the transferor or his right to transfer the share. All instruments of transfer shall be retained by the Company, but any instrument of transfer which the Board may decline to register shall on demand, be returned to the persons depositing the same.

29. Nothing contained in Article 23 shall prejudice any power of the Company to register as shareholder any persons to whom the right to any shares in the Company has been transmitted by operation of law.

30. The Company shall not charge any fees for transfers or transmissions in respect of any number of shares of the Company.

Interest in shares other than that of the registered holders.



Form of transfer.

Transfer to be left at office and; evidence of title to be given.

Transmission by operation of law

No Fee on transfer.

When register of members and debenture holders may be closed.

31. The register of members or the register of debenture holders may be closed for any period or periods not exceeding in the aggregate 45 days in any year but not exceeding 30 days at any one time after giving not less than 7 days previous notice by advertisement in some newspaper circulating in the District in which the registered office of the Company is situated.

Director's right to refuse registration subject to the provision of Section 111 of the Act.

32. The Board of Directors shall have the same right to refuse to register the name of a person entirely, by transmission to any shares or his nominee as if he were the transferee named in an ordinary transfer presented for registration.

Power to increase Capital.

33. Subject to the approval of Government, the Board of Directors may, with the sanction of the Company in general meeting increase the share capital by such sum, to be divided into shares of such amount, as may be specified in the resolution.

On what condition new shares may be issued.

34. Subject to such directions as may be issued by Govt. in this behalf new shares shall be issued upon such terms and conditions and which such rights and privileges annexed thereto as the Company may in its General meeting direct and if no such direction to given as the Board of Directors shall determine:

Provided that no shares (not being preference shares) shall be issued carrying voting right or rights in the Company as to dividend, capital or otherwise which are disproportionate to the rights attaching to the holders of other shares (not being preference shares).

How far new shares to rank with shares in original capital.

35. Except so far as otherwise provided by the conditions of issue, or by these articles, any capital raised by the creation of new shares shall be considered part of the original capital and shall be subject to the provision herein contained with reference to the payment of calls and installments, transfer and transmission, lien, voting, surrender and otherwise.

New shares to be offered to Members.

36. The new share shall be offered to the members in proportion to the existing shares held by each member and such offer shall be made by notice specifying the number of shares to which the member is entitled and limiting a time within which the offer if not accepted will be deemed to be declined and after the expiration of such time or on receipt of an intimation from the member to whom such notice is given that he declines to accept the shares offered the Board of Directors may dispose of the same in such manner as they think most beneficial to the Company.

37. Subject to the provisions of Section 100 to 104 of the Act, and to such directions as may be issued by Govt. in this behalf, the Company, may, from time to time by special resolution reduce its capital by paying off capital or cancelling capital which has been lost or is unrepresented by available assets, or is superfluous or by reducing the liability on the shares or otherwise as may seem expedient, and capital may be paid off upon the footing that it may be called up again or otherwise and the Board of Directors may, subject to the provisions of the Act, accept surrender of shares.

Reduction of
Capital

38. Subject to the approval of Govt. the Company in general meeting may, from time to time, sub-divide or consolidate its shares or any of them and exercise any of the other powers conferred by Section 94 of the Act and shall file with the Registrar such notice of exercise of any such powers as may be required by the Act.

Sub-division and
consolidation of
shares.



39. If at any time, the capital, by reason of the issue of preference shares or otherwise, is divided into different classes of shares, all or any of the right and privilege attached to each class may, subject to the provisions of Section 106 and 107 of the Act be modified, abrogated or death with by agreement between the Company and by any person purporting to contract on behalf of that class; provided such agreement is (a) ratified in writing by the holders of shares of that class of at least three fourths of the nominal issue value of them or (b) confirmed by a resolution passed at a separate general meeting and supported by the votes of at least three fourths of the holders of shares of that class and all the provisions hereinafter contained as to general meeting shall mutatis mutandis apply to every such meeting, except that the quorum thereof shall be members holding, or representing by proxy one fifth of the nominal amount of the issued shares of that class. This Article shall not by implication curtail the power of modification which the Company would have if the Article were omitted.

Power to modify.

40. Subject to the approval of Govt, the Board of Directors may from time to time, borrow, or secure the payment of any sum or sums of money for the purposes of the company by means of a resolution passed at a meeting of the Board.

Power to borrow.

41. The Board of Directors may, subject to the approval of Govt. secure the repayment of such moneys in such manner and upon such terms and conditions in all respect as they think fit and in particular, by the issue of bonds, perpetual, or redeemable debentures or debenture stock or any mortgage, charge or other security on the undertaking of the whole or any part of the property of the Company (both present and future) including its uncalled capital for the time being.

Conditions on
which money may
be borrowed.

Securities may be assignable free from equities.

Issue at discount etc., or with special privilege,

Persons not to have priority over any prior charge.

Indemnity may be given.

General Meetings.

When extraordinary meeting to be called

42. Debentures, debenture-stock, bonds or other securities may be made assignable free from any equities between the Company and the person to whom the same may be issued.

43. Subject to the approval of Govt. and the provisions of Section 117 of the Act, any debentures debenture stock bonds or other securities may be issued at a discount, premium or otherwise, and with any special privileges as to redemption, surrender, drawings, allotment of shares attending general meetings of the Company, appointment of Directors and otherwise.

44. Whenever any uncalled capital of the Company is charged all persons taking any subsequent charge thereon shall take the same subject to such prior charge and shall not be entitled by notice to the shareholders or otherwise to obtain priority over such prior charge.

45. If the Directors or any of them or any other persons shall become personally liable for the payment of any sum primarily due from the company, the Directors may execute or cause to be executed any mortgage, charge or security over or affecting the whole or any part of the assets of the Company by way of indemnity to secure the Directors or persons so becoming liable as aforesaid from any loss in respect of such liability.

46. The first Annual General Meeting of the Company shall be held within eighteen months of its incorporation. The Company shall in each calendar year hold in addition to any other meetings an Annual General Meeting. Not more than 15 months shall elapse between the date of one Annual General Meeting and that of the next. The first Annual General Meeting and the subsequent Annual General Meetings of the Company shall be held in accordance with the provisions of Section 166 of the Act. All meetings of the Company other than the Annual General Meetings shall be called extraordinary Meetings.

47. Subject to the Provision of Section 169 of the Act the Board of Directors may whenever they think fit and they shall, on the requisition of the holders of not less than one tenth of the paid up capital of the Company as at that date carried a right of voting in regard to that matter and on which all calls or other sums then due have been paid forthwith proceed to convene an extraordinary meeting of the Company and in the case of such requisition the following provisions shall have effect-

(1) The requisition must state the objects of the meeting and must be signed by the requisitionists and deposited at the office and may consist of several documents in like form each signed by one more or requisitionists.

(2) If the Board of Directors of the Company do not proceed within twenty one days from the date of the deposits of the valid requisition to cause a meeting to be called for the consideration of these matters on a day not later than forty five days from the date of the deposit of the requisition, the requisitionists or a majority of them in value may themselves convene the meeting, but any meeting so convened shall be held within three months from the date of the deposit of the requisition.

(3) Any meeting convened under this Article by the requisitionists shall be convened in the same manner as nearly as possible as that in which meetings are to be convened by the Board of Directors. If, after a requisition has been received, it is not possible for sufficient number of Directors to meet in time so as to form a quorum, any Director may convene an Extraordinary General Meeting in the same manner as nearly as possible as that in which meeting may be convened by the Board of Directors.

48. A General meeting of the Company may be called by giving not less than twenty one days' notice in writing specifying the place, day and hour of meeting, with a statement of the business to be transacted at the meeting. Such notice shall be served on every member in the manner here in after provided, but with the consent in writing of all the members entitled to receive notice of same, any particular meeting may be convened by such shorter notice and in such manner as those members may think fit.

Provided however, that where any resolution is intended to be passed as a special resolution at any general meeting as required by sub-section (2) of section 189 of the Act, notice of such meetings specifying the intention to propose the resolution as a special resolution shall be served.

49. The accidental omission to give notice to, or the nonreceipt of notice by, any member or other person to whom it should be given shall not invalidate the proceedings at the meeting.

50. The business of an annual general meeting shall be to receive and consider the profit and loss account, the balance sheet, and the report of the Directors and of the auditors, to declare dividends, and to appoint directors in the place of those retiring. All other business transacted at an annual general meeting and all business transacted at an extraordinary meeting shall be deemed special business.



Notice of meeting.

Omission to give notice.

Business of Annual General Meeting.

Quorum.

51. Five members present in person shall be a quorum for a general meeting.

Right of Govt. to appoint any person as their representative.

52. (1) Govt. so long as they are the shareholders of the Company, may from time to time, appoint one or more persons (who need not be a member or members of the Company) to represent them at all or any meetings of the Company.

(2) Any one of the persons appointed under clause (1) of this Article who is personally present at the meeting shall be deemed to be a member entitled to vote and be present in person and shall be entitled to represent Govt. at all or any such meetings and to vote on their behalf whether on a show of hands or on a poll.

(3) Govt. may from time to time cancel any appointment made under sub-clause (1) of this Article and make fresh appointment.

(4) Any person appointed by Govt. under this Article may if so authorised, by such order, appoint a proxy, whether specially or generally.

Chairman of general meeting.

53. The Chairman of the Board of Directors shall be entitled to take the Chair at every general meeting or if there be no such Chairman, or if at any meeting he shall not be present within fifteen minutes after time appointed for holding such meeting or is unwilling to act as Chairman, the members present shall choose another Director as Chairman, and if no Director shall be present or if all the Directors present decline to take the Chair, then, the members present shall choose one of their members to be Chairman.

If quorum not present when meeting to be dissolved and when to be adjourned.

54. If within fifteen minutes from the time appointed for the meeting a quorum is not present, the meeting convened upon such requisition as aforesaid, shall be dissolved; but in any other case it shall stand adjourned to the same day in the next week at the same time to place, and if at such adjourned meeting a quorum is not present, those members who are present shall be a quorum and may transact the business for which the meeting was called.

How questions to be decided at meeting.

55. Every question submitted to a meeting shall be decided by a show of hands and in the case of an equality of votes, the Chairman shall have a casting vote in addition to the vote or votes to which he may be entitled as a member.



56. At any general meeting a resolution put to vote of the meeting shall be decided on a show of hands, unless a poll is, before or on the declaration of the result of the show of hands, demanded by a member present in person or proxy or by duly authorised representative and unless a poll is so demanded, a declaration by the Chairman that a resolution has or has not, on a show of hands, been carried or carried unanimously or by a particular majority and an entry to that effect in the book of proceedings of the Company, shall be conclusive evidence, of the fact, without proof of the number or proportion of the vote recorded in favour of or against that resolution.

57. If a poll is duly demanded, it shall be taken in such manner and at such time and place as the Chairman of the meeting directs and either at once, or after an interval or adjournment or otherwise, and the result of the poll shall be deemed to be resolution of the meeting at which the poll was demanded. The demand of a poll may be withdrawn.

58. The Chairman of a general meeting may, with the consent of the meeting, adjourn the same, from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place.

59. Subject to the provisions of Section 180 of the Act, any poll duly demanded on the election of a chairman of a meeting or on any question of adjournment shall be taken at the meeting and without adjournment.

60. The demand of a poll shall not prevent the continuance of a meeting for the transaction of any business other than the question on which a poll has been demanded.

61. The Chairman of any meeting shall be the sole judge of the validity of every vote tendered at such meeting. The Chairman present at the taking of poll shall be the sole judge of the validity of every vote tendered at such poll.

62. Upon a show of hands every member present in person shall have one vote and upon a poll every member present in person or by proxy or by duly authorised representative shall have voting rights in proportion to his share of the paid up equity capital of the Company.

63. A proxy shall not be entitled to vote on a show of hands

What is to be evidence of passing of a resolution, where poll not demanded.



Poll.

Power to adjourn General Meeting

In what cases Poll taken without adjournment.

Business may proceed notwithstanding demand of poll.

Chairman's Decision conclusive.

Votes of Members.

Voting by proxy on show of hands.

Vote in respect of
Shares of
Deceased and
Bankrupt
Members.

64. Any Person entitled under the transmission clause to any share may vote at any general meeting in respect thereof in the same manner as if he were the registered holder of such shares provided that forty eight hours at least before the time of holding the meeting or adjourned meeting as the case may be, at which he proposes to vote, he shall satisfy the Board of Directors of his right to such shares, unless the Board of Directors shall have previously admitted his right to such shares or his right to vote at such meeting in respect thereof.

Joint Holders.

65. Where there are joint registered holders of any share any one of such persons may vote at any meeting either personally or by proxy, in respect of such shares as if he were solely entitled thereto, and if more than one such joint holders be present, the joint holder whose name stands first on the register in respect of such share shall alone be entitled to vote in respect thereof. Several executors or administrators of a deceased member in whose name any share stands shall for the purpose of this clause be deemed joint holder thereof.

Votes in respect of
shares of
Members of
Unsound Minds

66. A member of unsound mind, or in respect of whom an order has been made by any court having jurisdiction in lunacy may vote either on a show of hands or on poll by his committee or other legal guardian, and any such committee or guardian may on a poll, vote by proxy.

Proxies permitted

67. On a poll, votes may be given either personally or by proxy or by duly authorised representative.

Instrument
appointing Proxy
to be in writing.

68. A member entitled to attend and vote at a meeting may appoint another person (Whether a member or not) as his proxy to attend a meeting and vote on a poll. No member shall appoint more than one proxy to attend on the same occasion. A proxy shall not be entitled to speak at a meeting or to vote except on a poll. The instrument appointing a proxy shall be in writing and be signed by the appointer or his attorney duly authorised in writing or if the appointer is a body corporate, be under its seal or be signed by an officer or an attorney duly authorised by it.

Instrument
Appointing Proxy
to be deposited at
Office.

69. The instrument appointing a proxy and the power of attorney or other authority, if any, under which it is signed, or a notarially certified copy of the power or authority, shall be deposited at the registered office of the Company not less than forty eight hours before the time for holding the meeting or adjourned meeting at which the person named in the instrument proposes to vote, or in the case of a poll not less than 24 hours before the time appointed for taking of the poll and in default the instrument of proxy shall not be treated as valid.

70. A Vote given in accordance with the terms of an instrument of proxy shall be valid notwithstanding the previous death or insanity of the principal or the , revocation of the proxy or of the authority under which the proxy was executed or the transfer of the shares in respect of which the proxy is given provided that no intimation in writing of such death, insanity, revocation, or transfer or transmission shall have been received at the office of the Company before the commencement of the meeting or adjourned meeting at which the proxy is used.

71. The instrument appointing a proxy shall be in either of the forms in schedule IX to the Act, or a form as near thereto as circumstances admit.

72. No member shall be entitled to be present, or to vote on any question either personally or by proxy at any general meeting or upon a poll, or be reckoned in quorum whilst any call or other sum shall be due and payable to the Company in respect of any of the shares of such members.

73. No objection shall be made to the validity of any vote except at the meeting or poll at which such vote shall be tendered, and every vote whether given personally or by proxy, not disallowed at such meeting or poll, shall be deemed valid for all purposes of such meeting or poll whatsoever.

74. (a) Until otherwise decided by the Company in a General meeting, the number of Directors shall not be less than three and more than fifteen. The Directors are not required to hold any qualification shares.

(b) One third of the Board of Directors shall be appointed by Govt. while the remaining $\frac{2}{3}$ shall be appointed by the Company at the Annual General Meeting.

(c) At the Annual General Meeting in every year, one third of the Board of Directors for the time being other than the Directors appointed by the Govt. shall be liable to retirement by rotaion or if their number is not three or a multiple of three then the number nearest to one-third shall retire from office.

When vote by proxy valid though Authority revoked.



No Memeber entitled to vote etc., while call due to Company.

Time for objection to vote.

Number of Directors

- (d) The Directors to retire in every year shall be those who have been longest in office since their last election, but as between the persons who became Directors, on the same day, those who retire shall unless they otherwise agree among themselves, be determined by lot.
- (e) Govt. shall have the power to remove any Director appointed by them, at any time in their absolute discretion.
- (f) The following shall be the first Directors of the Company.

1. Thiru C.V.R. Panikar, I.A.S.,
Chairman and Managing Director,
TIDCO, Chennai - 2
2. Thiru K.P. Geethakrishnan, I.A.S.
Director (Finance),
TIDCO, Chennai - 2.
3. Thiru A. Padmanabhan, I.A.S.
Secretary to Government of
TamilNadu,
Industries Department,
Chennai - 9.
4. Thiru S. Guhan, I.A.S.
Special Secretary to Govt. of
Tamilnadu Finance Department,
Chennai - 9.
5. Thiru B. Vilaya Raghavan, I.A.S.
Secretary to Govt. of Tamilnadu
Public works Department,
Chennai - 9.
6. Thiru K. Venkatesan, I.A.S.
Director of Industries and
Commerce, Chepauk, Chennai - 5.
7. Thiru R.A. Seetharam Das, I.A.S.
Chairman and Managing Director
Tamilnadu Harijan Housing and
Development Corporation Ltd.,
Chennai - 6.



8. Thiru P. Sivalingam, B.E. (HONS),
M.S. (Calif) F.I.E. (IND)
Chief Engineer, Public works
Department, Chepauk,
Chennai - 5.

74. (g) Notwithstanding anything to the contrary contained in these Articles, so long as any monies remain owing by the Company to the Industrial Development Bank of India (IDBI) Industrial Finance Corporation of India (IFCI), The Industrial Credit and Investment Corporation of India (ICICI) or to any other Finance Corporation or Credit Corporation or to any other Financing Company or Body out of any loans granted by them to the Company or so long as IDBI, IFCI, ICICI, or any other Financing Corporation or Credit Corporation or any other Financing Company or Body (each of which IDBI, IFCI, ICICI, or any other finance corporation or credit corporation any other Financing Company or Body is hereinafter in this Article referred to as "the Corporation") continue to hold Debentures in the Company by direct subscription or private placement, or so long as the Corporation holds Shares in the Company as a result of underwriting or direct subscription or so long as any liability of the Company arising out of any Guarantee furnished by the Corporation on behalf of the Company remains outstanding, the Corporation shall have a right to appoint from time to time, any person or persons as a Director or Directors whole time or non whole time, (which Director or Directors is are hereinafter referred to as 'Nominee Director/s') on the Board of the Company and to remove from such office any person or persons so appoint and to appoint any person or persons in his or their places.

The Board of Directors of the Company shall have no power to remove from office the nominee Director/s. At the option of the Corporation such Nominee Director/s, shall not be required to hold any share qualification in the Company Also at the option of the Corporation such Nominee Directors shall not be liable to retirement by rotation of Directors. Subject as aforesaid, the Nominee Director/s shall be entitled to the same rights and privileges and be subject to the same obligations as any other Director of the Company. The Nominee Director/s so appointed shall hold the said office only so long as any moneys remain owing by the Company to the Corporation or so long as the Corporation holds Debentures in the Company as result of direct subscription or private placement or so long as the Corporation holds Shares in the Company as a result of under writing or direct subscription



or the liability of the company arising out of the Guarantee is outstanding and the Nominee Directors so appointed in exercise of the said power shall ipso facto vacate such office immediately the moneys owing by the company to the Corporation are paid off or on the Corporation ceasing to hold Debentures Shares in the Company or on the satisfaction of the liability of the Company arising out of the Guarantee furnished by the Corporation.

The Nominee Director/s appointed under this Article shall be entitled to receive all notices of and attend all General Meetings, Board Meetings and of the Meetings of the Committee of which nominee Director/s is/are member/s as also the minutes of such meetings. The Corporation shall also be entitled to receive all such notices and minutes.

The Company shall pay to the Nominee Director/s sitting fees and expenses which the other Directors of the Company are entitled, but if any other fees, commission, monies or remuneration in any form is payable to the Director/s of the Company, the fees, commission, monies and remuneration in relation to such Nominee Director/s shall accrue to the Corporation and same shall accordingly be paid by the Company directly to the Corporation. Any expenses that may be incurred by the corporation or such nominee Director/s in Connection with their appointment or Directorship shall also be paid or reimbursed by the Company to the Corporation or as the case may be to such Nominee Director/s.

Provided that if any such Nominee Director/s is an officer of the Corporation the sitting fees, in relation to such Nominee Director/s shall also accrue to the Corporation and the same shall accordingly be paid by the Company directly to the Corporation.

Provided further that if such Nominee Director/s is an officer of the Reserve Bank of India, the sitting fees in relation to such Nominee Director/s shall also accrue to IDBI and the same shall accordingly be paid by the company directly to IDBI.

In the event of the Nominee Director/s being appointed as whole time Director/s, such Nominee Director/s shall exercise such powers and such rights as are usually exercised or available to a whole time Director in the Management of the affairs of the Company. Such whole time Director/s shall be entitled to receive such remuneration fees, commission and monies as may be approved by the Corporation.

75. If the office of any Director other than one appointed by Govt. becomes vacant before the expiry of the period of directorship in the normal course, the resulting casual vacancies may be filled up by the Board of Directors, at a meeting of the Board. Any person so appointed shall hold office only upto the date to which the Director in whose place he was appointed would have held office if the vacancy had not occurred as aforesaid.

Casual vacancy.

In case of the Director appointed by Govt. the vacancy to be filled in by Govt. and such Director shall hold office upto the date to which the Director in whose place he was appointed would have held office if the vacancy had not occurred as aforesaid.



76. The Board of Directors may, from time to time, appoint any person as an additional Director provided that the number of Directors and additional Directors together shall not exceed the maximum number of Directors fixed under Article 74(a) above. Any person so appointed as an additional Director shall hold office upto the date of the next Annual General Meeting of the Company.

Additional Director.

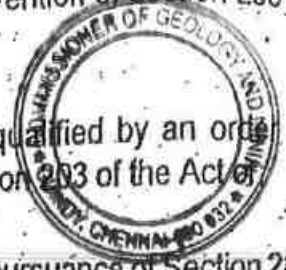
77. (1) The office of a Director shall be vacated if :

Vacation of office by Directors.

- a. he is found to be of unsound mind by a Court of Competent jurisdiction.
- b. he applied to be adjudicated an insolvent;
- c. he is adjudged an insolvent;
- d. he is convicted by a Court of any offense involving moral turpitude and is sentenced in respect thereof to imprisonment for not less than six months;
- e. he absents himself from three consecutive meetings of the Board of Directors or from all meetings of the Board for a continuous period of three months, which ever is longer without obtaining leave of absence from the Board.
- f. he (whether by himself or by any person for his benefit or on his account) or any firm in which he is a partner or any private company of which he is a Director accept

a loan or any guarantee or security for a loan from the Company in contravention of Section 295 of the Act.,

- g. he acts in contravention of section 299 of the Act.
- h. he becomes disqualified by an order of Court under Section 293 of the Act or
- i. he is removed in pursuance of Section 284 of the Act.



(2) Notwithstanding anything in clauses (d), (e) and (h) aforesaid, the disqualification referred to in those clauses shall not take effect.

- a. for thirty days from the date of the adjudication;
- b. where any appeal or petition is preferred within the thirty days aforesaid against the adjudication, sentence or conviction resulting in the sentence, or order until the expiry of seven days, from the date of which such appeal or petition is disposed of; or
- c. where within the seven days aforesaid, any further appeal or petition is preferred in respect of the adjudication, sentence, conviction or order and the appeal or petition, if allowed, would result in the removal of the disqualification, until such further appeal or petition is disposed of.

