DRAFT EIA / EMP REPORT

FOR

LIMEKANKAR QUARRY LEASE

Extent	4.370 Ha
Production	0.097 Mil. T of Lime Kankar for a period of 5 Years
Location	Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu.
Ultimate Depth	2.55m bgl

- Terms of Reference issued by SEIAA Tamil Nadu vide Lr.No.SEIAA-TN/F.No.7193/ SEAC/ToR-760/2020 Dated 24.09.2020
- Term of Reference -Extension Lr.No.SEIAA-TN/F.No.7193/SEAC/ToR-760/Extn, dated:08.08.2023
- Baseline Monitoring- Summer Season (March 2022 to May 2022)

PROJECT PROPONENT

CHETTINAD CEMENT CORPORATION PVT. LTD.

Ariyalur Works, Trichy Road, Keelapulur, Ariyalur District-621707.

CONSULTANT

CREATIVE ENGINEERS & CONSULTANTS

NABET ACCREDITED CONSULTANCY, NABL ACCREDITED TESTING LAB

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

Cell: 09444133619 Email : cecgiri@yahoo.com,

Creating Possibilities

Category-B1

MAY 2023

CEC/EMP/MI-191

REVISIONS OF EIA/EMP REPORT

Revision number	Report Status	Date of submission
00/MAY/23	Draft EIA /EMP Report	05.05.2023

Environmental Impact Assessment & Environmental Management Plan Report for Limekankar Quarry Lease of Chettinad Cement Corporation Pvt. Ltd. over an area of 4.370Ha in Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu was prepared by Creative Engineers & Consultants and authorized for submission by Mr. P.Giri, EIA Coordinator, CEO, of Creative Engineers & Consultants on 05.05.2023 after due review by the personnel and consultation with Chettinad Cement Corporation Pvt. Ltd. Current Revision number of the EIA/EMP report is 00/MAY/23, signifying as per the revision mentioned in the above table that this is a draft EIA/EMP report.

Chettinad cement

PROJECT PROPONENT DECLARATION

We, Chettinad Cement Corporation Pvt. Ltd. received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 dated: 24.09.2020 and received extension ToR vide their Lr.No.SEIAA TN/F.No.7193/SEAC/TOR/ Extn dated:08.08.2023 for mining lease for Lime Kankar Quarry over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu

We have entrusted the EIA study to M/s. Creative Engineers & Consultants (CEC), Chennai who have been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India with their accreditation valid upto 23.12.2023.

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

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

For M/s. Chettinad Cement Corporation Pvt. Ltd.,

R. A. K

R.A. Krishnakumar
Chief Operating officer

Chettinad Cement Corporation Private Limited
CIN : U93090TN1962PTC004947
E info@chettinadcement.com
www.chettinad.com

Regd. Office : Chettinad Towers,
603, Anna Salai, Chennai 600 006
T +91 44 2829 2727, 4295 1800 (100 lines)
F +91 44 2829 1558

Corporate Office : Sigapi Achi Building
18/3, Rukmani Lakshmipathy Road
Egmore, Chennai - 600 008.
T + 91 44 4369 1000

CREATIVE ENGINEERS & CONSULTANTS

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

Creating Possibilities

EIA Consultant Undertaking

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

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

CEC has been accredited by the National Accreditation Board for Education & Training (NABET), Quality Council of India for empanelment of EIA Consultants with their accreditation valid upto 23.12.2023.

Chettinad Cement Corporation Pvt. Ltd. received ToR under EIA Notification 2006 from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 dated:24.09.2020 and Extension TOR vide their Lr No.SEIAA-TN/F.No.7193/SEAC/TOR-760/Extn,dated:08.08.2023 or mining lease for Lime Kankar Quarry over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, TamilNadu

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

(P. Giri)
Chief Executive & EIA Coordinator
Creative Engineers & Consultants

9/4b, Bharathwajar Street, East Tambaram, Chennai – 600 059.
Ph : 22395170, 9444133619, fax : 91-44-22396643.
e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

Annexure – VII

Declaration by Experts contributing to the EIA Report for

Lime Kankar Quarry Lease of Chettinad Cement Corporation Pvt. Ltd. over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu

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

EIA coordinator:

Name: **P.Giri**

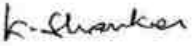
Signature and Date:

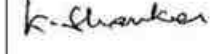
Period of involvement: **September 2019 onwards**

Contact information: **09444133619**

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP*	**P.Giri**	• **Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards.** • **Identification of sources of air pollution comprising dust, gaseous emission due to mining & other activities** • **Identification of Impacts & suggestion of mitigation measures** **Period: September 2019 onwards**	
		B.Swamynathan	• **Data interpretation of Micro meteorological data for wind rose.** • **Identification of polluting source and suggestion of suitable mitigation measures.** **Period: March 2022 onwards**	
2	WP*	**G.Sandhya**	• **Study of the monitored data with respect to the applicable standards.** • **Study of water requirement, preparation of water balance diagram.** • **Identification of impact of the project on the water quality and suggestion of suitable mitigation measures.** • **Preparation of sections relevant to WP functional area in the EIA/EMP report.**	