Alternate Director.

- 78. a. If a Director is absent from Tamil Nadu for a period of not less than three months, the Board of Directors or Govt. in case if that Director was their appointee may appoint an alternate Director during the said period of absence,
- b. An alternate Director appointed as aforesaid shall not hold office as such for a period longer than that permissible to the original Director in whose place he has been

appointed and shall vacate office if and when the original Director returns to the State in which meetings of the Board are ordinarily held.

79. Subject to the provisions of Section 252, 255 and 259 of the Act, the Company in General Meeting may increase or reduce the number of Directors subject to the limits set out in clause 74 (a) of the Articles of Association of the Company, and may also determine in what rotation the increased or reduced number is to retire.

80. Subject to the provisions of Section 284, the Company may by an ordinary resolution remove any Director who is subject to retirement by rotation before the expiration of his period of office and by an ordinary resolution appoint another person in his stead the person so appointed shall be subject to retirement at the same time as if he had become a Director on the day on which the Director in whose place he is appointed was last elected as Director.

81. a. *The Directors shall be entitled to such sitting fees for attending meetings of the Board of Directors or a Committee or sub-committee thereof, as may be fixed by the Board of Directors as prescribed by the Government from time to time and subject to the provisions of the Act.

b. in addition to the remuneration payable to them in pursuance of the Act, the Directors may be paid all travelling hotel and other expenses properly incurred by them (i) attending to and returning from meeting of Board of Directors or any committee thereof or (ii) in connection with the business of the Company.

82. The business of the Company shall be managed by the Board of Directors who may all expenses incurred in getting the Company registered and may exercise all such powers of the Company as are not, by the Act or any statutory modification thereof for the time being in force or by these articles, required to be exercised by the Company in general meeting, subject nevertheless to the provisions of these Articles to the provisions of the Act, and to such regulations being not inconsistent with the provisions, as may be prescribed by the Company in general meeting but no regulation made by the Company in general meeting shall invalidate any prior act of the Directors which would have been valid if that regulation had not been made.

*Substituted by means of Special Resolution passed by the Shareholders at the Extraordinary General Meeting held on 21st February 2013.



Powers of General Meeting to increase or reduce number of Directors.

Powers to remove Directors by ordinary resolution.

Sitting fees and travelling allowance to the Directors.

General powers of Company vested in Board of Directors.

**Specific powers to
the Board of
Directors.**

83. Without prejudice to the general powers conferred by Article 76, and the other powers conferred by these Articles but subject to the provisions of section 292 of the Act, the Board of Directors shall have the following powers namely:

1. to purchase, take on lease or otherwise acquire for the Company, property rights or privileges which the Company is authorised to acquire at such price, and generally on such terms and conditions as they think fit;
2. to authorise the undertaking of works of a capital nature, subject to the condition that all cases involving a capital expenditure exceeding rupees ten lakhs shall be referred to Govt. for their approval before authorisation;
3. to pay for any property, rights or privileges acquired by, or services rendered to the Company either wholly or partially in cash or in shares, bonds, debentures or other securities of the Company and any such shares may be issued either as fully paid up or with such amount credited as paid up thereon as may be agreed upon; and any such bonds, debentures or other securities may be either specifically charged upon all or any part of the property of the Company and its uncalled capital or not so charged;
4. to secure the fulfillment of any contracts or engagements entered into by the Company by mortgage or charge of all or any of the property of the Company and its uncalled capital alignment for the time being or in such other manner as they may think fit;
5. to appoint at their discretion, remove or suspend such manager, secretaries, officers, clerks, agents and servants for permanent, temporary or special services, as they may from time to time, think fit, and to determine their powers and duties and fix their salaries or emoluments and to require security of such amount as they think fit in such instances;

1. Provided that no post which are in the first two levels below the Managing Director carrying the time scale of pay of Rs.10,000-325-15,200 and above shall be created/upgraded without prior approval of Government.

2. Provided further that no appointment/ promotion of persons which are in the first



level and who are directly reporting to Managing Director carrying a time scale of Rs.10,000-325-15,200 and above shall be made with out prior approval of the Government.

6. to appoint any person or persons (whether incorporated or not) to accept and hold in trust for Company any property belonging to the Company or in which it is interested or for any other purposes; and to execute, and do such deeds and things as may be requisite in relation to any such trust. and to provide for the remuneration of such trustee or trustees;

7. to institute, conduct, defend, compound or abandon any legal proceedings by or against the Company or its officers or otherwise concerning the affairs of the Company and also to compound and allow time for payment or satisfaction of any claims of demands by or against the Company;

8. to refer any claims or demands by or against the Company to arbitration, and observe and perform the awards;

9. to make and give receipts, releases and other discharges for money payable to the Company and for the claims and demands of the Company.

10. to determine the person who shall be entitled to sign on the Company's behalf, bills, notes, receipts acceptances, endorsements, claques, releases, contracts and documents;

11. to appoint any person to be the attorney or agent of the Company with such powers (including power to subdelegate) and upon such terms as may deem fit;

12. to invest in the reserve Bank of India or in such securities as may be approved by Govt. and deal with any of the moneys of the Company upon such investments authorised by the Memorandum of Association of the Company (not being shares in this Company) and in such manner as they think fit, and from time to time to vary or release such investments;

13. to execute in the name and on behalf of the Company in favour of any director or other person who may incur or be about to incur any personal liability for the benefit of the Company such mortgages of the Company's property present and future, as they think fit and any such mortgage may contain a power of sale and such other powers, covenants and provisions as shall be agreed upon;



14. Subject to the approval of Govt. to give to any person employed by the Company a commission on the profits of any particular business transaction or a share in the general profits of the Company, and such commission or share of profits shall be treated as part of the working expenses of the Company;
15. from time to time to make, vary and repeal byelaws for the regulation of the business of the company, its officers and servants.
16. to give, award or allow any bonus, pension, gratuity or compensation to any employee, or the Company or his widow, children or dependents, that may appear to the Directors just or proper, whether such employee, his widow, children or dependants have or have not a legal claim upon the Company;
17. before declaring any dividend and subject to the approval of Govt. to set aside such portion of the profits of the Company as they may think fit, to form a fund to provide for such pensions, gratuities or compensation or to create any provident or benefit fund in such manner as the Directors may deem fit;
18. from time to time and at any time to establish any Local Board for managing any of the affairs of the Company in any specified locality in the State of Tamil Nadu or out of the State of Tamil Nadu and to appoint any persons to be members of such Local board and to fix their remuneration, and from time to time and at any time to delegate to any person so appointed any of the powers, authorities and discretion for the time being vested in the Directors other than their power to make call; and to authorise the members for the time being of any such Local Board or any of them to fill up any vacancies therein and to act notwithstanding vacancies and any such appointment or delegation may be made in such terms and subject to such conditions as the Directors may think fit and the Directors may at any time remove any person so appointed and may annual or vary any such delegation:
19. to enter into all such negotiations and contracts and rescind and vary all such contracts and execute and do all such acts, deeds and things in the name and on behalf of the Company as they may consider expedient for or in relation to any of the matters aforesaid or otherwise for the purpose of the Company; and
20. Subject to Section 292 of the Act to delegate all or any of the powers, authorities and discretion for the time being

vested in them, subject however to the ultimate control and authority being retained by them.

84. (1) Government may appoint anyone of the Directors of the Board to be the Managing and / or wholetime Director or Chairman for such period and upon such terms as it may think fit for the conduct or management of the business of the Company subject to the control and supervision of the Board of Directors. The Managing Director and / or wholetime Director or Chairman so appointed may be authorised by the Board to exercise such of the powers and discretion in relation to the affairs of the Company as are specifically delegated to him/them by the Board and are not required to be done by the Board of Directors of the Company at the General Meeting under the Act.
- (2) The Managing Director and / or whole time Director or Chairman shall be paid such salary and allowances as may be fixed by Govt.
- (3) In the absence of the Managing Director on leave or otherwise, the Board may with the previous approval of Govt. empower any other Director or Chairman or any principal officer of the Company to perform all or any of his functions and duties provided that where such absence is not likely to exceed three months, the previous approval of Govt. Shall not be necessary.



85. The Directors shall cause minutes to be made in books provided for the purpose-
- (a) of all appointments of officers made by the Directors;
- (b) of the names of the Directors present at each meeting of the Directors and of any Committee of the Directors;

Directors to cause Minutes to be made in the Books.

(c)

of all resolution and proceedings at all meetings of the Company and of the Directors and of the Committee of Directors; and every Director present at any meeting of Directors or Committee of Directors shall sign his name in a book to be kept for the purpose.

Seal

86. The seal of the Company shall not be affixed to any instrument except by the authority of a resolution of the Board of Directors and except in the presence of atleast two Directors and Secretary or such other person as the Board may appoint for the purpose; and the said Directors and Secretary or the person aforesaid shall sign every instrument to which the seal is so affixed in his presence.

Meeting of Directors and quorum.

87. The Directors may meet together for the transaction of business once in every three calendar months and at least four such meetings shall be held in every year. They may adjourn and otherwise regulate their meetings and proceedings as they think fit. One third of the total strength of Directors, (any fraction contained in that one third being rounded off as one) or minimum two disinterested directors whichever is higher shall be a quorum.

Place of meeting

88. The meeting of the Board may be held at the registered office or anywhere else within the State of Tamil Nadu if it is in the interest of the Company.

Director may summon meeting. How questions to be decided?

89. A Director may at any time convene a meeting of the board of Directors and questions arising at any meetings shall be decided by majority of votes. The Chairman shall have a second or casting vote.

Power of quorum.

90. A meeting of the Board of Directors at which a quorum is present shall be competent to exercise all or any of the Authorities, powers and discretion by or under the Articles of the Company for the time-being vested in or exercisable by the Board of Directors generally.

Chairman of Directors' Meetings.

91. Government may nominate a Director as Chairman of the Director's meetings and determine the period for which he is to hold office. If no such Chairman is nominated, or if at any meeting the Chairman is not present within 5 minutes after the time for holding the same, the Directors present may choose one of their members to be Chairman of the meeting.

92. The Chairman shall reserve for the decision of Govt. any proposals or decisions of the Board of Directors or any matter brought before the Board which arises, in the opinion of the Chairman an important issue and which is on that account fit to be reserved for the decision of Govt. and no decision on such an important issue shall be taken in the absence of the Chairman appointed by Govt.



In respect of matters reserved by the Chairman for decision of Govt. if the Govt. views are not received within a period of two months, the Board of Directors shall be entitled to act in accordance with the proposal or decision without further reference to Govt.

93. The Board of Directors may, subject to the restrictions laid down in Section 292 of the Act, delegate any of their powers to Committees consisting of such member or members of their body as they think fit and may, from time to time, revoke such delegation. Any committee so formed shall, in the exercise of the powers so delegated, conform to any regulations that may, from time to time, be imposed upon it by the Board of Directors.

**Delegation of
powers of
Committees**

94. A Committee may elect a chairman of their meetings. If no such Chairman is elected or if at any meeting the Chairman is not present within 5 minutes after the time appointed for holding the same, the members present may choose one of their members to be chairman of the meeting.

**Chairman of
meetings of
Committees.**

95. All acts done by any meeting of the Board of Directors or of a Committee of Directors, or by any person acting as a Director, shall notwithstanding that it be afterwards discovered that there was some defect in the appointment of such Directors or persons acting as aforesaid, or that they or any of them were disqualified, be as valid as if every such person had been duly appointed and was qualified to be a Director, provided that nothing in this article shall be deemed to give validity to acts done by a Director after his appointment has been shown to the Company to be invalid or to have terminated.

**When actions of
Directors of
Committees valid
not with-standing
defective
Appointment.**

96. Save as otherwise expressly provided in the Act, a resolution in writing signed by all the Directors then in India or by a majority of such of them as are entitled to vote on the resolution shall be as valid and effectual as if it had been passed at meeting of the Directors duly called and constituted.

**Resolution
without Board
Meeting valid.**



Reserve Fund.

97. Subject to such directions as may, from time to time be issued by Govt. in this behalf, the Board of Directors may before recommending any dividend, set aside out of the profits of the Company such sums as they think proper as a reserve fund to meet contingencies or for equalising dividends, or for special dividends, or for repairing, improving and maintaining any of the property of the Company, and for amortisation of capital and for such other purposes as the Board of Directors shall in their absolute discretion think conducive to the interests of the company, and may invest the several sums so set aside upon such investments (other than shares of the Company) as they may think fit from time to time, deal with and vary such investments, and dispose of all or any part thereof for the benefit of the Company and may divide the reserve funds into such special funds, as they think fit, and employ the reserve funds or any part thereof into the business of the Company and without being bound to keep the same separate from the other assets.

Dividends.

98. The profits of the company available for payment of dividend subject to any special rights relating thereto created or authorised to be created by these presents subject to the provisions of these presents as to the reserve fund and amortisation of capital shall with the approval of Govt. be divisible among the members in proportion to the amount of capital held by them respectively.

Provided always that any capital paid up on a share during the period in respect of which a dividend is declared shall only entitle the holder of such share to an apportioned amount of such dividend as from the date of payment.

Capital paid up in advance.

99. Where capital is paid up on any share in advance of calls upon the footing that the same shall carry interest such capital shall not, whilst carrying interest, confer a right to participate in profits.

Declaration of dividends.

100. The company in General meeting may declare a dividend to be paid to the members according to their rights and interest in the profits and may fix the time for payment, but no dividend shall exceed the amount recommended by the Directors.

Dividends out of profits only and not to carry interest.

101. No dividend shall be payable otherwise than out of the profits of the year or other period or any other undistributed profits of the Company and no dividend shall carry interest as against the Company.

102. The declaration of the Board of Directors as to the amount of the net profits of the Company shall be conclusive.

When to be deemed net profit.

103. Subject to the provisions of Section 205 of the Act, the Board of Directors may, from time to time, pay to the members such interim dividends as may be decided by them having regard to the position of the Company.

Interim Dividend.



104. The Board of Directors may retain any dividends on which the Company as a lien, and may apply the same in or towards satisfaction of the debts, liabilities, or engagements in respect of which the lien exists.

105. Any general meeting declaring a dividend may make a call on the members of such amount as the meeting fixes, but the call on each member shall not exceed the dividend payable to him and the call be made payable at the same time as the dividend, and the dividend may, if so arranged between the Company and the members, be set off against the call. The making of a call under this clause shall be deemed ordinary business of an ordinary general meeting which declares a dividend.

Dividend and Call together.

106. Any general meeting declaring a dividend may resolve or direct that such dividend wholly or in part be paid in cash in accordance with Section 205 of the Act and in particular of paid up share debenture or debenture stock of any other company, or may appoint any person to sign such contract on behalf of the person entitled to the dividend of the capitalised fund, and such appointment shall be effective.

Dividends or Bonus payable wholly or partly in cash.

107. A transfer of shares shall not pass the right to any dividend declared thereon after transfer and before the registration of the transfer.

Effect of transfer.

108. The Board of Directors may retain the dividends payable upon the shares in respect of which any person is under Article 23 entitled to become a member or which any person under that clause is entitled to transfer, until such person shall become a member in respect of such shares or shall duly transfer the same.

Retention in certain cases.

109. Any one of the several persons, who are registered as the joint holders of any share may give effectual receipts for all dividends and payments on account of dividends in respect of such shares.

Dividend to joint Holders

Payment by Post.

110. Unless otherwise directed, any dividend may be paid by cheque or warrant through post to the registered address of the member of person entitled or in the case of the joint holders, to the address of that one whose name stands first in the register in respect of the joint-holding; or to such person and to such address as the shareholder or joint-holder may in writing direct, and every cheque or warrant so sent shall be made payable to the order of the person to whom it is sent.

Notice of Dividend.

111. Notice of the declaration of any dividend, whether interim or otherwise, shall be given to the holder of registered shares in the manner hereinafter provided.

Accounts to be kept.

112. The Company shall cause to be kept proper books of accounts with respect to :

- a) All sums of money received and expended by the Company and the matters in respect of which the receipt and expenditure takes place;
- b) all sales and purchases of goods by the Company;
- c) the assets and liabilities of the Company

Inspection of Account Books

113. The books of account shall be kept at the registered office of the Company or at such other place as the Directors shall think fit and shall be open to inspection by the Directors during business hours.

Inspection of Members.

114. The Board of Directors shall, from time to time determine whether and to what extent and at what times and places and under what conditions or regulation the accounts and books of the Company or any of them shall be open to the inspection of members (not being Directors) and no member (not being a Director) shall have any right of inspecting any account or book or document of the Company except as conferred by law or authorised by the Directors or by the Company in general meeting.

Annual Accounts and Balance sheet

115. The Board of Directors shall at some date not later than 18 months after the incorporation of the Company and subsequently once atleast every year lay before the Company in general meeting a balance sheet and profit and loss account, in the case of the first account since the incorporation of the Company and in any other case since the preceding account made up to a date not earlier than the date of the meeting by more than six months.

116. The Chairman of the Board of Directors shall cause an annual report to be made out and attached to every balance sheet a report with respect to the state of the Company's affairs, the amount, if any, which they recommend should be paid by way of dividend and the amount, if any, which they propose to carry to the Reserve Fund, General Reserve or Reserve Account shown specifically on the balance sheet or to a Reserve Fund, General Reserve or Reserve Account to be shown specifically in a subsequent balance sheet. The report shall be signed by the Chairman of the Board of Directors on behalf of Directors if authorised in this behalf by the Directors and when he is not so authorised shall be signed by such number of Directors as are required to sign the balance sheet and the profit and loss account by virtue of sub-sections (1) and (2) of Section 215 of the Act.

117. Forms of balance sheet and profit and loss account should be in accordance with the provisions of Section 211 of the Act. The profit and loss account shall, in addition to the matters referred to in Section 211 of the Act, so arranged under the most convenient heads, the amount of gross income, distinguishing the several sources from which it has been derived, and the amount of gross expenditure, distinguishing the expenses of the establishment, salaries and other like matters. Every item of expenditure fairly chargeable against the year's income shall be brought into account so that a just balance of profit and loss may be laid before the meeting, and in cases where any item of expenditure which may in fairness be distributed over several years has been incurred in any one year, the whole amount of such item shall be stated, with the addition of the reasons why only a portion of such expenditure is charged against the income of the year.

118. The Company shall send a copy of such balance sheet and profit and loss account together with a copy of the auditor's report to the registered address of every member of the Company in the manner in which notices are to be given hereunder at least twenty one days before the meeting at which it is to be laid before the members of the Company and shall deposit a copy at the registered office of the Company for inspection of the members of the Company during a period of at least twenty one days before the meeting.

119. The Directors shall in all respects comply with the provisions of Sections 209 to 222 of the Act, or any statutory modification thereof for the time being in force as may be applicable to the Company.

**Annual Report of
Directors.**



**Contents of Profit
and Loss Account.**

**Balance sheet and
Profit and Loss
Account to be sent
to Members.**

**Directors to
comply with
Section 209 to 222
of the Act.**

Accounts to be audited annually.

120. Once at least in every year the accounts of the Company shall be examined and the correctness of the profit and loss account and balance sheet ascertained by one or more auditors as provided in the Act.

Appointment of Auditors.

121. The auditors of the Company shall be appointed or reappointed by the Central Government on the advice of the Comptroller and Auditor-General of India and their rights and duties shall be regulated by Sections 224 to 233 of the Act.

Auditors right to attend meetings.

122. The auditors of the Company shall be entitled to receive a notice of and to attend any general meeting of the Company at which any accounts which have been examined or reported on by them are to be laid before the Company and may make any statement or explanation they desire with respect to the accounts.

Powers of the Comptroller and Auditor-General of India.

123. The Comptroller and Auditor-General of India shall have power :

- a) to direct the manner in which the Company's accounts shall be audited by the auditors appointed in pursuance of Article 121 here of and to give such auditors instructions in regard to any matter relating to the performance of their functions as such ;
- b) to conduct a supplementary or test audit of the Company's accounts by such person or persons as he may authorise in his behalf; and for the purposes of such audit, to have access at all reasonable times, to all accounts, accounts books, vouchers documents and other papers of the Company and to require information or additional information to be furnished to any person or persons so authorised, on such matters, by such person or persons and in such form, as the Comptroller and Auditor-General of India may by general or special order, direct,

Comments upon or supplement to audit report by the

124. The auditors aforesaid shall submit a copy of their audit report to the Comptroller and Auditor-General of India who shall have the right to comment upon

audit report in such manner as he may think fit. Any such comments upon or supplement to the audit report shall be placed before the annual general meeting of the Company at the same time and in the same manner as the audit report.

125. Every accounts of the Company when audited and approved by General Meeting shall be conclusive. Whenever any minor or obvious errors in the accounts were subsequently found out the Board of Directors can correct such minor or obvious errors if any substantial errors and acts of commission or omission are found out in the accounts as approved by the General Meeting necessary rectification should be made only in the accounts of the Company for the succeeding financial year.

126. Notwithstanding anything contained in any of these article, Govt. may, from time to time, issue such directives as they may consider necessary in regard to the conduct of business of the Company or Directors thereof and in like manner may vary and annual any such directive. The Board of Directors shall give immediate effect to directives so issued.

127. A notice may be given by the Company to any member either personally or by sending it by post, to him to his registered address, or (if he has no registered address) to the address if any supplied by him to the Company for the giving of notice to him.

128. A holder of register shares, who has no registered place of address may from time to time, notify in writing to the Company an address, which shall be deemed his registered place of address, within the meaning of Article 127.

129. If a member has no registered address and has not supplied to the Company an address for the giving of notices to him, a notice addressed to him and advertised in newspapers circulating in the neighbourhood of the registered office of the Company, shall be deemed to be duly given to him on the date on which the advertisement appears.

130. A notice may be given by the Company to the joint holders of a share by giving the notice to the joint holder named first in the register in respect of the share.

Comptroller and Auditor-General of India to be placed before ordinary meetings

Accounts to be deemed finally settled



Right of Govt.

How notices to be served on members.

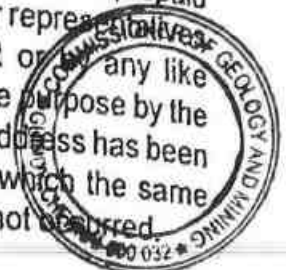
Notification of address by a holder of registered shares having no registered place of address.

When notice may be given by Advertisement.

Notice to joint holders.

How notice to be given to representatives of a deceased or a bankrupt member.

131. A notice may be given by the Company to the persons entitled to a share in consequence of the death or insolvency of a member by sending it through the post in a prepaid letter addressed to them by name, or by the title or representative of the deceased or assignee of the insolvent or any like description, at the address (if any) supplied for the purpose by the persons claiming to be so entitled (until such an address has been so supplied) by giving notice in any manner in which the same might have given if the death or insolvency had not occurred.



To whom notice of general meeting to be given.

132. Notice of every general meeting shall be given in the same manner herein before authorised to (a) every member of the Company except those members who having no registered address have not supplied to the Company an address for the giving of notice to them, and also to (b) every person entitled to a share in consequence of the death or insolvency of a member, who, but for his death or insolvency, would be entitled to receive notice of the meeting provided the Company has due notice.

Transferees, etc. bound by prior notice.

133. Every person, who by operation of law, transfer or other means whatsoever, shall become entitled to any share shall be bound by every notice in respect of such share which previously to his name and address and title to the share being notified to and registered by the Company, shall be duly given to the person from whom he derives his title to such share.

How notice to be signed.

134. The signature to any notice to be given by the Company may be written or printed.

How time to be counted.

135. Where a given number of days notice or notice extending over any other period is required to be given the day of service shall, unless it is otherwise provided be counted in such number of days or other period.

Distribution of assets on winding up.

136. If the company shall be wound up and the assets available for distribution among the members as much shall be insufficient to repay the whole of the paid up capital, such assets shall be distributed so that, as nearly as may be the losses shall be borne by the members in proportion to the capital paid up or which ought to have been paid up at the commencement of the winding up, on the shares held by them respectively. And if in a winding up the assets available for distribution among the members shall be more than sufficient to repay the whole of the capital paid up, the excess shall be distributed among the members in proportion to the capital paid up or which ought to have been paid up on the shares held by them respectively. But this clause shall be without prejudice to the rights of the holders of shares issued upon special terms and conditions.

137. No member shall be entitled to require discovery or any information respecting any detail of Company's trading or any matter which may be in the nature of a trade secret, mystery of trade or secret process which may relate to the conduct of the business of the Company and which in the opinion of the Directors it will be inexpedient in the interests of the members of the Company to communicate to the public.

138. Subject to the provisions, of Section 201 of the Act, every Director, Manager, Auditor, Secretary and other officer or servant of the Company shall be indemnified by the Company against, and it shall be the duty of the Directors out of the funds of the Company to pay all costs, losses and expenses which any such officer or servant may incur or become liable to, by reason of any contract entered into, or act or thing done by him as such officer or servant or in any way in the discharge of his duties; and the amount for which such indemnity is provided shall immediately attach as a lien on the property of the Company, and have priority as between the members over all other claims.

139. No Director, or other officer of the Company shall, be liable for the acts, receipts, neglects or defaults of any other Director or Officer of the Company or for joining in any receipt or other act for conformity or for any loss of expenses happening to the Company through the insufficiency or deficiency of title to any security in or upon which any of the moneys of the Company shall be invested or for any loss or damage arising from the bankruptcy, insolvency or tortuous act of any person with whom any moneys securities or effect shall be deposited or for any other loss, damage or misfortune whatever which shall happen in the execution of the duties of his office or in relation thereto, unless the same happens through his own negligence, default, misfeasance, breach of duty, or breach of trust.

Secrecy Clause.



Indemnity.

**Individual
responsibility of
Directors.**

Name of subscriber	Address, description and occupation, if any	Signature of subscribers	Signature of Witness and their addresses, description and occupation.
C.V.R. PANIKAR, S/o. Thiru. I.A. Panikar	Chairman & M.D. TIDCO, 150-A, Anna Salai, Chennai - 2.	(Sd.) C.V.R. PANIKAR	(Sd.) A. Duraipandian Spl. Officer in Tamilnadu Cements, 150-A, Anna Salai, Chennai - 2. 
S. GUHAN S/o. Dr. K.S. Sanjivi	Finance Secretary Govt. of Tamil Nadu	(Sd.) S. GUHAN	"
A. PANDMANABAN S/o. Thiru. D. Anandam	Secretary (Industries) Govt. of Tamil Nadu	(Sd.) A. PADMA- NABAN	"
A.S. PADMANABAN S/o. A.P. Subramaniam	General Manager Tamilnadu Cements Alangulam.	(Sd.) A.S. PADMA- NABAN	(Sd.) S. Ramamurthy, Production Manager, Tamilnadu Cements, Alangulam
K.P. GEETHAKRISHNAN S/o. Dr. K.R. Parthasarathy	Director (Finance) TIDCO, 150-A, Anna Salai, Chennai - 2.	(Sd.) K.P. GEETHA- KRISHNAN	(Sd.) G. Muthukrishnan Deputy Secretary TIDCO, Chennai - 2.
K. PALANIMANICKAM S/o. Kulandaiya	Development Manager TIDCO 150-A, Anna Salai, Chennai - 2.	(Sd.) K. PALANI- MANICKAM	(Sd.) A. Duraipandian Special Officer for Tamilnadu Cements, 150-A, Anna Salai, Chennai - 2.
A.M. THANGARAJ S/o. Thiru E. Asirvatham	Secretary, TIDCO 150-A, Anna Salai, Chennai - 2.	(Sd.) A.M. THANGARAJ	"



TAMIL NADU CEMENTS CORPORATION LIMITED

(A GOVERNMENT OF TAMIL NADU UNDERTAKING)
 5th Floor, Aavin Illam, No.3A, Pasumpon Muthuramalinganar Salai,
 Nandanam, Chennai - 600 035
 Phone: 28525461, 28525471, CIN:U40200TN1976SGC007081
 GST IN:33AABCT1819J1ZH



E-mail: tancemcs@gmail.com / WEBSITE: www.tancem.in

Sl No.	List of Directors as on 31.01.2023
1.	Thiru S. Krishnan, IAS Additional Chief Secretary to Government Industries, Investment Promotion and Commerce Department Secretariat, Chennai - 600 009
2.	Thiru C. Kamaraj, IAS Managing Director M/s. Tamilnadu Cements Corporation Limited 5 th Floor Aavin Illam, No.3A, Pasumpon Muthuramalingan Salai Nandanam, Chennai - 600 035
3.	Dr. Darez Ahamed, IAS Commissioner Rural Development and Panchayat Raj Saidapet, Chennai - 600 015.
4.	Thiru. J. Jayakanthan, IAS Commissioner Geology and Mining Guindy, Chennai - 600 032.
5.	Tmt. R. Lilly, IAS Special Secretary to Government Industries, Investment Promotion and Commerce Department Secretariat, Chennai - 600 009
6.	Thiru. V. Dakshinamoorthy, IAS Managing Director TWAD Board, Chepauk, Chennai-600 005.
7.	Thiru. Pratik Tayal, IAS Deputy Secretary to Government Finance Department Secretariat, Chennai - 600 009.
8.	Thiru. R. Viswanath Engineer-in-Chief (Buildings) and Chief Engineer (Buildings) Public Works Department, Chepauk, Chennai -600 005
9.	Thiru. D. Rajendran Director(Generation) TANGEDCO 10 th Floor, Eastern Wing, 144, Anna Salai, Chennai-600 002
10.	Dr. G.Natarajan (Independent Director) 288, TTK Road, Alwarpet, Chennai - 600 018
11.	Thiru P.Krishnamurthi (Independent Director) 1B, Suvarna Lok 34, Melony Road, T.Nagar, Chennai - 600 017



For TAMIL NADU CEMENTS CORPORATION LIMITED

Lakshmi Hanuman

Dr. LAKSHMI HANUMAN
 COMPANY SECRETARY



TAMIL NADU CEMENTS CORPORATION LIMITED

(A GOVERNMENT OF TAMIL NADU UNDERTAKING)

Registered Office : 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai,
Nandanam, Chennai - 600 035

Phone : 044 - 2852 5461 / 2852 5471 | Website : www.tancem.in

CIN : U40200TN1976SGC007081 | GST IN : 33AABCT1819J1ZH



PROCEEDINGS OF THE MANAGING DIRECTOR

PRESENT : THIRU C.KAMARAJ, I.A.S

007027

Rc.No. /A1/2022.

DATE: 30.12.2022

Sub: Estt. - TANCEM RO - Thiru .T.Ravichandran, Dy. General
Manager(Tech)/Unit Head, TANCEM, Ariyalur cement Works
- Transferred and posted at Stoneware Pipe Factory,
Virudhachalam - Orders issued.



ORDER:

Due to administrative reasons, the following transfer orders are effected.

- 1) Thiru.T.Ravichandran, Deputy General Manager (Tech)/Unit Head, TANCEM, Ariyalur cement Works is transferred and posted along with post at TANCEM Storeware Pipe Factory, Virudhachalam to restart the defunct Stoneware Pipe Factory at Virudhachalam and also directed to prepare detailed proposal of DPR and explore the possibility of running and operating the Stoneware Pipe Factory and allied products.
- 2) Thiru R. Jayachandran, Manager (Tech) Incharge now looking after Ariyalur Old Cement Works is transferred to Ariyalur new cement works and also to hold additional charge of Ariyalur Old Cement Plant.

This orders come into force with immediate effect and all other terms of service will remain the same and Thiru Jayachandran will move first.


MANAGING DIRECTOR

To

Thiru T. Ravichandran,
Deputy General Manager (Tech)/Unit Head

Thiru R. Jayachandran,
Manager (Tech-Mech) Incharge

 	 
இந்திய அரசாங்கம் Unique Identification Authority of India	தகவல் ■ ஆதார் அடையாளத்திற்கான சான்று. குடியுரிமைக்கு அடையாள சான்ற ஆன்லைன் ஆதரவு கேஷன் மூலம் பெறவும். ■ இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்டதாகும்.
பதிவேட்டு எண்/ Enrolment No.: 2007/15299/19363 Download Date: 08/03/2013 To ரவிச்சந்திரன் தங்கவேல் Ravichandran Thangavel S/O: Thangavel NO 123 MAYAR MUTHU STREET KK NAGAR Tiruchirappalli K.k.nagar Tiruchirappalli Tamil Nadu - 620021 9095099647 Generation Date: 31/03/2013 Signature valid 	INFORMATION ■ Aadhaar is a proof of identity, not of citizenship. ■ To establish identity, authenticate online. ■ This is electronically generated letter. ■ ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும். ■ வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும். ■ Aadhaar is valid throughout the country. ■ Aadhaar will be helpful in availing Government and Non-Government services in future.
உங்கள் ஆதார் எண் / Your Aadhaar No. : 2278 8111 9370 VID : 9152 9925 7962 6830 எனது ஆதார், எனது அடையாளம்	தகவல் ■ ஆதார் அடையாளத்திற்கான சான்று. குடியுரிமைக்கு அடையாள சான்ற ஆன்லைன் ஆதரவு கேஷன் மூலம் பெறவும். ■ இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்டதாகும்.
இந்திய அரசாங்கம் Unique Identification Authority of India  ரவிச்சந்திரன் தங்கவேல் Ravichandran Thangavel பிறந்த நாள்/DOB: 10/06/1967 ஆண்/ MALE 2278 8111 9370 VID : 9152 9925 7962 6830 எனது ஆதார், எனது அடையாளம்	தகவல் ■ ஆதார் அடையாளத்திற்கான சான்று. குடியுரிமைக்கு அடையாள சான்ற ஆன்லைன் ஆதரவு கேஷன் மூலம் பெறவும். ■ இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்டதாகும். ■ ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும். ■ வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும். ■ Aadhaar is valid throughout the country. ■ Aadhaar will be helpful in availing Government and Non-Government services in future. 2278 8111 9370 VID : 9152 9925 7962 6830



Committed to Precision

LABORATORY | CONSULTANCY | SUSTAINABILITY

GLOBAL LAB AND CONSULTANCY SERVICES

ANNEXURE X

SI No 92/3A2 Geetha Na

Alagaparan, Pu

Salem - 636 016, Tamil Na

Phone: 0427 2970989 / 91 70944 531

E-Mail: lab@glcs

Web: www.glcs

TEST REPORT

Report Number: GLCS/TR/2060/2022- 23

Report Date: 02.01.2023

Issued To :

Tancem Stoneware Pipe Factory,
Vriddachalam,
Cuddalore District - 606 001



Attention	Mr. Prasad	Sample Receipt Condition	Packaged - Good
REF. No.	620	Sample Quantity	1 kg
Sample Name	Fire Clay - 1	Sampled by	Client
Sample Description	Powder (White)	Sampling Method	-
Sample Code	GLCS / 2060	Date of Analysis	21.12.2022
Sample Receipt Date	21.12.2022	Date of Completion	01.01.2023

Sl. No.	TEST PARAMETER	TEST METHOD	UNIT	RESULT
1	Alumina as Al_2O_3	IS 2840	%	22.35
2	Silica as SiO_2	IS 2840	%	60.25
3	Iron as Fe_2O_3	IS 2840	%	0.78
4	Calcium as CaO	IS 2840	%	1.34
5	Magnesium as MgO	IS 2840	%	1.29
6	Sodium as Na_2O	GLCS/SOP/M/007	%	0.10
7	Potassium as K_2O	GLCS/SOP/M/008	%	0.07
8	Loss On Ignition	IS 2840	%	13.00
9	Titanium as TiO_2	USEPA 6010 D	%	0.08

For Global Lab and Consultancy Services



Authorised Signatory

S. MURUGESAN
Quality Manager

*****End of Report*****

Page 1 of 1

Note: The test results are only to the sample submitted for test. Any Correction of the test report on full or part shall invalidate the report. Samples are not drawn by us unless otherwise stated. Sample will be retained for 14 days from the date of reporting except in case of regulatory samples or specifically instructed by client. Perishable samples will be discarded immediately after reporting. We do not accept only liability with regard to origin or source from which the samples are extracted. The Laboratory is not responsible for authenticity of photocopied test reports. Any holder of this report is advised that information contained here on reflects the laboratory's finding at the time of its intervention only and within the limits of client instructions. The authenticity of the test report's issued by us can be verified by submitting on E-mail request with report number and report date along with report copy.

Centre Code :29



Reg. No. P 02120009 Code No. 0AB80 S.No. 410146



பாரதிதாசன் பல்கலைக்கழகம்
BHARATHIDASAN UNIVERSITY

(Established by the Government of Tamil Nadu in 1982, Recognized by UGC under 21 and 12B of UGC
Member, Association of Indian Universities and Association of Commonwealth Universities, Accredited by NAAC with 'A'

அறிவியல் புலம்
FACULTY OF SCIENCE



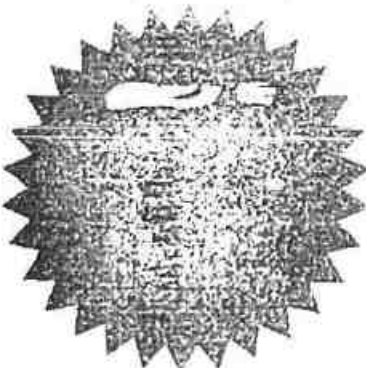
பாரதிதாசன் பல்கலைக்கழக ஆட்சிக் குழு ஏப்ரல் 2004

ஆம் ஆண்டு நடத்திய செயல்முறை நிலத்தியல் - தேர்வில்
சு. பிரசாத்

என்பவர் முதல் வகுப்பில் தேர்ச்சி பெற்றார் என்று தக்க தேர்வாளர்கள்
சான்றளித்தபடி அறிவியல் நிறைஞர் - என்னும் பட்டத்தை
அவருக்குப் பல்கலைக்கழக இலச்சினையுடன் வழங்குகிறது.

The Syndicate of the BHARATHIDASAN UNIVERSITY hereby makes
known that S. PRASAD has been
admitted to the Degree of MASTER OF SCIENCE, having
been certified by duly appointed Examiners to be qualified to receive the same in
APPLIED GEOLOGY at the Examination field in
APRIL 2004 and placed in FIRST Class. -

Given under the seal of the University.



திருச்சிராப்பள்ளி
Tiruchirappalli

நாள் : 27th October 2004
Dated :

பதிவாளர் Registrar

துணைவேந்தர் Vice-Chancellor

C 029318 ISSUED ON : 22 AUG 2008



தமிழ்நாடு சிமெண்ட் கழகம்
(தமிழ்நாடு அரசு நிறுவனம்)

TAMILNADU CEMENTS CORPORATION LIMITED
(A Government of Tamilnadu Undertaking)

ANNEXURE XI



அரியலூர் சிமெண்ட் ஆலை, அரியலூர் - 621 729, அரியலூர் மாவட்டம், தமிழ்நாடு.
Ariyalur Cement Factory, Ariyalur - 621 729, Ariyalur District, Tamilnadu.
E-mail : tanaridgmooffice@gmail.com website : www.tancem.co



ACW/PL-1/2023-

SERVICE CERTIFICATE

Certified that Thiru.S. Prasad, S/o. Sundaresan is a permanent employee of Tamilnadu Cements Corporation Limited (Public Sector Undertaking of Government of Tamilnadu) from 21.07.2011 and rendered 11 years of service in mines department and he is at present holding the post of Asst.Manager (Geologist). The employee no. of Thiru.S. Prasad is 01985.

For TANCEM/ARIYALUR CEMENT WORKS

For UNIT HEAD



Q.L. APPLIED AREA :

TOPO SHEET NO. : 58 A

LATITUDE : 11°44'49.52" N to 11°45'01.01" N
LONGITUDE : 79°32'52.03" E to 79°33'03.38" E

APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - I

DATE OF SURVEY : 29.03.2023

LOCATION PLAN

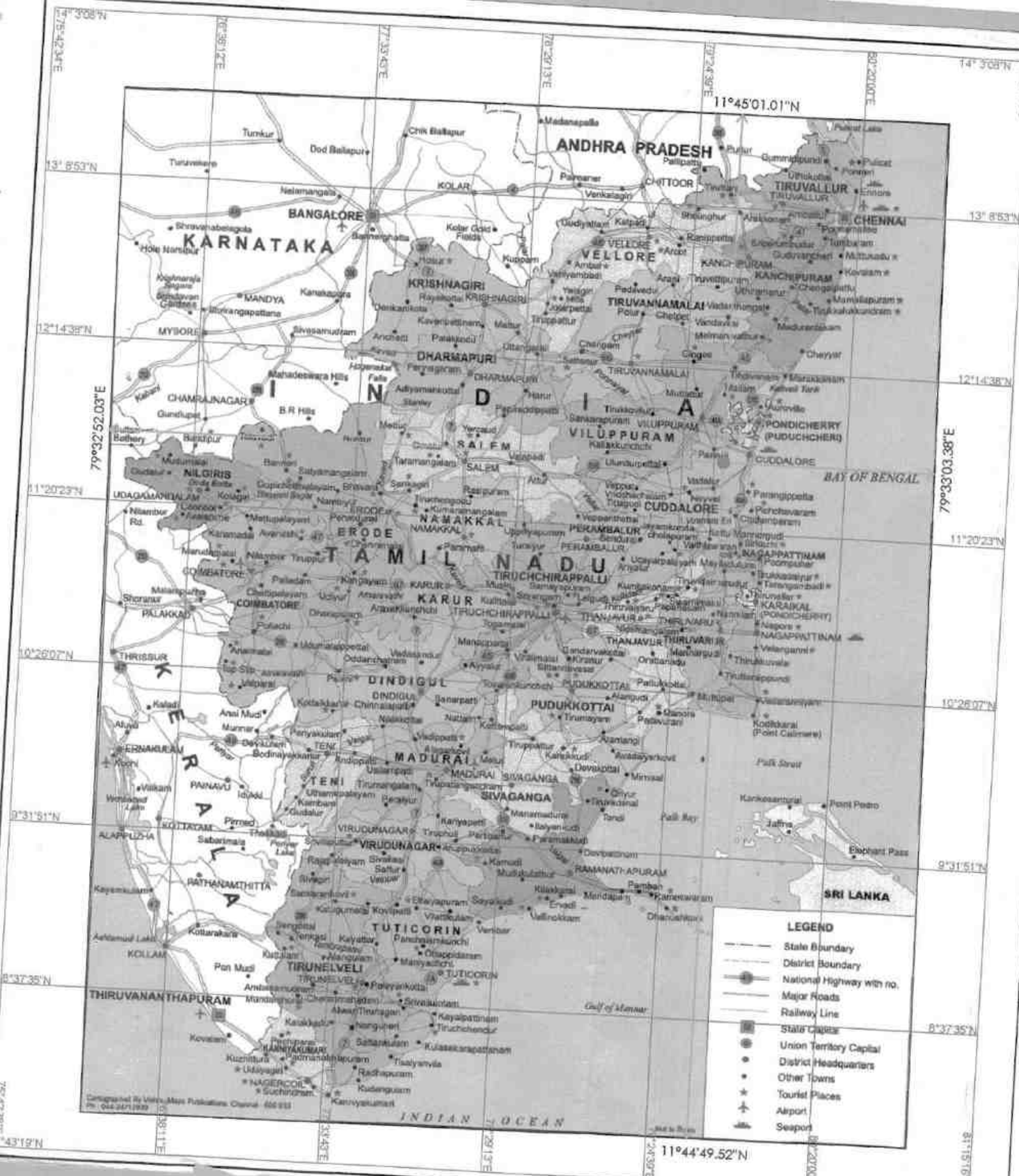
SCALE. 1:24,00,000

PREPARED BY :

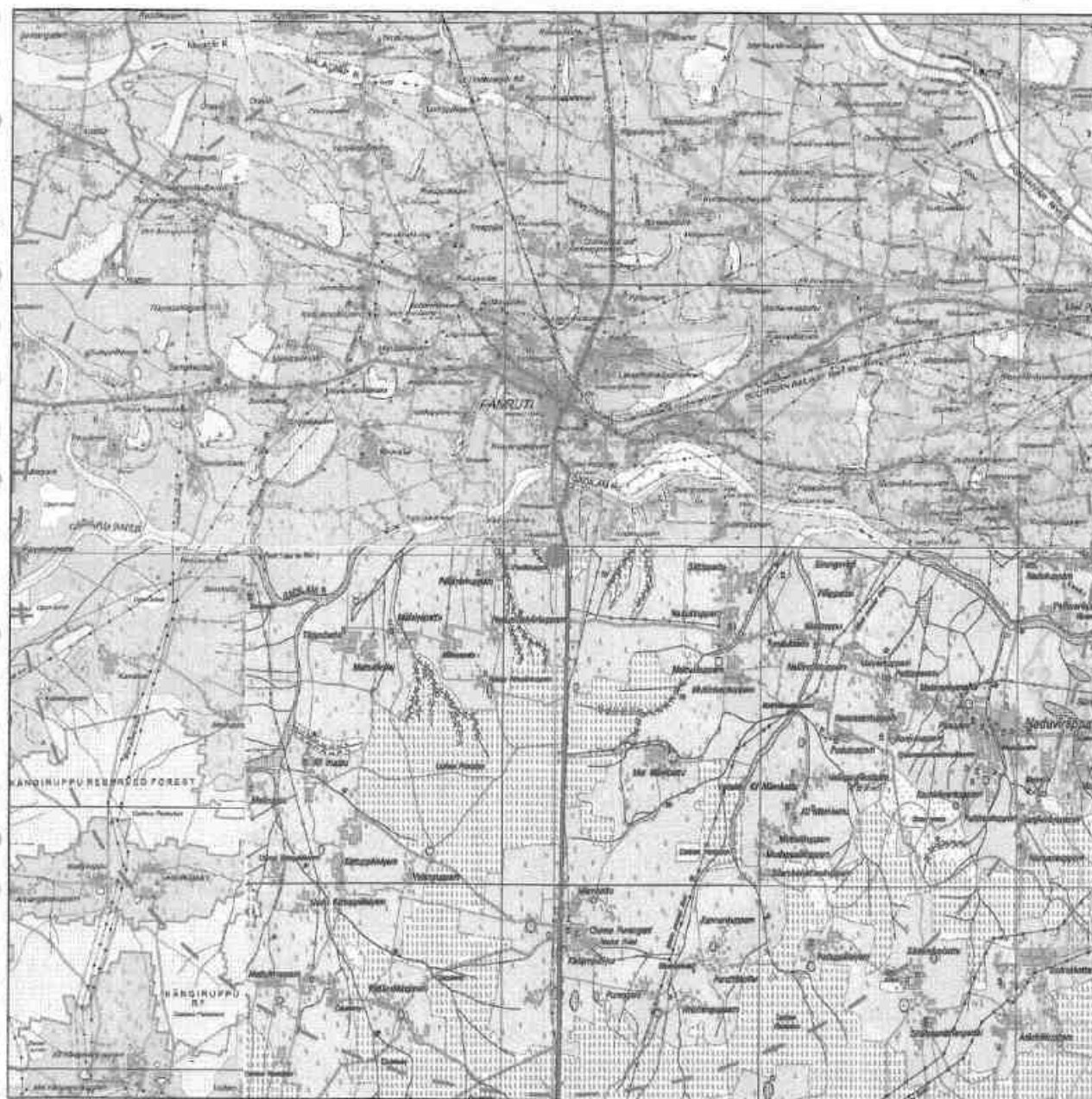
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. Prasad

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON



11° 50' 26.47"N



11° 39' 24.06"N

TOPO SHEET NO. : 58 M/09

LATITUDE : 11°44'49.52"N to 11°45'01.01"N
 LONGITUDE : 79°32'52.03"E to 79°33'03.38"E

10km RADIUS



Q.L. APPLIED AREA



INDEX

Express highway: with toll; with bridge; with distance stone.....
 Roads metalled: according to importance.....
 Roads, double carriageway; according to importance.....
 Unmetalled road. Cart-track. Pack-track with pass. Foot-path.....
 Streams: with track in bed; undefined. Canal.....
 Dams: masonry or rock-filled; earthwork. Weir.....
 River; dry with water PAP CANAL; with island & rocks. Tidal river.....
 Submerged rocks. Shoal. Swamp. Reeds.....
 Wells: lined; unlined. Tubewell. Spring. Tanks; perennial; dry.....
 Embankments: road or rail; tank. Broken ground.....
 Railways, broad gauge: double: single with station; under constrn.....
 Railways, other gauges: double: single with distance stone, do.....
 Mineral line or tramway. Kiln. Cutting with tunnel.....
 Contours with sub-features. Rocky slopes. Cliffs.....
 Sand features: (1) flat. (2) sand-hills(permanent). (3) dunes(shifting).
 Towns or Villages: inhabited; deserted. Fort.....
 Huts: permanent, temporary. Tower. Antiquities.....
 Temple. Chhatri. Church. Mosque. Idgah. Jangal.....
 Lighthouse. Lightship. Buoys: lighted, unlighted. Anchorage.....
 Mine. Vine on trellis. Grass. Scrub.....
 Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees.....
 Areas: cultivated; Wooded. Surveyed trees.....
 Boundary, international.....
 Boundary, state: demarcated; undemarcated.....
 Boundary, district; subdivision; tahsil or taluk, forest.....
 Boundary pillars: surveyed; unlocated.....
 Heights, triangulated: station: point; approximate.....
 Bench-mark: geodetic; tertiary; canal.....
 Post office. Telegraph office. Overhead tank.....
 Rest house or inspection bungalow. Circuit house. Police station.....
 Camping Ground. Forest: reserved; protected.....
 Spaces names: administrative; locality or tribal.....
 Hospital. Dispensary. Veterinary: Hospital/Dispensary.....
 Aerodrome. Helipad. Tourist site.....
 Powerline: with pylons surveyed; with poles unsurveyed.....



APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
 (A Government of Tamil Nadu Undertaking)
 5th Floor, Aavin Illam, 3A, Pasumpon Muthuramalingam Salai
 Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
 EXTENT : 6.59.0 Ha
 VILLAGE : PANIKANKUPPAM,
 TALUK : PANRUTI
 DISTRICT : CUDDALORE
 STATE : TAMILNADU

PLATE NO - I-A

DATE OF SURVEY : 29.03.2023

TOPO SKETCH OF QUARRY LEASE
 APPLIED AREA FOR 10Km RADIUS

SCALE. 1:1,00,000

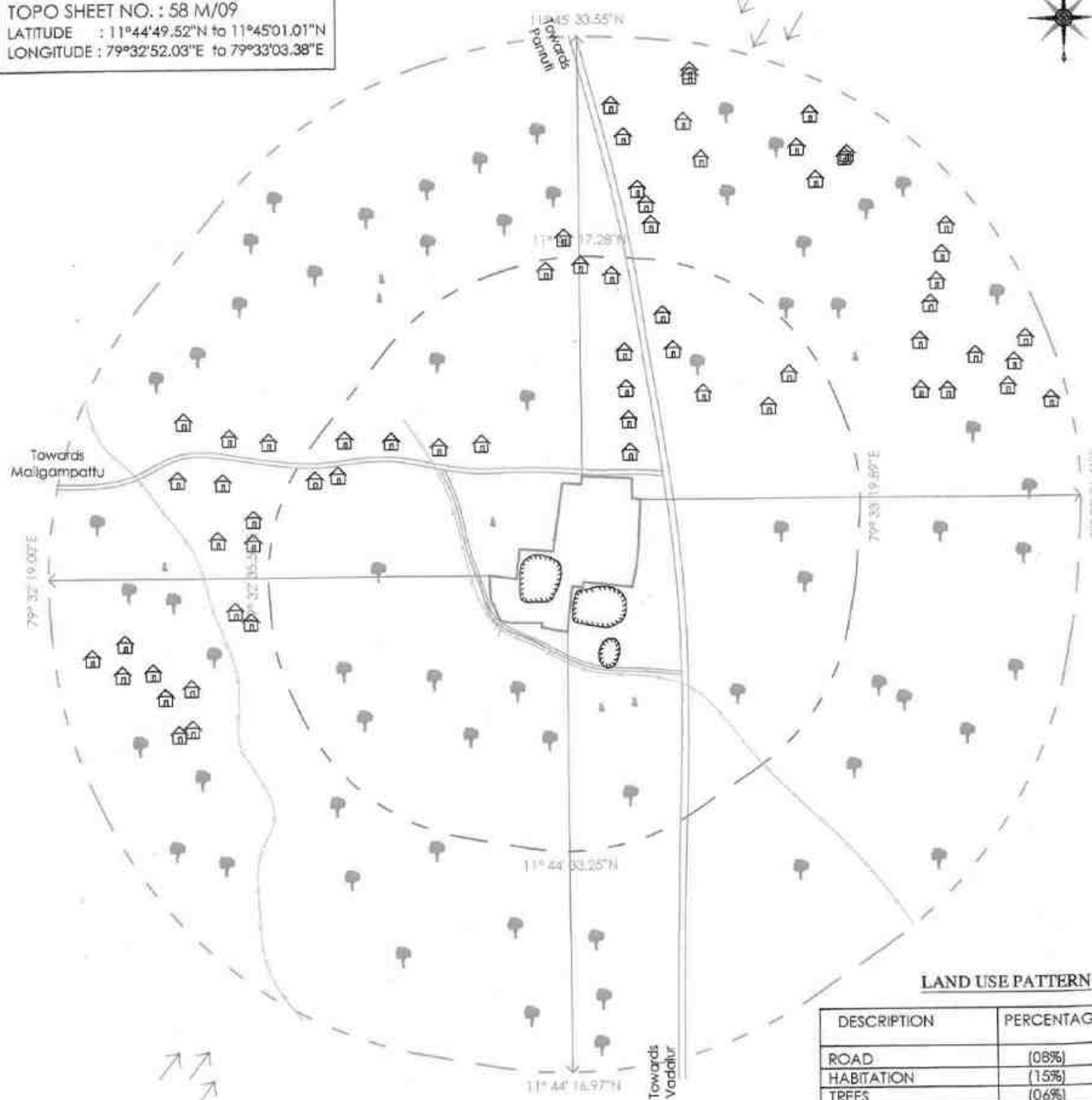
PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
 PLATE IS TRUE AND CORRECT TO THE BEST OF MY
 KNOWLEDGE BASED UPON THE LEASE MAP
 AUTHENTICATED BY STATE GOVERNMENT


 S. PRASAD,
 Assistant Manager (Geology)
 QUALIFIED PERSON

TOPO SHEET NO. : 58 M/09
 LATITUDE : 11°44'49.52"N to 11°45'01.01"N
 LONGITUDE : 79°32'52.03"E to 79°33'03.38"E

OCTOBER TO DECEMBER



JULY TO SEPTEMBER

LAND USE PATTERN

DESCRIPTION	PERCENTAGE	INDEX
ROAD	(08%)	
HABITATION	(15%)	
TREES	(06%)	
SEASONAL AGRI LAND	(67%)	
PIT	(04%)	
TOTAL	(100%)	

INDEX

- Q.L. A. AREA
- 1 Km RADIUS
- 500m RADIUS
- SEASONAL AGRICULTURE LAND
- TREES
- HABITATION
- WIND DIRECTION
- PANCHAYAT ROAD
- APPROACH ROAD
- QUARRY PIT
- NATIONAL HIGHWAY
- ODAI & CANAL

APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
 (A Government of Tamil Nadu Undertaking)
 5th Floor, Aavin Illam
 3A, Pasumpon Muthuramalingam Salai
 Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3., etc.,
 EXTENT : 6.59.0 Ha
 VILLAGE : PANIKANKUPPAM,
 TALUK : PANRUTI
 DISTRICT : CUDDALORE
 STATE : TAMILNADU

PLATE NO - I-C

DATE OF SURVEY : 29.03.2023

TOPO SKETCH OF QUARRY LEASE AREA FOR 1km RADIUS

SCALE. 1:10,000

PREPARED BY :

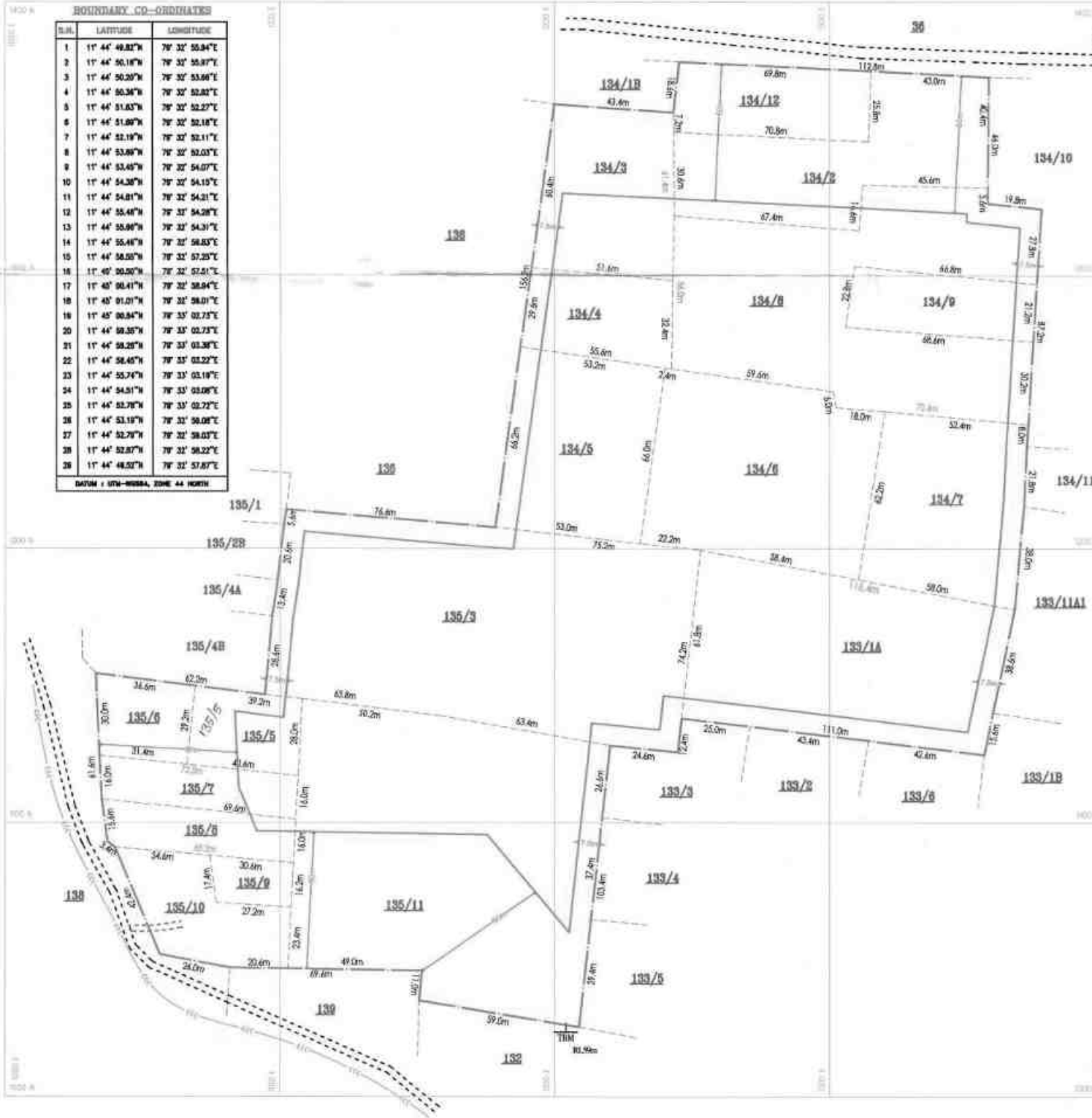
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
 PLATE IS TRUE AND CORRECT TO THE BEST OF MY
 KNOWLEDGE BASED UPON THE LEASE MAP
 AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
 Assistant Manager (Geology)
 QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 44' 49.82"N	78° 32' 55.94"E
2	11° 44' 50.18"N	78° 32' 55.97"E
3	11° 44' 50.20"N	78° 32' 55.96"E
4	11° 44' 50.34"N	78° 32' 52.82"E
5	11° 44' 51.03"N	78° 32' 52.27"E
6	11° 44' 51.89"N	78° 32' 52.18"E
7	11° 44' 52.19"N	78° 32' 52.11"E
8	11° 44' 53.89"N	78° 32' 52.03"E
9	11° 44' 53.45"N	78° 32' 54.07"E
10	11° 44' 54.30"N	78° 32' 54.15"E
11	11° 44' 54.81"N	78° 32' 54.21"E
12	11° 44' 55.46"N	78° 32' 54.28"E
13	11° 44' 55.86"N	78° 32' 54.31"E
14	11° 44' 55.46"N	78° 32' 58.83"E
15	11° 44' 56.55"N	78° 32' 57.23"E
16	11° 44' 59.50"N	78° 32' 57.51"E
17	11° 45' 00.41"N	78° 32' 58.94"E
18	11° 45' 01.01"N	78° 32' 58.01"E
19	11° 45' 00.94"N	78° 32' 02.73"E
20	11° 44' 58.35"N	78° 32' 02.73"E
21	11° 44' 58.25"N	78° 32' 03.38"E
22	11° 44' 58.45"N	78° 32' 03.22"E
23	11° 44' 55.74"N	78° 32' 03.19"E
24	11° 44' 54.51"N	78° 32' 03.08"E
25	11° 44' 52.76"N	78° 32' 02.72"E
26	11° 44' 53.19"N	78° 32' 58.08"E
27	11° 44' 52.78"N	78° 32' 58.03"E
28	11° 44' 52.87"N	78° 32' 58.22"E
29	11° 44' 48.52"N	78° 32' 57.87"E

DATUM : UTM-MERKA, ZONE 44 NORTH



EXTENT DETAILS IN HA	
133/1A	0.63.50
134/2	0.39.50
134/3	0.26.50
134/4	0.16.50
134/5	0.34.50
134/6	0.50.00
134/7	0.35.00
134/8	0.75.50
134/9	0.13.50
134/12	0.18.00
135/3	1.04.00
135/5	0.11.00
135/6	0.09.50
135/7	0.10.50
135/8	0.13.50
135/9	0.05.00
135/10	0.14.50
135/11	1.18.50
TOTAL	6.59.00 Ha

INDEX	
[Symbol]	Q.L. APPLIED AREA BOUNDARY
[Symbol]	50m & 7.5m SAFETY BARRIER
[Symbol]	TEMPORARY BENCH MARK
[Symbol]	APPROACH ROAD
[Symbol]	VILLAGE ROAD
[Symbol]	GDAI

APPLICANT:
T.V. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Anna Nagar,
3A, Panruti, Cuddalore, Tamil Nadu - 600 035.

LOCATION OF QUARRY:
S.F.No. 133/1, 133/2, 133/3, 133/4, 133/5, etc.,
EXTENT : 6.59.00 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - II
DATE OF SURVEY : 29.01.2023
QUARRY LEASE PLAN
SCALE : 1:1000

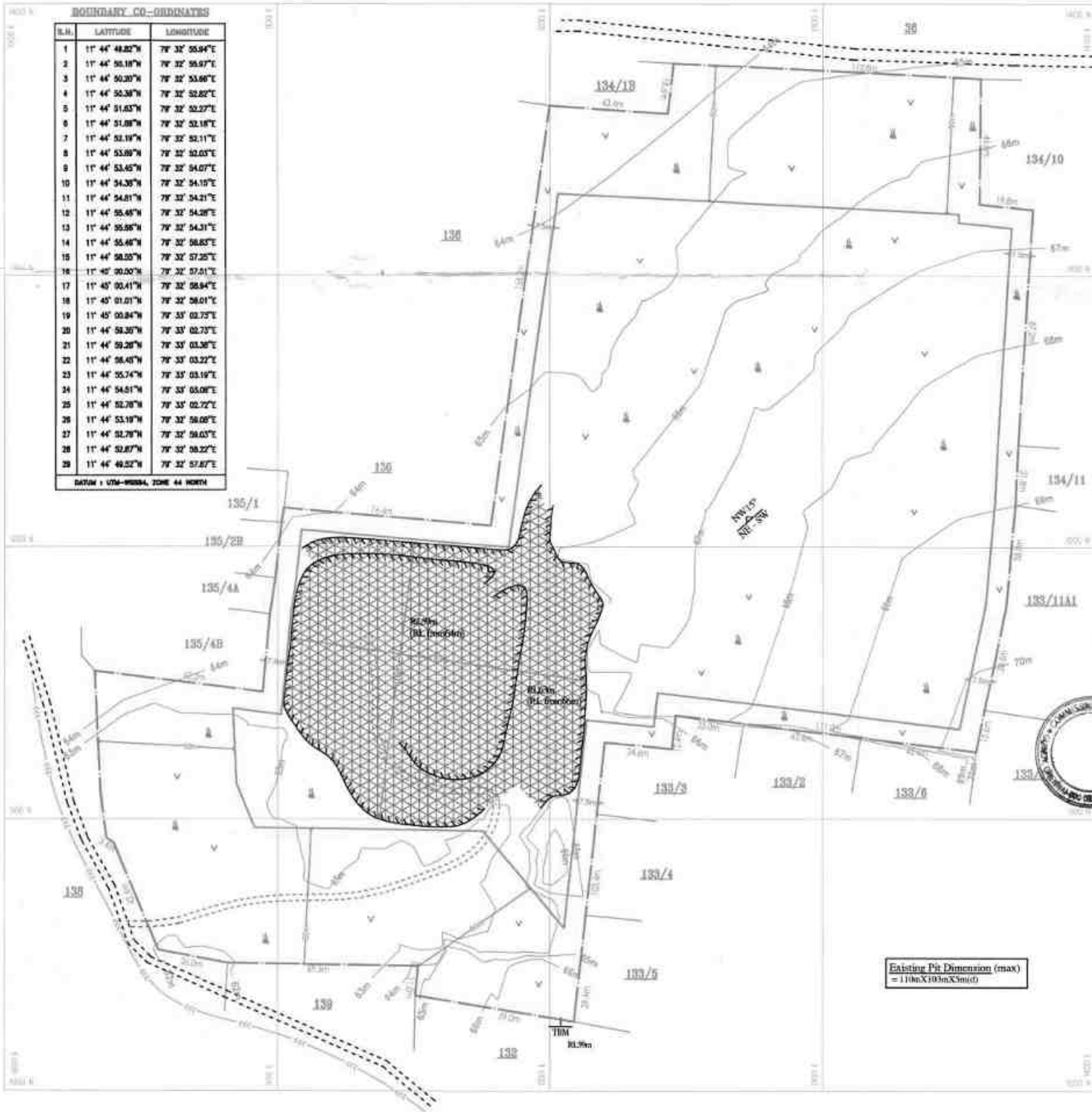
PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE DATA MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 44' 48.82"N	78° 32' 55.94"E
2	11° 44' 50.18"N	78° 32' 55.97"E
3	11° 44' 50.30"N	78° 32' 55.86"E
4	11° 44' 50.34"N	78° 32' 52.82"E
5	11° 44' 51.03"N	78° 32' 52.27"E
6	11° 44' 51.08"N	78° 32' 52.18"E
7	11° 44' 52.19"N	78° 32' 52.11"E
8	11° 44' 53.09"N	78° 32' 52.03"E
9	11° 44' 53.45"N	78° 32' 54.07"E
10	11° 44' 54.35"N	78° 32' 54.19"E
11	11° 44' 54.81"N	78° 32' 54.21"E
12	11° 44' 55.45"N	78° 32' 54.28"E
13	11° 44' 55.95"N	78° 32' 54.31"E
14	11° 44' 55.46"N	78° 32' 58.83"E
15	11° 44' 58.05"N	78° 32' 57.25"E
16	11° 45' 30.00"N	78° 32' 57.51"E
17	11° 45' 00.41"N	78° 32' 58.94"E
18	11° 45' 01.01"N	78° 32' 58.01"E
19	11° 45' 00.84"N	78° 33' 02.73"E
20	11° 44' 58.35"N	78° 33' 02.73"E
21	11° 44' 59.26"N	78° 33' 03.38"E
22	11° 44' 58.45"N	78° 33' 03.22"E
23	11° 44' 55.74"N	78° 33' 03.19"E
24	11° 44' 54.51"N	78° 33' 03.08"E
25	11° 44' 52.78"N	78° 33' 02.72"E
26	11° 44' 53.18"N	78° 32' 58.08"E
27	11° 44' 52.78"N	78° 32' 58.03"E
28	11° 44' 52.87"N	78° 32' 58.22"E
29	11° 44' 49.52"N	78° 32' 57.87"E

DATUM : UTM-WGS84, ZONE 44 NORTH



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TEMPORARY BENCH MARK
- TOP SOIL
- FIRECLAY
- QUARRY PIT
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- VILLAGE ROAD
- QDAI
- STRIKE AND DIP

APPLICANT:

Tvt. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aavin Ilam
3A, Panampun Muthuramalingam Salai
Mandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - III

DATE OF SURVEY : 29.03.2023

SURFACE PLAN

SCALE : 1:1000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEAST MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 44' 49.82"N	79° 32' 55.94"E
2	11° 44' 50.18"N	79° 32' 55.97"E
3	11° 44' 50.20"N	79° 32' 53.66"E
4	11° 44' 50.38"N	79° 32' 52.82"E
5	11° 44' 51.63"N	79° 32' 52.27"E
6	11° 44' 51.68"N	79° 32' 52.18"E
7	11° 44' 52.19"N	79° 32' 52.11"E
8	11° 44' 53.89"N	79° 32' 52.03"E
9	11° 44' 53.40"N	79° 32' 54.07"E
10	11° 44' 54.38"N	79° 32' 54.15"E
11	11° 44' 54.81"N	79° 32' 54.31"E
12	11° 44' 55.48"N	79° 32' 54.28"E
13	11° 44' 55.66"N	79° 32' 54.31"E
14	11° 44' 55.46"N	79° 32' 56.83"E
15	11° 44' 58.55"N	79° 32' 57.25"E
16	11° 45' 00.50"N	79° 32' 57.51"E
17	11° 45' 00.41"N	79° 32' 58.94"E
18	11° 45' 01.01"N	79° 32' 59.01"E
19	11° 45' 00.84"N	79° 33' 02.73"E
20	11° 44' 58.35"N	79° 33' 02.73"E
21	11° 44' 59.20"N	79° 33' 03.30"E
22	11° 44' 56.45"N	79° 33' 03.22"E
23	11° 44' 55.74"N	79° 33' 03.19"E
24	11° 44' 54.51"N	79° 33' 03.08"E
25	11° 44' 52.79"N	79° 33' 02.72"E
26	11° 44' 53.19"N	79° 32' 59.08"E
27	11° 44' 52.70"N	79° 32' 59.03"E
28	11° 44' 52.87"N	79° 32' 58.22"E
29	11° 44' 49.52"N	79° 32' 57.87"E