			Period: March 2022 onwards	
3	SHW*	**P.Giri**	• **Quantification of mineral & waste from mining operation** • **Waste disposal method evaluation** • **Providing dump management plan** • **Providing Surface Runoff Management Structure Requirements.** • **Identification of Hazardous waste and its details of disposal** **Period: September 2019 onwards**	
4	SE*	**R.Baburaj**	• **Identification of villages in the study area and finalization of demographic profile of the villages within the study area.** • **Preparation of sections relevant to SE functional area in the EIA/EMP report** **Period: March 2022 onwards**	
5	EB*	**B.Swamynathan**	• **Perusal of existing data relevant to this project.** • **Studying the details of flora and fauna, separately for core, buffer zone and forest area based on primary field survey.** • **Identification of species , Indicating the Schedule of the fauna present in the study area** • **Assessment of impact on Biological environment and suggestion of mitigative measures** • **Collecting & providing details of existing and proposed Green belt development /plantation in the core zone** **Period: March 2022 onwards**	
6	HG*	**K.Shankar**	• **Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures** • **Perusal of site specific ground water table details for the core zone and the study area.** • **Studied the hydrological aspects of surface and groundwater in study area** • **Study about impact on the hydrology due to mining operation** • **Suggesting mitigative measures like RWH for enhancement of ground water level** **Period: March 2022 onwards**	

7	GEO*	**K.Shankar**	• **Study of geology of the ML area and the surrounding areas.** • **Provide details about Mineral composition** **Period: March 2022 onwards**	
8	SC*	**B.Swamynathan**	• **Study of soil profile** • **Assessment of Impact on soil and suggesting plantation scheme.** **Period: March 2022 onwards**	
9	AQ*	**G.Sandhya**	• **Quantification of emission particulars** • **Preparation of meteorological data in suitable form for input into the model** • **Simulation of model for generation of Isopleth and data interpretation. Analysis of the Isopleth generated** • **Studying the impact on AAQ monitoring locations due to the generated emissions.** • **Preparation of sections relevant to AQ functional area in the EIA/EMP report.** **Period: March 2022 onwards**	
10	NV*	**P.Giri**	• **Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards.** • **Predict the noise level and vibration level due to proposed mining operation based on scientific evaluation.** • **Suggesting the Mitigation measures to control noise pollution, Suggesting the Mitigation measures to control ground vibration** **Period: September 2019 onwards**	
11	LU	**B.Swamynathan**	• **Collection of Remote sensing satellite data to study the land use pattern.** • **Primary field survey and limited field verification** • **Preparation of Land use map using Satellite data of the project area separately for the core zone and the buffer zone and providing the land use pattern.** **Period: March 2022 onwards onwards**	

12	RH*	**K.Shankar**	• **Identified Major risks involved in the project Mitigation measures suggested to avoid risk.** • **Preparation of onsite and offsite emergency management plan** **Period: March 2022 onwards onwards**	K.Shankar

*One TM against each FAE may be shown
**Please attach additional sheet if required

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

I, **P.Giri** hereby,confirm that the above mentioned experts prepared the EIA report for **Lime Kankar Quarry Lease of Chettinad Cement Corporation Pvt. Ltd. over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu**

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

Signature:

Name: **P.Giri**

Designation: **Chief Executive**

Name of the EIA consultant organization: **Creative Engineers & Consultants, Chennai – 59**
NABET Certificate No. & Issue Date: **No- NABET/EIA/2023/SA 0187 & date 30.01.2023**

QUALITY COUNCIL® OF INDIA
Creating an Ecosystem for Quality

National Accreditation Board for Education and Training

Certificate of Accreditation

Creative Engineers and Consultants,

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

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

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

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

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

Sr. Director, NABET
Dated: January 30, 2023

Certificate No.
NABET/EIA/2023/SA 0187

Valid up to
December 23, 2023

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

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TERMS OF REFERENCE & ITS COMPLIANCE

Thiru. K.V. GIRIDHAR, I.F.S.,
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY – TAMIL NADU
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.
Phone No.044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 Dated:24.09.2020

To

M/s. Chettinad Cements Corporation Pvt. Ltd.
Ariyalur Works,
Trichy Road,
Keelapulur
Ariyalur District 621707.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference (ToR) for the Proposed Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu by M/s. Chettinad Cements Corporation Private Limited 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/ 44467/2019, Dated: 09.10.2019.
2. Your application submitted for Terms of Reference dated: 11.10.2019.
3. Minutes of the 166th SEAC Meeting held on 30.07.2020.
4. Minutes of the 397th SEIAA Meeting held on 21.09.2020.