DATUM : UTM-WGS84, ZONE 44 NORTH



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TEMPORARY BENCH MARK
- TOP SOIL
- FIRECLAY
- QUARRY PIT
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- VILLAGE ROAD
- ODAI
- STRIKE AND DIP

APPLICANT:

Tvl. TANCEN Stoneware Pipe Factory.
(A Government of Tamil Nadu Undertaking)
5th Floor, Aavin Ilam
3A, Pasumpun Muthuramalingam Salai
Nandanam, Chennai, Tamil Nadu - 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 133/3, etc.,
EXTENT : 10.0 Ha
VILLAGE : PASUMPUKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - IV

DATE OF SURVEY : 29.03.2023

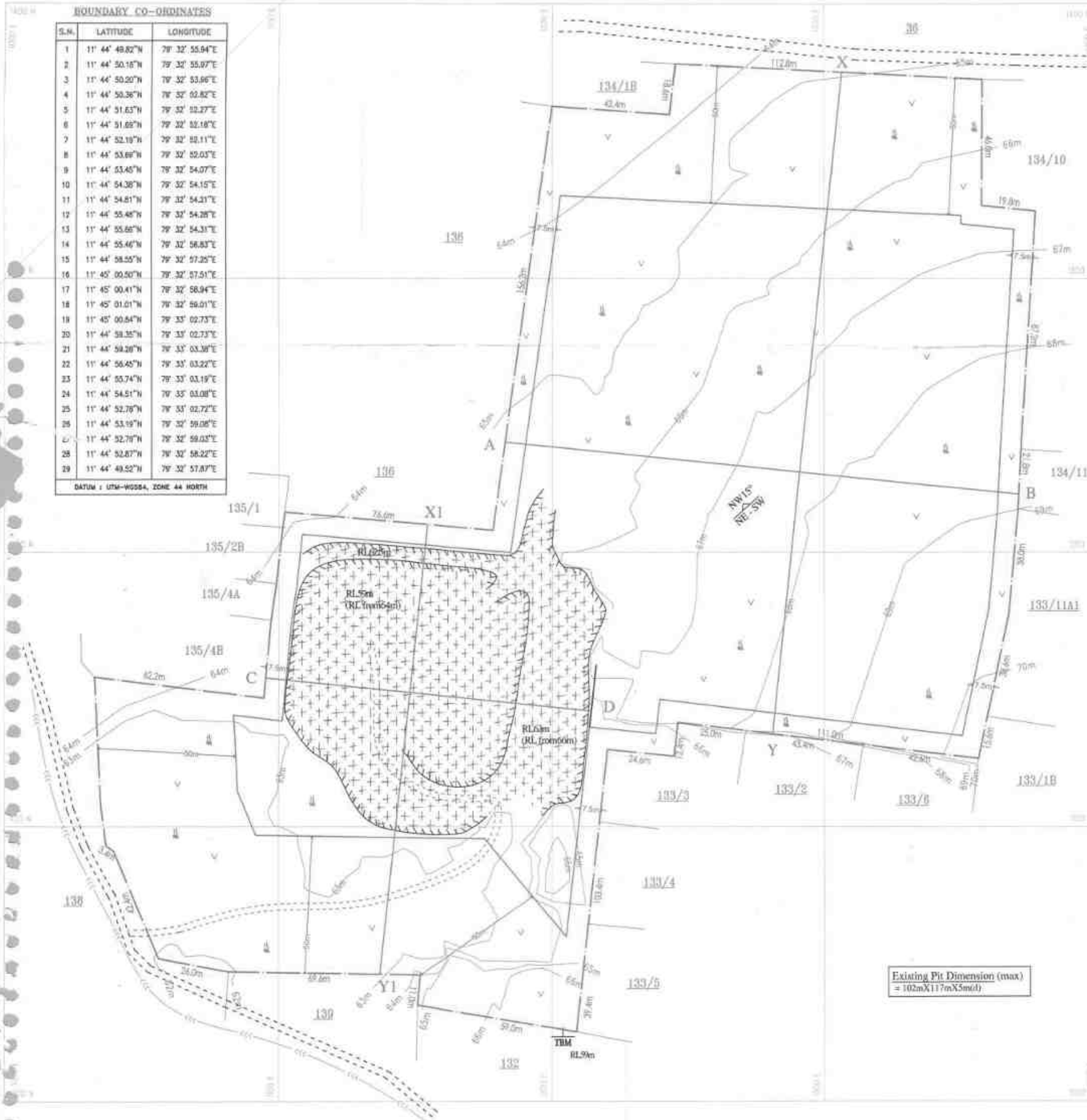
GEOLOGICAL PLAN

SCALE : 1:1000

PREPARED BY:

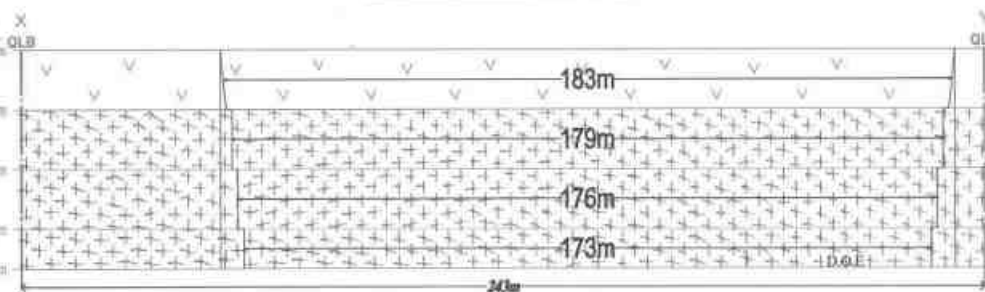
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. Prasad
S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

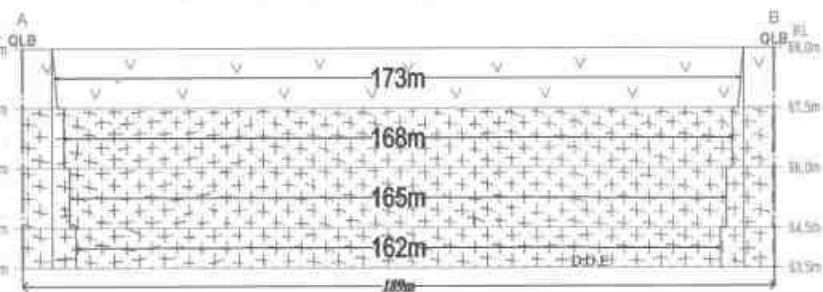


Existing Pit Dimension (max)
= 102mX117mX5m(d)

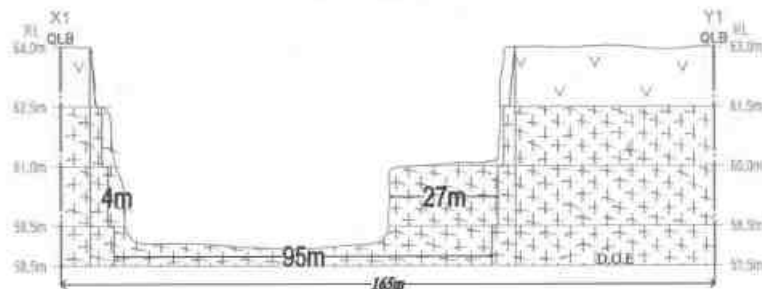
SECTION ALONG X-Y



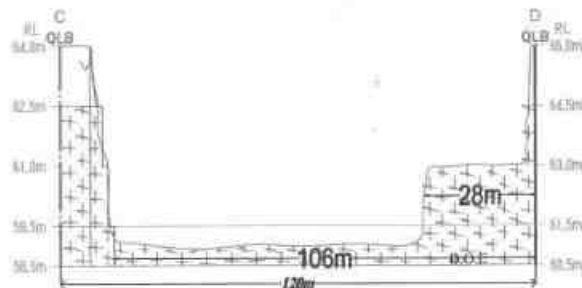
SECTION ALONG A-B



SECTION ALONG X1-Y1



SECTION ALONG C-D



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TOP SOIL
- FIRE CLAY
- DEPTH OF ESTIMATION

APPLICANT:

T.V. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Axvin Ilam
3A, Pasumpun Muthuramalingam Salai
Nandimam, Chennai, Tamilnadu - 600 035.

LOCATION OF QUARRY:

S.F.No : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - IV-A

DATE OF SURVEY : 29.03.2023

GEOLOGICAL SECTIONS

SCALE
HOR : 1:1000 ; VER 1:100

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LENSE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 44' 49.82"N	79° 32' 55.94"E
2	11° 44' 50.18"N	79° 32' 55.97"E
3	11° 44' 50.20"N	79° 32' 53.86"E
4	11° 44' 50.38"N	79° 32' 52.82"E
5	11° 44' 51.63"N	79° 32' 52.27"E
6	11° 44' 51.89"N	79° 32' 52.18"E
7	11° 44' 52.18"N	79° 32' 52.11"E
8	11° 44' 53.89"N	79° 32' 52.03"E
9	11° 44' 53.48"N	79° 32' 54.07"E
10	11° 44' 54.38"N	79° 32' 54.15"E
11	11° 44' 54.81"N	79° 32' 54.21"E
12	11° 44' 55.48"N	79° 32' 54.28"E
13	11° 44' 55.66"N	79° 32' 54.31"E
14	11° 44' 55.44"N	79° 32' 56.83"E
15	11° 44' 58.55"N	79° 32' 57.25"E
16	11° 45' 00.50"N	79° 32' 57.51"E
17	11° 45' 00.41"N	79° 32' 58.94"E
18	11° 45' 01.01"N	79° 32' 59.01"E
19	11° 45' 00.84"N	79° 32' 02.73"E
20	11° 44' 59.35"N	79° 32' 02.73"E
21	11° 44' 59.28"N	79° 32' 03.38"E
22	11° 44' 58.45"N	79° 32' 03.22"E
23	11° 44' 58.74"N	79° 32' 03.19"E
24	11° 44' 54.51"N	79° 32' 03.08"E
25	11° 44' 52.76"N	79° 32' 02.72"E
26	11° 44' 53.19"N	79° 32' 59.08"E
27	11° 44' 52.79"N	79° 32' 59.03"E
28	11° 44' 52.87"N	79° 32' 58.22"E
29	11° 44' 49.82"N	79° 32' 57.87"E

DATUM : IGM-WGS84, ZONE 44 NORTH



SITE SERVICES
(Proposed)
A - OFFICE
B - STORE ROOM
C - FIRST AID ROOM
D - REST SHELTER
E - TOILET

INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TEMPORARY BENCH MARK
- TOP SOIL
- FIRECLAY
- QUARRY PIT
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- VILLAGE ROAD
- ODAI
- STRIKE AND DIP
- DUMP

APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aurin Blam
3A, Pasumpun Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKKUPPAM,
TALUK : PANRUTH
DISTRICT : CHIDALORE
STATE : TAMILNADU

DATE OF SURVEY : 29/03/2023

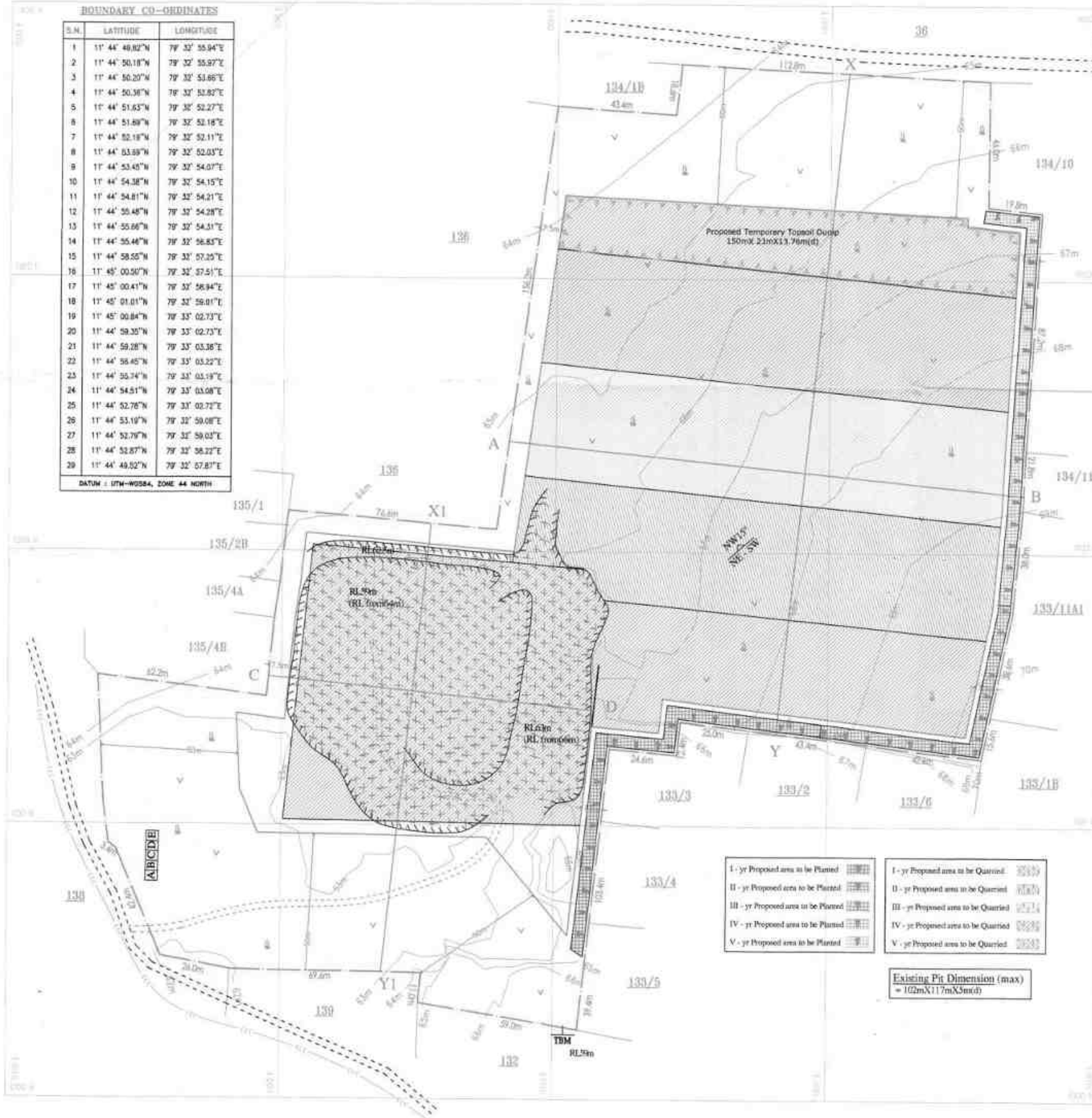
YEARWISE DEVELOPMENT & PRODUCTION PLAN

SCALE: 1:1000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

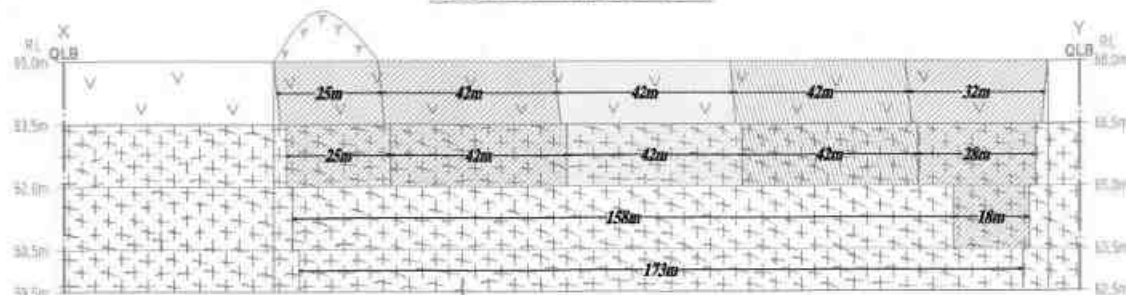


I - yr Proposed area to be Planted		I - yr Proposed area to be Quarried	
II - yr Proposed area to be Planted		II - yr Proposed area to be Quarried	
III - yr Proposed area to be Planted		III - yr Proposed area to be Quarried	
IV - yr Proposed area to be Planted		IV - yr Proposed area to be Quarried	
V - yr Proposed area to be Planted		V - yr Proposed area to be Quarried	

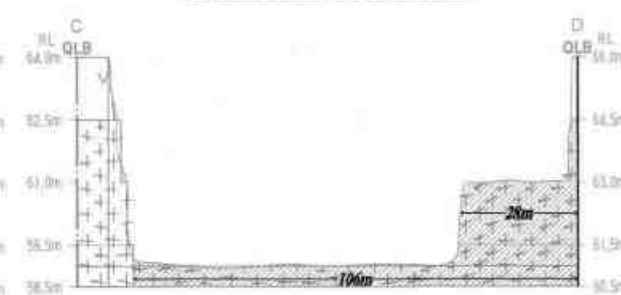
Existing Pit Dimension (max)
= 102mX117mX5m(d)

I - yr Proposed area to be Quarried	
II - yr Proposed area to be Quarried	
III - yr Proposed area to be Quarried	
IV - yr Proposed area to be Quarried	
V - yr Proposed area to be Quarried	

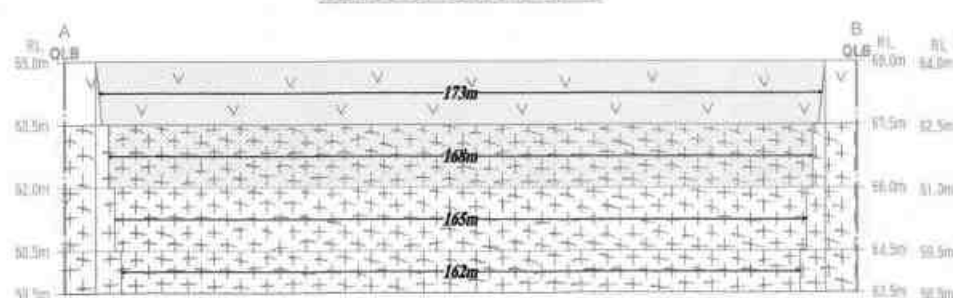
SECTION ALONG X-Y



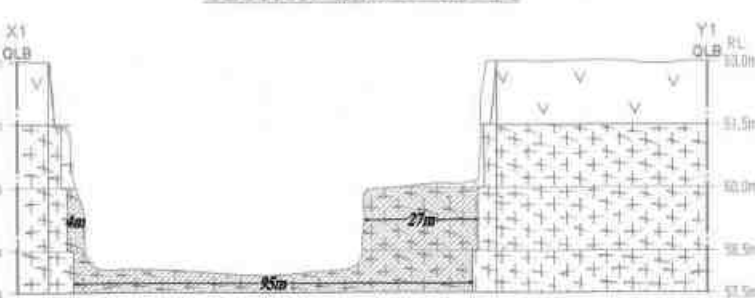
SECTION ALONG C-D



SECTION ALONG A-B



SECTION ALONG X1-Y1



INDEX

	Q.L. APPLIED AREA BOUNDARY
	50m & 7.5m SAFETY BARRIER
	TOP SOIL
	FIRECLAY

APPLICANT

Tvj, TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aravin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu - 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - V-A

DATE OF SURVEY : 29.03.2023

YEARWISE DEVELOPMENT & PRODUCTION SECTIONS

SCALE
HOR 1:1000 ; VER 1:100

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

Assistant Manager (Quarries)
QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	11° 41' 48.00"N	79° 32' 55.94"E
2	11° 41' 50.10"N	79° 32' 55.87"E
3	11° 41' 50.20"N	79° 32' 55.86"E
4	11° 41' 50.30"N	79° 32' 55.82"E
5	11° 41' 51.00"N	79° 32' 52.27"E
6	11° 41' 51.80"N	79° 32' 52.10"E
7	11° 41' 52.10"N	79° 32' 52.11"E
8	11° 41' 53.00"N	79° 32' 52.63"E
9	11° 41' 53.45"N	79° 32' 54.07"E
10	11° 41' 54.30"N	79° 32' 54.10"E
11	11° 41' 54.81"N	79° 32' 54.21"E
12	11° 41' 55.45"N	79° 32' 54.29"E
13	11° 41' 55.80"N	79° 32' 54.31"E
14	11° 41' 55.48"N	79° 32' 55.83"E
15	11° 41' 56.05"N	79° 32' 57.25"E
16	11° 41' 56.50"N	79° 32' 57.51"E
17	11° 41' 56.41"N	79° 32' 58.84"E
18	11° 41' 56.84"N	79° 32' 59.61"E
19	11° 41' 56.84"N	79° 32' 59.61"E
20	11° 41' 56.85"N	79° 32' 59.61"E
21	11° 41' 56.85"N	79° 32' 59.61"E
22	11° 41' 56.85"N	79° 32' 59.61"E
23	11° 41' 56.85"N	79° 32' 59.61"E
24	11° 41' 56.85"N	79° 32' 59.61"E
25	11° 41' 56.85"N	79° 32' 59.61"E
26	11° 41' 56.85"N	79° 32' 59.61"E
27	11° 41' 56.85"N	79° 32' 59.61"E
28	11° 41' 56.85"N	79° 32' 59.61"E
29	11° 41' 56.85"N	79° 32' 59.61"E
30	11° 41' 56.85"N	79° 32' 59.61"E

LATITUDE - UTM - WGS84, ZONE 48 NORTH

ALL SERVICES

1. SURVEY
2. FIRST AIR ROAD
3. FIRST AIR ROAD
4. FIRST AIR ROAD
5. FIRST AIR ROAD



- Q.L. APPROX. AREA BOUNDARY
- 50m & 7.5m
- TEMPORARY BENCH MARK
- TOP SOIL
- FIRST LAY
- QUARRY PIT
- CONTOUR
- SERIES
- QUARRY HAIL ROAD
- APPROACH ROAD
- VILLAGE ROAD
- ODAI
- PLANTATION
- STRIKE AND DIP
- PROPOSED BACKFILLING

APPLICANT

T. TANJEM Soneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
3rd Floor, Aavin Ilam
1A, Ponnusami Mahalingam Salai,
Nandambam, Chennai-600 085.

LOCATION OF QUARRY

S.F. Nos. : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.590 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANKUTTI,
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - VI

DATE OF SURVEY : 29.03.2013

QUARRY LAYOUT & AFFORESTATION PLAN

SCALE : 1:1000

PROPOSED BY

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE CASE WORK
AUTHENTICATED BY STATE GOVERNMENT

[Signature]
COMMISSIONER,
Geographical Names, Chennai
QUALIFIED PERSON

Proposed Pit Dimension (max)
XY-AB = 181mX173mX5.5m(d)
X(Y)-CD = 192mX111mX3.3m(d)

Proposed Backfilling
= 102mX10mX5.3m(d)



- APPLIED AREA BOUNDARY
- QUARRY BOUNDARY
- TOP SOIL
- FIRECLAY
- PROPOSED BACKFILLING

APPLICANT:

TVL TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Admin Block
3A, Panampom Marthandalingam Salai
Nambiar, Chennai, Tamilnadu - 600 035.

LOCATION OF QUARRY

S.F.No : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - VII-A

DATE OF SURVEY : 29.01.2023

PROGRESSIVE QUARRY CLOSURE

SECTIONS

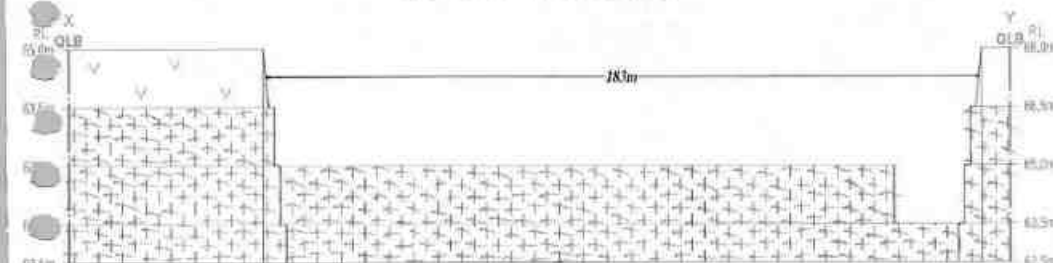
SCALE
HDR 1:1000 ; VER 1:100

PREPARED BY:

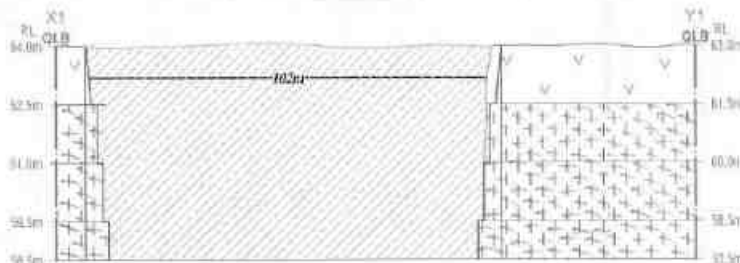
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAT IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD,
Assistant Manager (Geology),
QUALIFIED PERSON

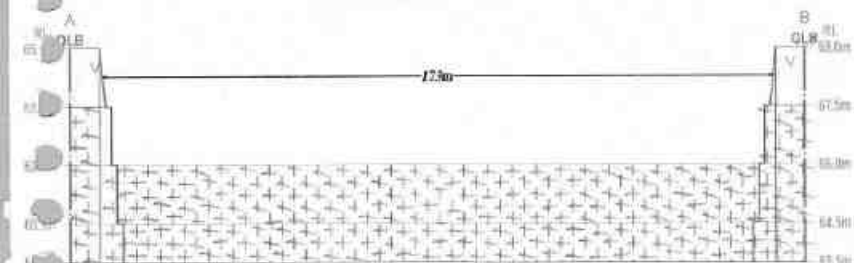
SECTION ALONG X-Y



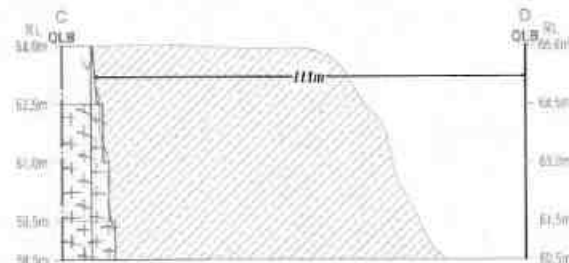
SECTION ALONG X1-Y1

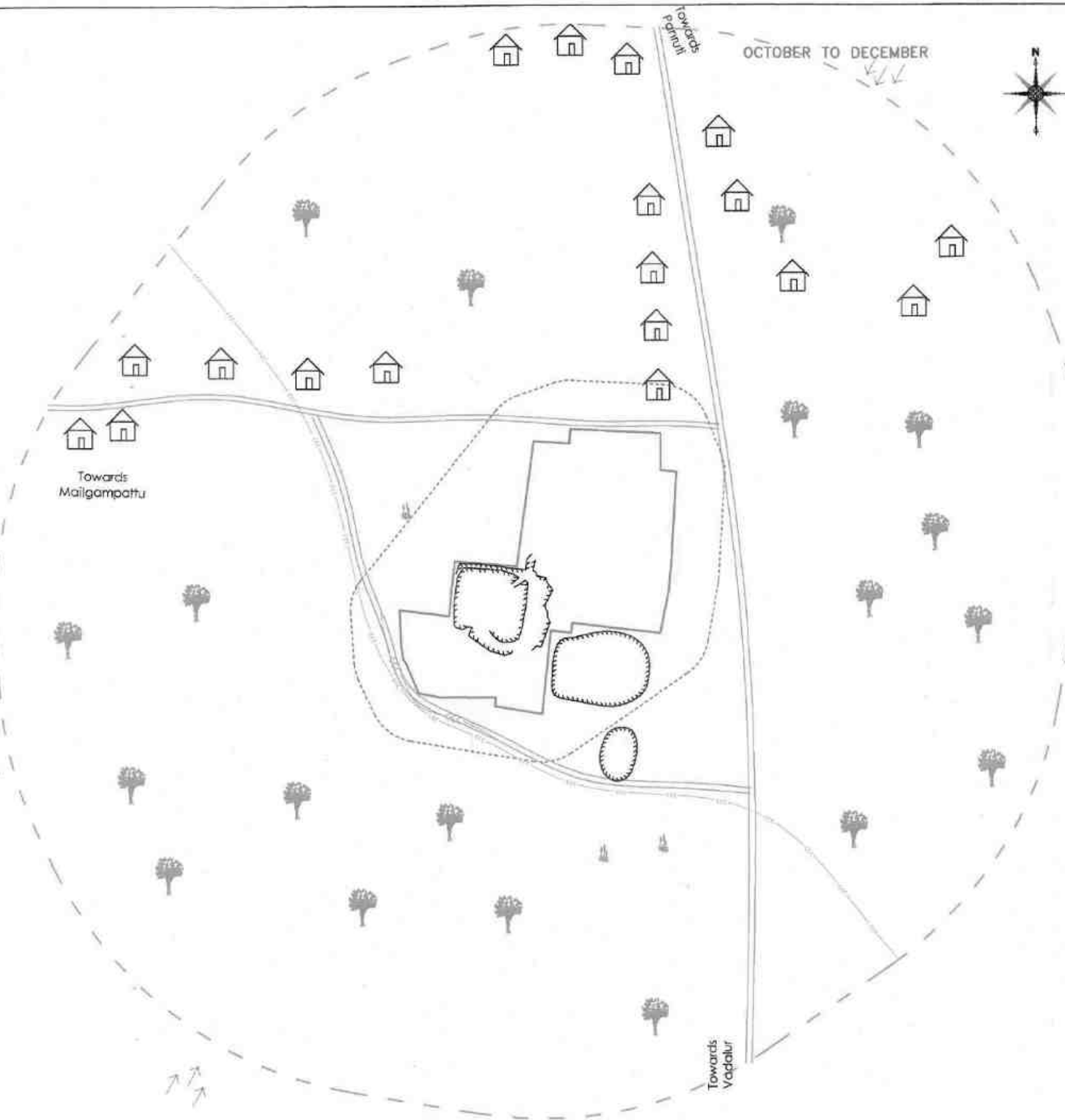


SECTION ALONG A-B



SECTION ALONG C-D





OCTOBER TO DECEMBER



APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY

S.F.Nos : 133/1, 134/2, 134/3 etc.,
EXTENT : 6.59 Ha
VILLAGE : PANANKUPPAM
TALUK : PANRIGI
DISTRICT : CUDDALORE
STATE : TAMILNADU

INDEX

LEASE BOUNDARY	
CONTOUR 1m INTERVAL	
WIND DIRECTION	
PIT	
60m RADIUS	
500m RADIUS	
TREES	
APPROACH ROAD	
PANCHAYAT ROAD	
7.5m SAFETY DISTANCE	
HABITATION	
SEASONAL AGRICULTURE LAND	
NH ROAD	

PLATE NO: VIII

DATE OF SURVEY : 29.03.2023

ENVIRONMENTAL PLAN

SCALE 1:5000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. Prasad

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

JULY TO SEPTEMBER



- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TOP SOIL
- FIRE CLAY
- PROPOSED BACKFILLING

APPLICANT:

Tvl. TANCEN Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Anna Hall
3A, Panampur Muthuramalingam Salai,
Nandambam, Chennai, Tamil Nadu - 600 035.

LOCATION OF QUARRY:

S.F. Nos : 133/LA, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - IX-A

DATE OF SURVEY : 29.03.2023

CONCEPTUAL

SECTIONS

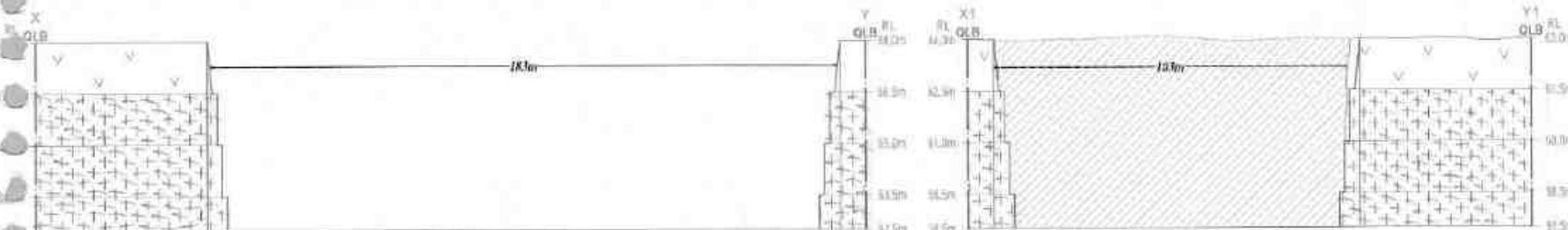
SCALE
HOR : 1:1000 ; VER : 1:100

PREPARED BY:

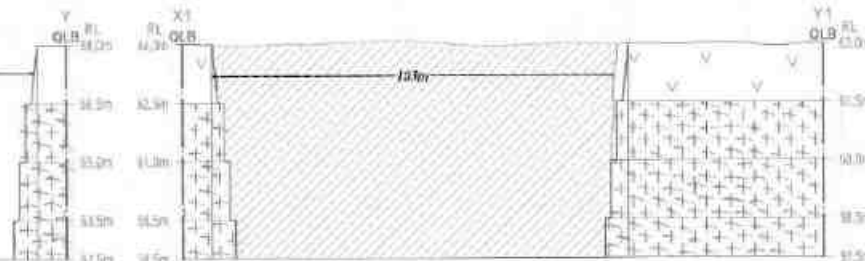
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LATEST MAP
AUTHENTICATED BY

S. PRASAD,
Assistant Manager (Geology)
QUALIFIED PERSON

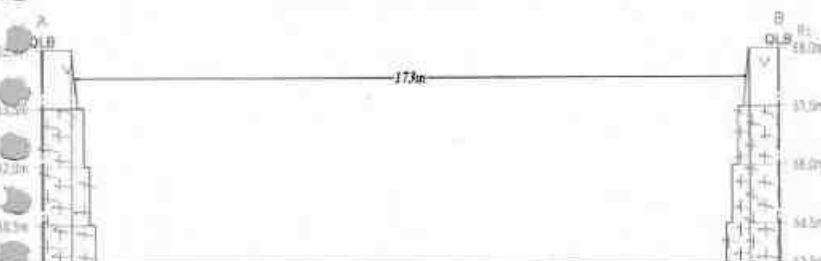
SECTION ALONG X-Y



SECTION ALONG X1-Y1



SECTION ALONG A-B



SECTION ALONG C-D

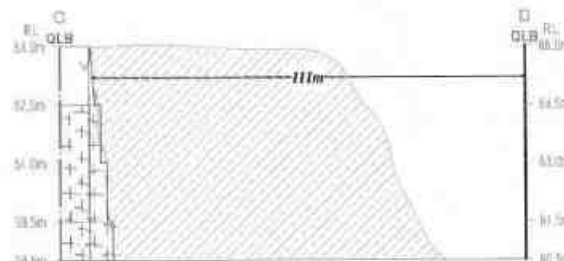
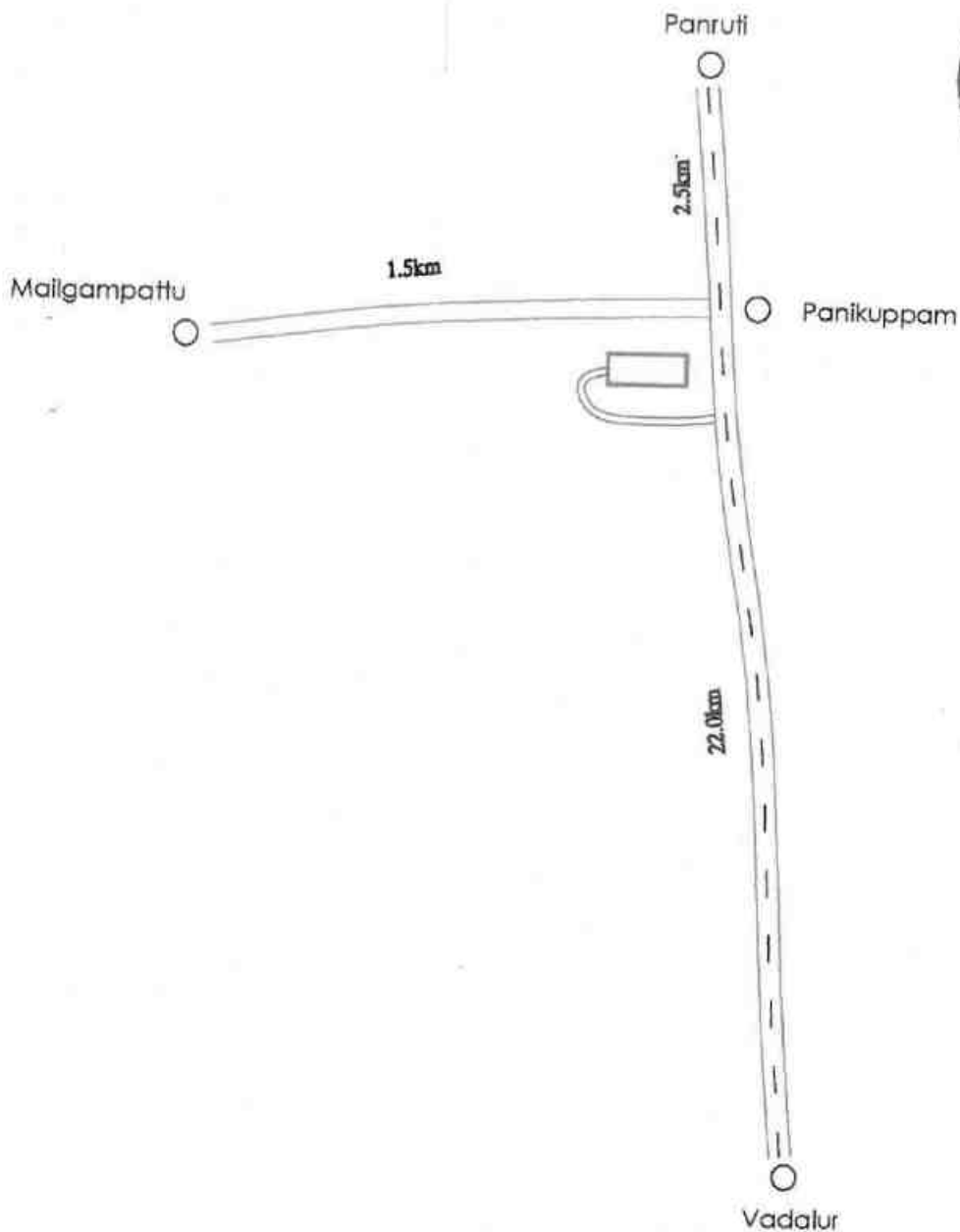


PLATE NO : I-B

ROUTE MAP



INDEX

LEASE APPLIED AREA	
NATIONAL HIGHWAY	
VILLAGE ROAD	
APPROACH ROAD	

APPLICANT:

Tvl. TANCEM Stoneware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu- 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2,
134/3., etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

SCALE :

NOT TO SCALE

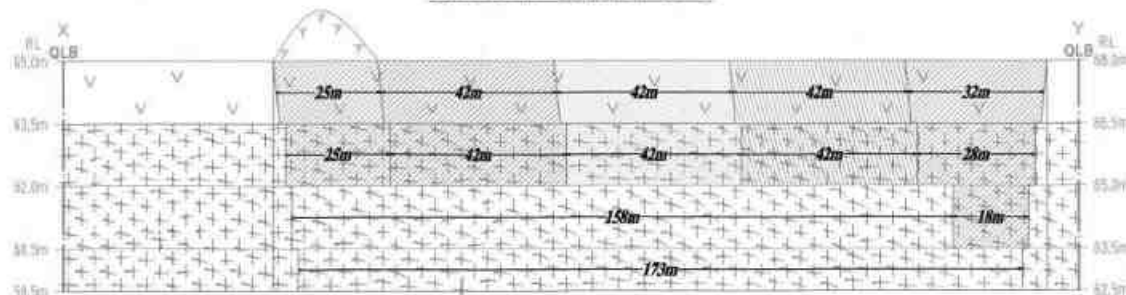
PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

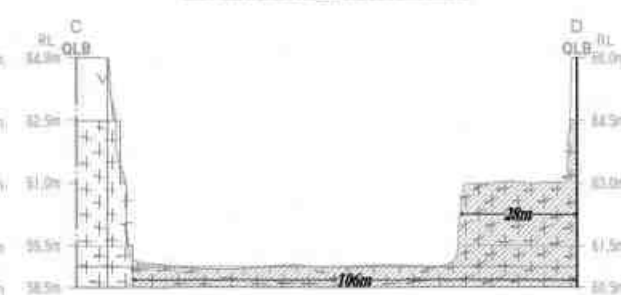
S. PRASAD.,
Assistant Manager (Geology)
QUALIFIED PERSON

I - yr Proposed area to be Quarried	
II - yr Proposed area to be Quarried	
III - yr Proposed area to be Quarried	
IV - yr Proposed area to be Quarried	
V - yr Proposed area to be Quarried	

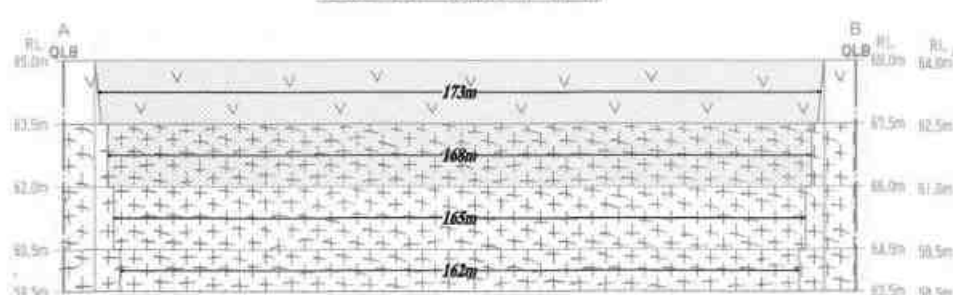
SECTION ALONG X-Y



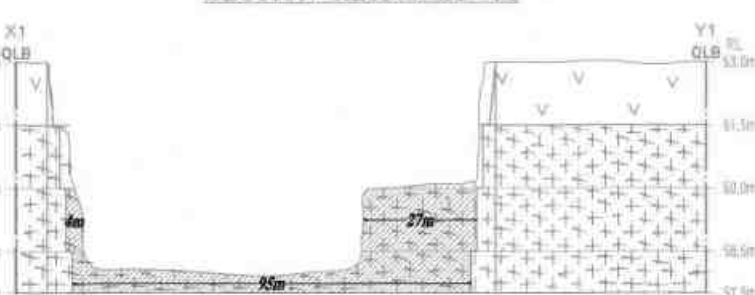
SECTION ALONG C-D



SECTION ALONG A-B



SECTION ALONG X1-Y1



INDEX

- Q.L. APPLIED AREA BOUNDARY
- 50m & 7.5m SAFETY BARRIER
- TOP SOIL
- FIRECLAY

APPLICANT

Tvl. TANCEM Wareware Pipe Factory,
(A Government Undertaking)
5th Floor, Aavin Illam
3A, Pasumpon Muthuramalingam Salai
Nandanam, Chennai, Tamilnadu - 600 035.

LOCATION OF QUARRY:

S.F.Nos : 133/1A, 134/2, 134/3, etc.,
EXTENT : 6.59.0 Ha
VILLAGE : PANIKANKUPPAM,
TALUK : PANRUTI
DISTRICT : CUDDALORE
STATE : TAMILNADU

PLATE NO - V-A

DATE OF SURVEY : 29.03.2023

YEARWISE DEVELOPMENT & PRODUCTION SECTIONS

SCALE
HOR 1:1000 ; VER 1:100

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

S. PRASAD
Assistant Engineer (Geology)
QUALIFIED PERSON

BOUNDARY CO-ORDINATES

S.N	LATITUDE	LONGITUDE
1	11° 46' 49.02"N	78° 32' 55.34"E
2	11° 46' 50.00"N	78° 32' 55.97"E
3	11° 46' 50.00"N	78° 32' 56.84"E
4	11° 46' 50.00"N	78° 32' 57.00"E
5	11° 46' 51.03"N	78° 32' 57.77"E
6	11° 46' 51.69"N	78° 32' 58.18"E
7	11° 46' 52.19"N	78° 32' 58.19"E
8	11° 46' 53.69"N	78° 32' 58.03"E
9	11° 46' 53.45"N	78° 32' 58.07"E
10	11° 46' 54.28"N	78° 32' 58.15"E
11	11° 46' 54.81"N	78° 32' 58.21"E
12	11° 46' 55.48"N	78° 32' 58.28"E
13	11° 46' 55.48"N	78° 32' 58.31"E
14	11° 46' 55.48"N	78° 32' 58.63"E
15	11° 46' 55.55"N	78° 32' 58.75"E
16	11° 45' 53.50"N	78° 32' 57.81"E
17	11° 45' 53.41"N	78° 32' 56.94"E
18	11° 45' 51.01"N	78° 32' 56.01"E
19	11° 45' 53.84"N	78° 33' 02.73"E
20	11° 44' 53.35"N	78° 33' 02.73"E
21	11° 44' 53.28"N	78° 33' 03.38"E
22	11° 44' 53.43"N	78° 33' 03.22"E
23	11° 44' 53.34"N	78° 33' 03.18"E
24	11° 44' 54.51"N	78° 33' 03.66"E
25	11° 44' 52.78"N	78° 33' 02.72"E
26	11° 44' 53.18"N	78° 32' 59.06"E
27	11° 44' 52.79"N	78° 32' 59.03"E
28	11° 44' 52.87"N	78° 32' 58.22"E
29	11° 44' 49.52"N	78° 32' 57.61"E

DATE: 11/04/2024, ZONE 44 NORTH

SITE SERVICES

- WATER SUPPLY
- POWER SUPPLY
- WASTE DISPOSAL
- WASTE WATER

INDEX

- Q.L. APPLIED AREA
- 30m & 7.5m SAFETY DISTANCE
- TEMPORARY BOUNDARY MARK
- TOP SOIL
- UNDERLAY
- QUARRY PIT
- CONTOUR
- SHOOTS
- QUARRY HAUL ROAD
- APPROACH ROAD
- VILLAGE ROAD
- ODM
- PLANTATION
- BARBED WIRE FENCING
- PROPOSED GAILAND DRAIN
- STRIKE AND DIB
- PROPOSED BACKFILLING

APPLICANT

T.V. TANCER Somware Pipe Factory,
(A Government of Tamil Nadu Undertaking)
5th Floor, Anna Hall
JA, Panampet Mahanagaralingam Solai
Nandam, Chennai, Tamilnadu - 600 033.