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

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY-TN
24 SEP 2020
Panagal Maaligai, Saidapet, Chennai-15

MEMBER SECRETARY
SEIAA-TN

The proponent, M/s. Chettinad Cements Corporation Private Limited has submitted application for ToR on 11.10.2019, in Form-I, Pre- Feasibility report for the Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

The proposal was placed in the 166th SEAC Meeting held on 30.07.2020. Based on the presentation given by the project proponent and document furnished by the project proponent, the SEAC has recommended the proposal for the grant of Terms of Reference (ToR) to SEIAA with Public Hearing, subject to the following specific conditions in addition to the points mentioned in the standard terms of reference for conducting environment impact assessment study for non-coal mining projects and information to be included in EIA/EMP report issued by the MoEF&CC.

1. 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.
2. The proponent shall conduct the hydro-geological study to evaluate the impact of proposed mining activity on the groundwater table, agriculture activity, and water bodies such as rivers, tanks, canals, ponds etc. located nearby by the proposed mining area.
3. The proponent shall furnish the details on number of groundwater pumping wells, open wells within the radius of 1 km along with the water levels in both monsoon and non-monsoon seasons. The proponent would also collect the data of water table level in this area during both monsoon and non-monsoon seasons from the PWD / TWAD.
4. The Proponent shall conduct the Cumulative impact study on the agricultural area due to Mining, Crushers and other activities around the site area.
5. The details of surrounding well and the cumulative impact on the ground water shall be part of EIA study.
6. The Socio-economic impact assessment due to the project needs to be carried out within 10 km buffer zone from the mines.

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SEIAA-TN

7. A detailed report on the green belt development already undertaken is to be furnished. They also need to submit the proposal for green belt activities for the proposed mine(s).
8. Proposal for CER activities should be furnished out taking into consideration the requirement of the local habitants available within the buffer zone as per Office Memorandum of MoEF& CC dated 01.05.2018.
9. A detailed mining closure plan for the proposed project shall be submitted.
10. A detail report on the safety and health aspects of the workers and for the surrounding habitants during operation of mining for drilling and blasting shall be submitted.
11. The recommendation for the issue Terms of Reference is subject to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981 /2016, M.A.No.982/2016 & M.A.No.384/2017).
12. Details of the lithology of the mining lease area shall be furnished.
13. A study shall be conducted on the number of trees (name of the species, age) present in the mining lease applied area and how, it will be managed during mining activity.
14. The project proponent shall adhere to all the conditions imposed in the Mine plan approval vide Lr. No. 1507/MM10/2018/LK/Ary. Dated. 09.01.2019 by the A.D Mines, Department of Geology and Mining-Ariyalur District.

Discussion by SEIAA and the Remarks:-

The proposal was placed before the 397th SEIAA Meeting held on 21.09.2020. After detailed discussion the Authority decided to grant Terms of Reference along with public hearing for the preparation of EIA Report with additional ToR as recommended by SEAC and subject to General conditions in addition to the following conditions:

1. Details of study on social impact, including livelihood of local people.
2. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
3. Reserve funds should be earmarked for proper closure plan.
4. 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

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MEMBER SECRETARY
SEIAA-TN

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.

5. A detailed post-COVID health management plan for workers as per ICMR and MHA guidelines or the State Govt. guideline may be followed and report shall be furnished.

A. STANDARD TERMS OF REFERENCE

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should 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

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MEMBER SECRETARY
SEIAA-TN

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.

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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-

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MEMBER SECRETARY
SEIAA-TN

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 the aquifers. Necessary permission from Central

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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

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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

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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 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

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of mining and below depth of mining and the same shall be furnished in the EIA report.

10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
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.

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29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
b. All documents may be properly referenced with index, page numbers and continuous page numbering.
c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & 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

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- The TORs 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.

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Copy to:

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai -34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
6. The District Collector, Ariyalur District.
7. Stock File.

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24 SEP 2020
Pallingai Malligai, Saidapet, Chennai-15

THIRU.DEEPAK S. BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERM OF REFERENCE-EXTENSION

Lr. No.SEIAA-TN/F.No.7193/SEAC/TOR- 760/Extn, dated: 08.08.2023

To

M/s. Chettinad Cements Corporation Pvt. Ltd.
4th & 5th Floors,
Rani Seethai Hall Building,
603, Anna Salai,
Chennai - 600 006.

Sir/Madam,

Sub: SEIAA-TN – Existing Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District by M/s. Chettinad Cements Corporation Private Limited – Terms of Reference - issue of Extension Validity – Regarding.