LOCATION OF QUARRY

S.F. No: 133/1A, 134/2, 134/3, etc.,
EXTENT: 6.59.0 Ha
VILLAGE: PANIKANKUPPAM,
TALUK: PANRUTI
DISTRICT: CUDDALORE
STATE: TAMILNADU

PLATE NO - VII

DATE OF SURVEY: 29.01.2023

PROGRESSIVE QUARRY CLOSURE PLAN & SECTIONS

SCALE: 1:1000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLAN IS TRUE AND CORRECT TO THE BEST OF MY
KNOWLEDGE BASED UPON THE FIELD MAP
AUTHENTICATED BY STATE GOVERNMENT

[Signature]
SPECIAL
Assistant Manager (Geology)
QUARRY PERSON

Proposed Backfilling
= 102mX15mX5.5m

Proposed Pit Dimension (max)
XY-AB = 181mX171mX5.5m
X1Y1-CD = 102mX111mX5.5m

LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Ha)	ADDITIONAL AREA TO BE REQUIRED AT THIS PERIOD (Ha)	AREA AT THE END OF LIFE OF QUARRY (Ha)	Color
AREA COVER QUARRY	1.025	5.275	6.298	XXXX
ROAD	0.01	0.01	0.01	XX
INFRASTRUCTURE	0.01	0.01	0.01	XX
ROAD	1.059	0.00	0.00	XXXX
CURRY BELT	0.00	0.00	0.00	XXXX
UNUTILIZED AREA	5.555	0.00	0.00	XXXX
TOTAL	6.590	5.285	11.875	

தெய்வம் மலையில், மலையாள மலையில், 52. மலையாளம்
- தெய்வம் மலையில் மலையாள மலையில் மலையாளம்
மலையாள மலையாளம்.

பாரதியார், பாரதிதாசனார் கருத்து

Grise 7 mi. hwy: 133/1A - 0.63.5, 134/2 - 0.39.5.

$$134/3 = 0.265, 134/4 = 0.165, 134/5 = 0.345, 134/6 = 0.500$$

$134/7 = 0.35.0$, $134/8 = 0.75.5$, $134/9 = 213.5$, $134/12 = 0180$

$135/3 = 1.04.0$, $135/5 = 0110$, $135/6 = 009.5$, $135/7 = 010.5$

$(35/8) = 0.135$, $(35/9) = 0.050$, $(35/10) = 0.145$, $(35/11) = 1.185$

ମିଳି ଶିକ୍ଷଣୀ ଏକାଠି ପଢ଼ାବୁଦ୍ଧି ଓ ଅଳଗତ୍ ଶାସ୍ତ୍ର ଆମେ

From 2 to 2.5 million. This is the only

6. ১৭৫৬ সাল ১৭ জুন তারিখ। জেনারেল ক্লিফোর্ড লিখিত।

சிறுவர் அடி உயரம் குறைந்த சிகரெட் பழக்கம்

7th June 1960
Landing at 10.30 AM

கிளையின் அமைய எதிர்த்து 23ஆம் திகதி 1965-ம் ஆண்டு

අනුමතය. අනුමතය අනුමතය

300 ବର୍ଷ ମଧ୍ୟରେ ଶିଖର, ବରୁଣ, ଶେଷ

Johnson, 2nd Snowin, 4000th Stair

- કોલેસ્ટ્રોલના સ્તરોમાં વધારો થવાને કારણે શરીરમાં ચર્મીડોનનું સ્તર વધી જાય છે.

- Abhinav Bhatnagar. 4 Durgam Chaurahat, Delhi 110015.
P. Sastri

P. Lasting

1619, 2025

பணிக்குள் புகுப்பதில்

1950-1951 - 1951-1952



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,

3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099986

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 1 Core Zone- Near Project Area** - 11°44'54.50"N 79°33'0.07"E

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/038 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/035 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period: hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	59.8	30.2	17.5	4.5	20.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	58.8	32.2	18.8	4.3	21.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	59.0	31.5	18.7	4.1	20.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	58.7	31.6	17.5	5.1	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	59.1	32.4	18.0	5.3	20.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	58.6	31.5	19.1	5.7	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	59.1	33.6	18.4	4.8	20.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	58.7	30.4	19.3	5.1	20.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	59.6	31.2	17.8	4.3	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	58.4	30.3	18.5	4.8	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	59.3	31.2	18.4	5.0	20.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	58.1	34.5	19.6	5.7	20.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	59.7	36.5	18.6	4.2	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	58.2	35.4	17.9	4.9	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	59.3	32.3	18.9	5.1	20.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	58.4	33.3	18.2	5.7	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	59.6	31.2	19.3	4.9	20.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	58.7	33.2	18.4	4.1	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	56.4	32.1	18.6	5.8	20.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	58.9	30.1	17.5	4.6	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	58.6	30.7	18.4	4.3	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	59.7	30.1	18.6	4.7	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	59.8	30.9	17.3	4.5	20.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	58.3	31.7	17.5	4.4	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	59.1	32.0	18.4	4.3	20.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	58.5	32.8	18.6	4.5	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0);
Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)
Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

Reviewed & Authorised by

V. SELVAKUMAR

Technical Manager

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and renders the signatory liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days after the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothis Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099987

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 2 Near Quarry - 1°46'0.21"N 79°32'50.50"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/039 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/036 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	60.1	31.2	18.9	4.6	21.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	61.2	32.5	19.1	4.8	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	60.0	31.6	18.6	4.9	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	61.3	32.4	19.4	5.0	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	60.1	33.0	18.7	5.2	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	61.3	32.8	19.2	5.4	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	60.8	31.7	18.6	5.6	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	61.4	32.6	19.4	4.9	21.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	60.9	31.6	18.5	4.8	22.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	61.3	32.3	19.2	4.6	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	60.7	31.2	17.8	5.4	22.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	61.4	32.6	19.8	4.2	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	60.3	31.6	18.3	5.0	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	61.5	32.4	19.1	4.8	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	61.4	31.6	18.7	5.3	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	60.3	32.6	19.6	4.9	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	61.8	31.3	18.8	4.7	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	61.5	32.4	19.3	4.9	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	60.7	31.2	18.4	4.5	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	61.4	32.4	19.7	5.0	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	60.2	31.9	18.6	4.9	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	61.4	32.4	19.4	5.7	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	61.7	32.7	18.0	4.8	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	60.1	31.0	19.2	5.6	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	61.4	30.9	18.3	5.3	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	60.5	31.7	19.7	5.2	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

Reviewed & Authorised by

V. SELVAKUMAR

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only after the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable and/or unstable testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099988

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 3 Near Quarry (Residential) - 11°44'53.56"N 79°32'36.09"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/040 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/038 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period:hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	63.4	33.9	21.3	4.1	22.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	62.8	35.8	22.6	5.2	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	62.6	35.1	20.1	5.5	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	64.5	35.0	23.8	6.0	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	65.1	36.4	24.0	4.	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	62.3	35.7	21.5	4.8	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	63.5	34.1	22.6	4.4	22.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	64.8	33.7	20.4	5.0	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	62.4	35.9	21.2	5.2	24.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	63.5	35.1	23.8	6.0	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	63.4	36.4	22.5	4.8	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	64.6	33.2	20.4	4.6	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	62.5	34.5	23.3	5.1	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	65.2	33.7	22.4	5.7	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	62.1	35.1	23.8	5.6	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	64.3	34.4	24.1	5.2	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	62.5	33.9	21.6	5.6	21.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	63.8	34.0	20.2	4.8	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	62.4	35.1	22.4	4.5	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	62.5	34.6	23.6	5.0	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	63.6	33.1	24.8	5.1	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	64.8	35.5	20.7	5.4	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	65.2	34.6	21.9	5.3	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	62.3	33.9	22.5	5.4	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	64.7	35.1	23.3	5.1	21.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	63.6	34.6	24.1	4.7	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



V. Selvakumar

Reviewed & Authorised by

V. SELVAKUMAR

Technical Manager

Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmentally sensitive remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035

**Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.**

Test Certificate No : CML/25-26/T099989

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 4 Ulunthampattu (School) - 1°46'0.21"N 79°32'50.50"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/042 & 18.11.2026

Sampling Instrument ID & Calibration Due Date : CML/ENV/FDS/038 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period: hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
05.03.2025	7:00-7:00	64.8	37.4	21.5	4.8	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.10.2025	7:30-7:30	63.9	36.9	22.3	5.2	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:00-7:00	64.1	37.8	24.0	5.5	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:30-7:30	63.3	38.1	20.3	6.0	21.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:00-7:00	64.0	36.2	21.9	6.2	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:30-7:30	63.0	37.1	20.8	6.3	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:00-7:00	65.3	36.8	22.2	4.4	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:30-7:30	63.1	35.6	23.6	4.6	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:00-7:00	64.0	36.4	21.1	4.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:30-7:30	63.9	37.9	20.8	5.8	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:00-7:00	64.2	39.0	20.6	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:30-7:30	62.0	38.1	23.5	6.1	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:00-7:00	62.3	39.9	23.9	6.4	21.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:30-7:30	64.1	36.7	22.7	4.6	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:00-7:00	63.5	38.9	20.9	4.8	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:30-7:30	62.2	37.7	24.0	5.0	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:00-7:00	63.9	36.1	20.2	5.3	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:30-7:30	64.3	37.5	21.1	5.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:00-7:00	65.0	38.9	22.6	6.3	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:30-7:30	62.7	39.6	23.7	5.4	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:00-7:00	63.7	37.9	20.8	4.7	21.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:30-7:30	62.5	38.0	24.5	4.6	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:00-7:00	63.6	36.1	20.8	5.2	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:30-7:30	64.4	35.5	23.3	5.8	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:00-7:00	63.8	37.7	22.6	5.6	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:30-7:30	64.9	35.5	21.4	4.9	22.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:00-7:00	63.4	34.6	22.3	5.0	23.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be used for any other purpose without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099990

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 5 Melmambattu (Residential) - 11°43'25.22"N 79°34'17.44"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/042 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/039 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period:hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	64.9	35.4	22.1	5.8	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	65.5	36.8	22.5	4.5	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	64.1	35.9	23.9	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	65.9	36.7	22.4	5.1	22.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	64.3	35.2	23.5	5.2	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	65.8	36.3	22.9	4.8	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	66.2	34.2	23.2	4.9	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	65.0	35.9	22.4	5.8	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	64.8	36.1	23.1	5.1	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	63.5	34.7	22.9	5.0	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	65.8	36.5	23.5	5.2	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	64.4	34.7	23.6	5.4	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	65.1	36.0	22.3	5.9	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	64.0	34.0	21.9	5.8	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	66.5	36.1	23.0	5.3	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	64.9	34.4	22.2	5.7	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	65.2	36.5	23.6	4.8	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	64.8	34.8	22.8	5.0	25.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	65.5	36.3	22.9	5.1	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	63.5	35.4	23.1	5.2	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	64.1	35.1	22.9	5.3	25.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	65.7	34.0	23.8	5.4	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	64.9	36.5	22.5	5.3	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	66.8	35.2	23.0	5.7	25.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	65.0	35.1	22.8	5.1	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	64.1	36.5	23.0	5.4	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



V. Selvakumar

Reviewed & Authorised by
V. SELVAKUMAR

Technical Manager

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099991

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 6 Palapattu (Residential) - 11°44'43.62"N 79°36'2.11"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/043 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/040 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period:hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	64.2	37.1	20.4	4.9	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	65.9	35.9	21.8	5.1	22.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	64.2	38.1	20.6	5.5	23.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	66.8	39.2	20.8	5.8	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	64.7	37.4	23.3	4.5	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	65.5	36.2	24.0	5.9	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	64.4	38.7	23.9	6.1	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	65.1	37.6	22.5	6.5	21.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	64.0	36.0	22.2	6.2	22.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	65.9	35.4	20.1	5.3	23.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	64.3	35.6	22.8	5.2	23.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	65.5	34.6	23.7	5.4	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	64.9	36.8	22.7	5.6	22.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	65.7	34.8	22.4	5.0	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	64.1	36.4	23.7	4.8	24.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	65.9	36.2	20.9	4.5	25.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	66.0	37.3	22.2	4.6	21.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	64.2	36.0	23.5	4.7	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	65.8	36.2	21.4	5.1	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	64.9	35.0	20.6	5.6	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	63.5	36.9	22.4	5.8	22.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	66.0	37.0	21.1	6.0	23.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	63.5	36.8	22.9	6.1	21.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	63.7	37.7	23.5	6.4	21.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	65.0	36.5	24.1	5.9	22.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	64.9	37.0	20.9	6.1	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit; DL: Detection Limit; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0); Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

Reviewed & Authorised by
V. SELVAKUMAR

Technical Manager
Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,

3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,

Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099992

Test Certificate Date : 02.01.2026

Location of Sampling : **AAQ - 7 Elandampattu (Residential) - 11°45'32.85"N 79°29'38.73"E**

Sampling Plan & Procedure : CML/LAB/ENV/SOP/AAQ (IS 5182 & USEPA Compendium)

Sampling Instrument ID & Calibration Due Date: CML/ENV/RDS/044 & 18.11.2026

Sampling Instrument ID & Calibration Due Date: CML/ENV/FDS/041 & 19.11.2026

Ambient Air Monitoring Details		Particulate Pollutant			Gaseous Pollutant					Metals Pollutant			Organic Pollutant	
Parameters		SPM	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	CO	Pb	Ni	As	C ₆ H ₆	BaP
NAAQ Norms		200	100	60	80	80	400	180	4	1	20	6	5	1
Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	ng/m ³
Date	Period:hrs	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
01.10.2025	7:00-7:00	66.2	36.1	23.5	6.8	25.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.10.2025	7:30-7:30	64.9	35.4	24.6	7.1	26.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
06.10.2025	7:00-7:00	65.0	34.9	23.5	6.9	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
07.10.2025	7:30-7:30	66.7	36.4	25.9	5.5	26.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.10.2025	7:00-7:00	64.0	35.0	24.7	6.3	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.10.2025	7:30-7:30	66.2	34.1	23.4	7.7	25.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.10.2025	7:00-7:00	66.0	36.4	24.7	6.1	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.10.2025	7:30-7:30	65.9	35.0	25.0	5.3	23.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27.10.2025	7:00-7:00	64.9	34.1	23.9	6.9	25.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.10.2025	7:30-7:30	66.2	36.4	24.8	7.2	24.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
03.11.2025	7:00-7:00	66.1	34.4	25.6	6.4	26.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
04.11.2025	7:30-7:30	65.0	35.9	23.8	7.2	24.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.11.2025	7:00-7:00	64.1	36.2	24.2	5.5	25.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.11.2025	7:30-7:30	65.9	36.9	25.9	6.9	24.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.11.2025	7:00-7:00	66.0	36.4	23.0	7.1	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.11.2025	7:30-7:30	64.1	34.5	24.1	6.3	23.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24.11.2025	7:00-7:00	66.1	36.9	25.6	5.4	25.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25.11.2025	7:30-7:30	65.2	34.1	24.2	6.8	24.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
01.12.2025	7:00-7:00	65.5	35.5	23.9	7.7	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
02.12.2025	7:30-7:30	64.9	36.9	25.3	5.5	24.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
08.12.2025	7:00-7:00	66.0	35.4	24.9	6.0	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
09.12.2025	7:30-7:30	65.1	34.7	23.8	6.1	25.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.12.2025	7:00-7:00	65.0	36.6	25.0	7.5	24.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.12.2025	7:30-7:30	66.5	35.1	23.5	7.3	23.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28.12.2025	7:00-7:00	64.5	34.9	24.1	6.5	24.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29.12.2025	7:30-7:30	65.8	36.8	23.9	7.2	23.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note: BDL: Below Detection Limit ; DL: Detection Limit ; NH₃: BDL (DL:20); O₃: BDL (DL:20); CO: BDL (DL:1.0);

Pb: BDL (DL:0.1); Ni: BDL (DL:1.0); As: BDL (DL:1.0); C₆H₆: BDL (DL:1.0); BaP: BDL (DL:0.1)

Remarks: The values observed for the pollutants given above are within the CPCB standards.

End of Report

For Chennai Mettex Lab Private Limited



V. Selvakumar

Reviewed & Authorised by

V. SELVAKUMAR

Technical Manager

Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and shall be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement, while perishable & environmentally sensitive related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099993

Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring

Location of Sampling : N1 - Core Zone - 11°44'56.26"N 79°32'57.38"E

Location of Sampling : N2 - Near Quarry - 11°45'4.91"N 79°33'13.71"E

Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981

Sampling Instrument : CML/ENV/SLM/001 & CML/ENV/SLM/003

Sampling Date : 15.10.2025						
Location	N1 – Core zone			N2 - Near Quarry		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	40.2	42.1	41.25	38.4	42.3	40.77
07:00-08:00	42.3	44.3	42.3	37.3	41.2	39.67
08:00-09:00	41.2	43.2	41.2	36.3	40.2	38.67
09:00-10:00	43.2	45.3	43.2	35.2	38.2	36.95
10:00-11:00	46.1	48.3	46.1	33.2	35.4	34.44
11:00-12:00	35.2	37.4	35.2	34.5	36.6	35.68
12:00-13:00	34.1	36.4	34.1	35.6	37.6	36.71
13:00-14:00	33.6	35.8	33.6	36.4	38.4	37.51
14:00-15:00	35.4	37.3	35.4	37.2	39.2	38.31
15:00-16:00	34.2	36.1	34.2	38.2	40.2	39.31
16:00-17:00	33.2	35.2	33.2	40.2	42.1	41.25
17:00-18:00	34.2	36.4	34.2	42.1	44.3	43.34
18:00-19:00	35.2	37.2	35.2	43.1	46.3	44.99
19:00-20:00	36.2	38.3	36.2	44.2	45.2	44.73
20:00-21:00	38.1	40.1	38.1	38.2	40.1	39.25
21:00-22:00	36.3	38.2	36.3	36.2	38.2	37.31
22:00-23:00	37.2	40.2	37.2	37.5	39.4	38.55
23:00-00:00	38.2	41.3	38.2	38.1	40.2	39.28
00:00-01:00	36.4	39.3	36.4	39.4	40.1	39.76
01:00-02:00	37.2	39.1	37.2	35.1	37.6	36.53
02:00-03:00	35.2	38.2	35.2	36.2	38.4	37.44
03:00-04:00	34.6	36.2	34.6	34.5	36.2	35.43
04:00-05:00	33.2	35.4	33.2	33.2	35.1	34.25
05:00-06:00	32.5	34.6	32.5	32.2	34.6	33.56
Result	Day Means		38.6	Day Means		39.3
	Night Means		37.0	Night Means		36.9

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

End of Report

For Chennai Mettex Lab Private Limited



NOTE: Any unauthorized alteration, forgery or falsification of the content or signature of the submitted results in this test report refer only to the sample(s) tested and analyzed. The results of the analysis of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced or used without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.

This document is unlawful to be used for legal action. Unless otherwise stated, the results of the analysis of regulatory samples, which will be retained for 15 days from the date of testing, except in case of environmental samples, which will be discarded. The results of the analysis of regulatory samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced or used without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 2232163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099994

Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring

Location of Sampling : N3 – Near Quarry (Residential) - 11°44'54.32"N 79°32'35.89"E

Location of Sampling : N4 – Ulunthampattu (School) - 11°46'0.14"N 79°32'49.69"E

Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981

Sampling Instrument : CML/ENV/SLM/003 & CML/ENV/SLM/009

Sampling Date : 19.11.2025

Location	N3 – Near Quarry (Residential)			N4 - Ulunthampattu (School)		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	42.5	44.3	43.49	37.6	45.6	43.23
07:00-08:00	37.6	46.7	37.6	35.9	44.1	35.9
08:00-09:00	37.1	47.8	37.1	32.6	39.4	32.6
09:00-10:00	39.8	49.4	39.8	33.7	41.5	33.7
10:00-11:00	38.9	41.8	38.9	38.4	46.9	38.4
11:00-12:00	40.2	43.8	40.2	36.5	44.6	36.5
12:00-13:00	41.5	45.7	41.5	40.2	48.8	40.2
13:00-14:00	41.6	46.7	41.6	43.8	49.5	43.8
14:00-15:00	42.5	48.7	42.5	37.8	46.5	37.8
15:00-16:00	43.5	49.8	43.5	41.2	48.9	41.2
16:00-17:00	41.0	46.8	41	43.6	42.7	43.6
17:00-18:00	39.8	47.8	39.8	39.4	48.4	39.4
18:00-19:00	37.8	45.8	37.8	36.2	45.9	36.2
19:00-20:00	36.8	44.9	36.8	32.6	40.1	32.6
20:00-21:00	36.1	43.4	36.1	34.2	43.2	34.2
21:00-22:00	37.8	42.8	37.8	33.6	41.7	33.6
22:00-23:00	36.8	41.8	36.8	32.6	40.2	32.6
23:00-00:00	35.0	42.8	35	32.8	40.7	32.8
00:00-01:00	36.4	41.9	36.4	32.4	39.4	32.4
01:00-02:00	36.8	45.1	36.8	31.9	38.7	31.9
02:00-03:00	37.6	46.2	37.6	32.6	40.6	32.6
03:00-04:00	36.3	46.5	36.3	33.8	41.5	33.8
04:00-05:00	36.1	46.1	36.1	31.4	39.5	31.4
05:00-06:00	35.9	46.5	35.9	32.9	39.2	32.9
Result	Day Means		42.8	Day Means		44.3
	Night Means		34.7	Night Means		35.4

Note: CPCB Norms Residential Area Day Time:55 dB(A); Night Time:45 dB(A)

The Noise level in the above location exists within the permissible limits of CPCB.

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

NOTE: Any unauthorized alteration, forgery or falsification of the content or signature of this document is illegal and the signatory will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & technical samples related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be accepted in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu – 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099995

Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring

Location of Sampling : N5 - Melmambattu (Residential) - 11°43'25.48"N 79°34'15.16"E

Location of Sampling : N6 - Palapattu (Residential) - 11°44'43.43"N 79°36'1.35"E

Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981

Sampling Instrument : CML/ENV/SLM/001 & CML/ENV/SLM/009

Sampling Date : 24.12.2025

Location	N5 - Melmambattu (Residential)			N6 - Palapattu (Residential)		
Parameter	Min	Max	Result	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	37.2	45.9	43.44	34.6	43.2	40.75
07:00-08:00	37.3	46.7	44.16	36.1	38.2	36.1
08:00-09:00	37.8	47.8	45.20	38.2	40.1	38.2
09:00-10:00	39.8	49.4	46.84	37.5	42.3	37.5
10:00-11:00	38.9	41.8	40.59	36.2	43.6	36.2
11:00-12:00	40.2	43.8	42.36	35.2	45.1	35.2
12:00-13:00	41.5	45.7	44.09	36.1	44.5	36.1
13:00-14:00	41.6	46.7	44.86	37.2	45.2	37.2
14:00-15:00	42.5	48.7	46.62	38.2	42.3	38.2
15:00-16:00	43.5	49.8	47.70	39.1	43.2	39.1
16:00-17:00	41	46.8	44.80	40.2	42.1	40.2
17:00-18:00	39.8	47.8	45.43	41.3	43.1	41.3
18:00-19:00	37.8	45.8	43.43	42.1	44.2	42.1
19:00-20:00	36.8	44.9	42.52	43.5	45.6	43.5
20:00-21:00	36.1	43.4	41.13	38.1	40.1	38.1
21:00-22:00	41.8	45.8	44.25	37.2	39.2	37.2
22:00-23:00	40.8	44.6	43.10	36.4	38.1	36.4
23:00-00:00	38.7	42.8	41.22	35.1	37.2	35.1
00:00-01:00	34.7	41.8	39.56	34.2	36.3	34.2
01:00-02:00	35.9	43.7	41.36	33.5	35.4	33.5
02:00-03:00	36.2	40.7	39.01	32.1	34.2	32.1
03:00-04:00	37.4	39.8	38.76	33.6	35.1	33.6
04:00-05:00	37.6	38.7	38.18	34.5	36.3	34.5
05:00-06:00	38.6	40.2	39.47	35.1	37.2	35.1
Result	Day Means		44.1	Day Means		46.8
	Night Means		40.1	Night Means		38.8

Note: CPCB Norms Residential Area Day Time:55 dB(A); Night Time:45 dB(A)

The Noise level in the above location exists within the permissible limits of CPCB.

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

Reviewed & Authorised by

V. SELVAKUMAR

Test Cell Manager

Authorized Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and constitutes a criminal offence for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental test samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

ISSUED TO: M/s. TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

(A Government of Tamil Nadu Undertaking), 5th Floor, Aavin Illam,
3A, Pasumpon Muthuramalingam Salai, Nandanam, Chennai, Tamil Nadu - 600 035.

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc., Panikankuppam Village,
Panruti Taluk, Cuddalore District.

Test Certificate No : CML/25-26/T099996

Test Certificate Date : 02.01.2026

Sample Description : Ambient Noise Monitoring

Location of Sampling : N7 - Elandampattu (Residential) - 11°45'34.48"N 79°29'38.55"E

Sampling Plan & Procedure: CML/LAB/ENV/SOP/N&L & IS 9989:1981

Sampling Instrument : CML/ENV/SLM/001

Location	N7 - Elandampattu (Residential)		
Parameter	Min	Max	Result
Time	dB(A)	dB(A)	dB(A)
06:00-07:00	33.5	35.8	34.80
07:00-08:00	32.6	40.6	32.6
08:00-09:00	34.5	42.4	34.5
09:00-10:00	36.4	43.9	36.4
10:00-11:00	35.9	44.1	35.9
11:00-12:00	32.8	40.9	32.8
12:00-13:00	33.6	41.6	33.6
13:00-14:00	39.4	47.7	39.4
14:00-15:00	39.7	48.4	39.7
15:00-16:00	41.5	48.9	41.5
16:00-17:00	42.4	50.4	42.4
17:00-18:00	35.9	43.4	35.9
18:00-19:00	34.1	42.1	34.1
19:00-20:00	33.5	41.9	33.5
20:00-21:00	35.6	43.5	35.6
21:00-22:00	32.7	40.7	32.7
22:00-23:00	33.6	41.9	33.6
23:00-00:00	34.6	42.4	34.6
00:00-01:00	32.5	40.9	32.5
01:00-02:00	36.5	44.3	36.5
02:00-03:00	31.2	39.4	31.2
03:00-04:00	32.5	40.1	32.5
04:00-05:00	33.7	41.5	33.7
05:00-06:00	31.2	38.9	31.2
Result	Day Means		40.2
	Night Means		38.8

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

Reviewed & Authorised by

V. SELVAKUMAR

Technical Manager

Authorized Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful. The customer will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & unstable related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T099997

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/001

Sample Description : Surface Water (SW-1) - Kedilam River
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.91
Conductivity @ 25°C	IS 3025 Part 14:2013	1235.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	5 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	728 mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	204.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	33.7 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	19.4 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	193.4 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	251.0 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1-2022	58.2 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.51 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F,D	0.48 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	19.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

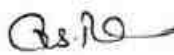
Lab No: 2646180/001 T.C No: CML/25-26/T099997 Dated : 02.01.2026

Page No.2 of 2

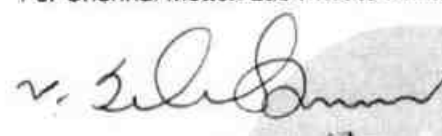
TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL (DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL (DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL (DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39:2021	BDL (DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
BOD @ 27°C for 3 days	IS 3025 Part 44:2023	15.5 mg/l
Chemical Oxygen Demand	IS 3025 Part 58:2023	50.3 mg/l
Dissolved Oxygen	IS 3025 Part 38:1989 (Azide Modification)	7.6 mg/l
Barium as Ba	IS 3025 Part 65:2022	BDL (DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	20.1.8 mg/l
Discipline: Biological Group: Water		
Total Coliform	APHA 24 th Edn. 2023-9221 B	1600 MPN/100ml
Escherichia coli	APHA 24 th Edn. 2023-9221 F	210 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number.		

End of Report

For Chennai Mettex Lab Private Limited


Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory




Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing. except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T099998

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/002

Sample Description : Open Well (OW-1) -Near Project Area
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.33
Conductivity @ 25°C	IS 3025 Part 14:2013	1085.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	640.0 mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	180.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	38.4 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	20.4 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	165.0 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	219.5 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1-2022	51.4 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.42 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F,D	0.38 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	5.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646180/002 T.C No: CML/25-26/T099998 Dated : 02.01.2026 Page No.2 of 2

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39:2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29:2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological		Group: Water
Total Coliform	APHA 24 th Edn. 2023-9221 B	180 MPN/100ml
Escherichia coli	APHA 24 th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory



Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory



NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai. Tamil Nadu – 600 035.

T.C No : CML/25-26/T099999

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/003

Sample Description : Open Well (OW-2)- Elandampattu
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.53
Conductivity @ 25°C	IS 3025 Part 14:2013	1039.0µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	612.0mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	172.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	44.8 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	14.5 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	151.5 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	200.5 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1:2022	51.4 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.52 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F,D	0.42 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	5.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing. except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

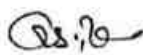
Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
 Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
 Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646180/003 T.C No: CML/25-26/T099999 Dated : 02.01.2026 Page No.2 of 2

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL (DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL (DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL (DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39-2021	BDL (DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL (DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological		Group: Water
Total Coliform	APHA 24 th Edn. 2023-9221 B	170 MPN/100ml
<i>Escherichia coli</i>	APHA 24 th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited


 Reviewed & Authorised by
G.S. RADHA
 Technical Manager
 Authorised Signatory




 Reviewed & Authorised by
V. SELVAKUMAR
 Technical Manager
 Authorised Signatory



NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu – 600 035.

T.C No : CML/25-26/T100000

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/004

Sample Description : Open Well (OW- 3)- Palapattu
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.32
Conductivity @ 25°C	IS 3025 Part 14:2013	1026.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	2 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	605.0 mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	164.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	40.0 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	15.5 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	152.0 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	198.2 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1-2022	51.4 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.41 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F,D	0.41 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	4.3 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing... except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646180/004 T.C No: CML/25-26/T100000 Dated : 02.01.2026

Page No.2 of 2

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39:2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia total ammonia-N) (as	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29:2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological Group: Water		
Total Coliform	APHA 24 th Edn. 2023-9221 B	130 MPN/100ml
Escherichia coli	APHA 24 th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory



Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement, while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu – 600 035.

T.C No : CML/25-26/T100001

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/005

Sample Description : Bore Well (BW-1) -Near Project Area
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.27
Conductivity @ 25°C	IS 3025 Part 14:2013	995.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	2 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	578.0 mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	144.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	33.6 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	14.6 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	135.6 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	198.6 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1-2022	48.6 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.38 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F.D	0.33 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	8.9 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

[Signature]

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing. Except in case of regulatory samples, which will be retained for a specific period as per statutory requirement, while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646180/005 T.C No: CML/25-26/T100001 Dated : 02.01.2026

Page No.2 of 2

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39:2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological		Group: Water
Total Coliform	APHA 24 th Edn. 2023-9221 B	120 MPN/100ml
Escherichia coli	APHA 24 th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited

Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory



Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 2

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai. Tamil Nadu – 600 035.

T.C No : CML/25-26/T100002

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646180/006

Sample Description : **Bore Well (BW-2)- Melmambattu**
(as stated by customer)

TEST	PROTOCOL	RESULTS
Discipline: Chemical		Group: Water
Colour	IS 3025 Part 4:2021	5 Hazen
Odour	IS 3025 Part 5:2018	Agreeable
pH at 25°C	IS 3025 Part 11:2022 (electrometric method)	7.38
Conductivity @ 25°C	IS 3025 Part 14:2013	848.0 µmhos/cm
Turbidity	IS 3025 Part 10:2023	1 NTU
Total Dissolved Solids	IS 3025 Part 16:2023	491.0mg/l
Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (EDTA titrimetric method)	128.0 mg/l
Calcium as Ca	IS 3025 Part 40:1991 (EDTA titrimetric method)	32.0 mg/l
Magnesium as Mg	IS 3025 Part 46:2023	11.6 mg/l
Total Alkalinity as CaCO ₃	IS 3025 Part 23:2023	118.7 mg/l
Chloride as Cl	IS 3025 Part 32:1988 (Argentometric Method)	150.2 mg/l
Sulphate as SO ₄	IS 3025 Part 24/Sec 1:2022	36.8 mg/l
Iron as Fe	IS 3025 Part 53:2003 (1,10 phenanthroline method)	0.35 mg/l
Residual Free Chlorine	IS 3025 Part 26:2021	BDL (DL:0.1 mg/l)
Fluoride as F	APHA 24 th Edn. 2023:4500 F.D	0.31 mg/l
Nitrate as NO ₃	IS 3025 Part 34:1988 (Chromotropic acid method)	5.8 mg/l
Copper as Cu	IS 3025 Part 65:2022	BDL (DL:0.01 mg/l)
Manganese as Mn	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Mercury as Hg	IS 3025 Part 65:2022	BDL (DL:0.0005 mg/l)
Cadmium as Cd	IS 3025 Part 65:2022	BDL (DL:0.001 mg/l)
Selenium as Se	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)

...Contd....2

[Signature]

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

Lab No: 2646180/006 T.C No: CML/25-26/T100002 Dated : 02.01.2026

Page No.2 of 2

TEST	PROTOCOL	RESULTS
Aluminium as Al	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Lead as Pb	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Zinc as Zn	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Total Chromium as Cr	IS 3025 Part 65:2022	BDL(DL : 0.02 mg/l)
Boron as B	IS 3025 Part 65:2022	BDL(DL : 0.05 mg/l)
Mineral Oil	IS 3025 Part 39:2021	BDL(DL : 0.01 mg/l)
Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43/Sec 1 - 2022	BDL (DL:0.0005 mg/l)
Anionic Detergents (as MBAS)	IS 3025 Part 68:2019	BDL (DL:0.01 mg/l)
Cyanide as CN	IS 3025 Part 27/Sec 1-2021 (Colorimetric method)	BDL (DL:0.01 mg/l)
Barium as Ba	IS 3025 Part 65:2022	BDL(DL:0.05 mg/l)
Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Nesslerization method)	BDL (DL:0.01 mg/l)
Sulphide as H ₂ S	IS 3025 Part 29-2022	BDL (DL:0.01 mg/l)
Molybdenum as Mo	IS 3025 Part 65:2022	BDL (DL:0.02 mg/l)
Total Arsenic as As	IS 3025 Part 65:2022	BDL (DL:0.005 mg/l)
Total Suspended Solids	IS 3025 Part 17 -2022	BDL (DL:1.0 mg/l)
Discipline: Biological		Group: Water
Total Coliform	APHA 24 th Edn. 2023-9221 B	130 MPN/100ml
Escherichia coli	APHA 24 th Edn. 2023-9221 F	< 1.8 MPN/100ml
Note : APHA – American Public Health Association, BDL – Below Detection Limit, DL – Detection Limit, MPN – Most Probable Number, < 1.8 MPN/100ml can be taken as "No Microbial Growth".		

End of Report

For Chennai Mettex Lab Private Limited


Reviewed & Authorised by
G.S. RADHA
Technical Manager
Authorised Signatory




Reviewed & Authorised by
V. SELVAKUMAR
Technical Manager
Authorised Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days only from the completion date of testing. except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced except in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 1

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu – 600 035.

T.C No : CML/25-26/T100003

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646181/001

Sample Description : Soil – 1 – Core Zone - Project Area
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	6.98
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	245.0 µmhos/cm
03	Texture :		
	Clay	Gravimetric Method	27.2 %
	Sand		31.9 %
	Silt		40.9 %
04	Water Holding Capacity	By Gravimetric Method	42.3 %
05	Bulk Density	By Cylindrical Method	1.01 g/cm ³
06	Porosity	By Gravimetric Method	36.5 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	55.5 mg/kg
08	Magnesium as Mg		22.3 mg/kg
09	Manganese as Mn		29.6 mg/kg
10	Zinc as Zn		2.27 mg/kg
11	Boron as B		1.02 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	80.5 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.022 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	27.1 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	3.11mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	288.0 mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		1.91 mg/kg
21	Iron as Fe		63 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	1.76 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	1.02 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	29.8 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited



NOTE: Any unauthorized alteration, forgery or falsification of the content of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested. Sample(s) are retained for 15 days only from the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable or environmentally testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the terms and conditions of the agreement between Chennai Mettex Lab and its Customer.

Reviewed & Authorised by
V. SELVARAJU
Authorized Signatory



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No 1 of 1

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T100004

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646181/002

Sample Description : Soil - 2 -Near Quarry (Residential Land)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	6.76
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	302.5 µmhos/cm
03	Texture :		
	Clay	Gravimetric Method	28.7 %
	Sand		37.5 %
	Silt		33.8 %
04	Water Holding Capacity	By Gravimetric Method	41.3%
05	Bulk Density	By Cylindrical Method	0.89 g/cm ³
06	Porosity	By Gravimetric Method	40.9 %
07	Calcium as Ca	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	76.5 mg/kg
08	Magnesium as Mg		33.4 mg/kg
09	Manganese as Mn		26.5 mg/kg
10	Zinc as Zn		4.06 mg/kg
11	Boron as B		2.01 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	89.5 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.022 %
14	Potassium as K	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	20.6 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	6.08 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	384.8 mg/kg
17	Cadmium as Cd	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		1.21 mg/kg
21	Iron as Fe		18.98 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	3.81 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	2.21 %
24	Cation Exchange Capacity	USEPA 9080 - 1986	27.8 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited



[Signature]

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from the completion date of testing ... except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & analytical related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 1

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T100005

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646181/003

Sample Description : Soil - 3 - Ulunthampattu (Residential Land)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.20
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	258.1+ μ mhos/cm
03	Texture :		
	Clay	Gravimetric Method	27.2 %
	Sand		30.5 %
	Silt		42.3 %
04	Water Holding Capacity	By Gravimetric Method	38.3 %
05	Bulk Density	By Cylindrical Method	1.21 g/cm ³
06	Porosity	By Gravimetric Method	40.8 %
07	Calcium as Ca	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	73.5 mg/kg
08	Magnesium as Mg		34.3 mg/kg
09	Manganese as Mn		27.6 mg/kg
10	Zinc as Zn		6.82 mg/kg
11	Boron as B		1.36 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	79.5 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.020 %
14	Potassium as K	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	23.8 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	4.69 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	293.5 mg/kg
17	Cadmium as Cd	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		0.96 mg/kg
21	Iron as Fe		10.29 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	2.43 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	1.41 %
24	Cation Exchange Capacity	USEPA 9080 - 1986	30.6 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited



[Signature]
V. SELVAKUMAR
Technical Manager
Authorized Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content of this document is unlawful and authorized by Chennai Mettex Lab Private Limited. The undersigned shall be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days after the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced or copied in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

Page No 1 of 1

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu – 600 035.

T.C No : CML/25-26/T100006

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuoppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025

Lab No : 2646181/004

Sample Description : Soil – 4 Melmambattu (Barren Land)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	7.19
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	366.5 µmhos/cm
03	Texture :		
	Clay	Gravimetric Method	29.4 %
	Sand		33.8 %
	Silt		36.8 %
04	Water Holding Capacity	By Gravimetric Method	40.8 %
05	Bulk Density	By Cylindrical Method	1.08 g/cm ³
06	Porosity	By Gravimetric Method	39.3 %
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	61.5 mg/kg
08	Magnesium as Mg		30.6 mg/kg
09	Manganese as Mn		23.7 mg/kg
10	Zinc as Zn		3.98 mg/kg
11	Boron as B		1.52 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	68.1 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.025 %
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	31.3 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	5.24 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	416.8 mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		1.07 mg/kg
21	Iron as Fe		15.21 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	2.49 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	1.42 %
24	Cation Exchange Capacity	USEPA 9080 – 1986	25.9 meq/100g of soil

End of Report

For Chennai Mettlex Lab Private Limited

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders will be liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for **Retention & Auditability** completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & **SELVAKUMAR** testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be **Technical Director** in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettix Lab's customer, and is provided in accordance with the **Authorized Signatory** with Chennai Mettix Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED®

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No 1 of 1

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T100007

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646181/005

Sample Description : Soil - 5 Palapattu (Agriculture Land)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	6.8
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	395.5 µmhos/cm
03	Texture :		
	Clay	Gravimetric Method	28.5 %
	Sand		40.1 %
	Silt		31.4%
04	Water Holding Capacity	By Gravimetric Method	38.6 %
05	Bulk Density	By Cylindrical Method	1.03 g/cm ³
06	Porosity	By Gravimetric Method	41.2 %
07	Calcium as Ca	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	58.9 mg/kg
08	Magnesium as Mg		26.6 mg/kg
09	Manganese as Mn		27.8 mg/kg
10	Zinc as Zn		3.98 mg/kg
11	Boron as B		1.09 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	73.6 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff:2015)	0.017 %
14	Potassium as K	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	27.7 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	3.58 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	282 mg/kg
17	Cadmium as Cd	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		0.98 mg/kg
21	Iron as Fe		4.03 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	2.18 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	1.27 %
24	Cation Exchange Capacity	USEPA 9080 - 1986	32.1 meq/100g of soil

End of Report



For Chennai Mettex Lab Private Limited

V. Selvakumar

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and punishable by law. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days from the date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement, while perishable & environmentally sensitive related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced or copied in any form, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.



CHENNAI METTEX LAB PRIVATE LIMITED[®]

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032, Tamil Nadu, INDIA
Phone : +91 44 22323163, 22311034, 42179490, 42179491 | CIN : U74999TN2008PTC069459
Email : test@mettexlab.com | Web : www.mettexlab.com

TEST REPORT

Page No.1 of 1

ISSUED TO : M/s.TANCEM Stoneware Pipe Factory, Extent: 6.59.0ha

T.C Date : 02.01.2026

(A Government of Tamil Nadu Undertaking),
5th Floor, Aavin Illam, 3A, Pasumpon
Muthuramalingam Salai, Nandanam,
Chennai, Tamil Nadu - 600 035.

T.C No : CML/25-26/T100008

Date Of Receipt : 23.12.2025

Analysis Commenced On: 23.12.2025

Analysis Completed On : 02.01.2026

Site Address: S.F. Nos. 133/1A, 134/2, 134/3 etc.,
Panikankuppam Village, Panruti Taluk, Cuddalore District.

Cust. Ref : SRF Dated : 22.12.2025.

Lab No : 2646181/006

Sample Description : Soil - 6 Elandampattu (Agriculture Land)
(as stated by customer)

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff.2016)	6.9
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	420.5 µmhos/cm
03	Texture :		
	Clay	Gravimetric Method	27.5 %
	Sand		30.8 %
	Silt		41.7 %
04	Water Holding Capacity	By Gravimetric Method	40.9 %
05	Bulk Density	By Cylindrical Method	1.89 g/cm ³
06	Porosity	By Gravimetric Method	37.8 %
07	Calcium as Ca	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	52.6 mg/kg
08	Magnesium as Mg		22.8 mg/kg
09	Manganese as Mn		19.9 mg/kg
10	Zinc as Zn		4.25 mg/kg
11	Boron as B		1.74 mg/kg
12	Chloride as Cl	APHA 23 rd Edn 2019 4500 Cl B	75.5 mg/kg
13	Total Soluble Sulphate as SO ₄	IS 2720 Part 27 : 1977 (Reaff.2015)	0.017 %
14	Potassium as K	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	28.6 mg/kg
15	Total Phosphorus as P	IS 10158 : 1982 (Stannous chloride method)	3.15 mg/kg
16	Total Nitrogen as N	IS 14684 : 1999	398.5 mg/kg
17	Cadmium as Cd	USEPA 3050 B - 1996 & USEPA 6010 C - 2000	BDL (DL : 1.0 mg/kg)
18	Total Chromium as Cr		BDL (DL : 1.0 mg/kg)
19	Copper as Cu		BDL (DL : 1.0 mg/kg)
20	Lead as Pb		1.05 mg/kg
21	Iron as Fe		16.08 mg/kg
22	Organic Matter	IS : 2720 Part 22: 1972	2.12 %
23	Organic Carbon	Methods of analysis of soils, plants, waters and fertilizers by HLS Tandon	1.23 %
24	Cation Exchange Capacity	USEPA 9080 - 1986	27.1 meq/100g of soil

End of Report

For Chennai Mettex Lab Private Limited



Y. Selvakumar
Y. SELVAKUMAR
Technical Manager
Authorized Signatory

NOTE: Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and liable for legal action. Unless otherwise stated the submitted results in this test report refer only to the sample(s) tested and such sample(s) are retained for 15 days after the completion date of testing, except in case of regulatory samples, which will be retained for a specific period as per statutory requirement; while perishable & other environmental testing related remnant samples will be discarded consequent upon completion of testing. Samples are not drawn by us unless otherwise stated. This document cannot be reproduced in full, without prior written approval of the laboratory. This report is for the exclusive use of Chennai Mettex Lab's customer, and is provided in accordance with the agreement between Chennai Mettex Lab and its Customer.

National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Exploration and Mining Solutions, Salem

No. 17, Advaita Ashram Road, Fairlands, Salem, Tamil Nadu – 636 004

Geo Exploration and Mining Solutions, Salem is Re-Accredited (RA3) as Category-A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations (Version 3), for the preparation of EIA/EMP reports in the sectors listed below, as per the specified categories

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	Mineral beneficiation	7	2 (b)	A
3.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
4.	Building and construction projects	38	8 (a)	B

Note: Names of approved experts and sectors are mentioned in RAAC minutes dated August 21, 2025, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/25/3827 dated August 25, 2025. The accreditation needs to be renewed before the expiry date by Geo Exploration and Mining Solutions, Salem following due process of assessment.

Valid up to
August 06, 2028

Issue Date
August 25, 2025



Certificate No.
NABET/EIA/25-28/RA 0424


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

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