Ref:
1. Earlier ToR issued by SEIAA-TN vide Lr. No. SEIAA-TN/F.No. 7193/SEAC/ToR-760/2020, dated: 24.09.2020.
2. MoEF&CC Notification S.O. 221(E) 18.01.2021.
3. Online Proposal No. SIA/TN/MIN/302822/2023, dated: 02.08.2023.
4. Your Application for Extension of Validity of Terms of Reference dated: 03.08.2023.
5. Minutes of the 645th SEIAA meeting held on 08.08.2023.

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In the reference 1st cited above, the Terms of Reference was accorded to M/s. Chettinad Cements Corporation Private Limited for the Existing Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu, vide T.O. Lr.No. SEIAA-TN/F.No.7193/SEAC/ToR-760/2020, dated: 24.09.2020.

Now the Project Proponent, M/s. Chettinad Cements Corporation Private Limited has applied for extension of validity of Terms of Reference vide online application No. SIA/TN/MIN/302822/2023 dated: 02.08.2023.

Details of SEIAA Remarks:

The subject was placed before the Authority in its 645th meeting held on 08.08.2023. After detailed discussions, the Authority noted the following:

1. The proponent, M/s. Chettinad Cements Corporation Private Limited has submitted application for ToR on 11.10.2019, in Form-I, Pre- Feasibility report for the Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District vide online application No. SIA/TN/MIN/44467/2019, Dated: 09.10.2019.
2. ToR was issued to the Project Proponent vide T.O. Lr.No. SEIAA-TN/F.No. 7193/SEAC/ToR-760/2020, dated: 24.09.2020 for a period of three years with validity up to 23.09.2023.
3. Now the Project Proponent, M/s. Chettinad Cements Corporation Private Limited has applied for extension of validity of Terms of Reference for the quarrying of Existing Lime Kankar quarry lease over an extent of 4.37.0 ha in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3 (P), 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1 (P) and 242/10B2 at Kallankurichi Village, Ariyalur Taluk, Ariyalur District vide online application No. SIA/TN/MIN/302822/2023 dated: 02.08.2023.

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4. However, as per MoEF&CC Notification S.O. 221(E) 18th January 2021, para 9A stated as follows:

"9A. Notwithstanding anything contained in this notification, the period from the 1st April, 2020 to the 31st March, 2021 shall not be considered for the purpose of calculation of the period of validity of Prior Environmental Clearances granted under the provisions of this notification in view of outbreak of Corona Virus (COVID-19) and subsequent lockdowns (total or partial) declared for its control, however, all activities undertaken during this period in respect of the Environmental Clearance granted shall be treated as valid.".

5. Further, as per MoEF&CC office memorandum vide No. J-11013/41/2006-IA-II (I) (Part) , dated: 29.08.2017, para (iii) & (iv) stated as follows:

(iii)The above validity period can be extended by the concerned Regulatory Authority for a maximum period of one year without referring the proposal to the EAC/SEAC concerned, provided an application is made by the applicant before expiry of the validity period, together with an updated Form-1 and proper justification and there is no change in terms and conditions of the ToRs. After the lapse of validity, such extension will need EAC/SEAC consideration.

(iv)Thus, an outer limit of validity of ToRs shall be 4 years for all the projects/activities and 5 years for River Valley and HEP Projects.

The Authority, after detailed discussions, decided to issue extension of validity of earlier issued ToR dated 24.09.2020 for a period valid up to 23.09.2025 in view of the above-mentioned office memorandum dated: 29.08.2017 & MoEF&CC Notification S.O. 221(E) dated 18.01.2021. All other conditions imposed in ToR dated 24.09.2020 remains unaltered.

MEMBER SECRETARY
SEIAA-TN

Copy to:

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Principal Secretary to Government, Environment and Forests Department, Tamil Nadu.

3. The Principal Secretary to Government, Industries Department, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai – 34.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. The Chairman, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
7. The District Collector, Ariyalur District
8. The Commissioner of Geology and Mines,Guindy,Chennai-32
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Spare.

TOR COMPLIANCE

S.No	ToR Points	Reply	Pg.No
A. ToR in Addition to Standard ToR			
1.	**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.**	Details of hydrogeological scenario of this project is provided under **Section 3.6, Chapter-III.**	**3-39**
2.	**The proponent shall conduct the hydro-geological study to evaluate the impact of proposed mining activity on the groundwater table, agriculture activity and waterbodies such as rivers, tanks,canals,ponds etc. located nearby the proposed mining area.**	Details of hydrogeological scenario of this project is provided under **Section 3.6, Chapter-III.**	**3-39**
3.	**The proponent shall furnish the details on number of groundwater pumping wells, open wells within the radius of 1Km along with the water levels in both monsoon and non-monsoon season. The proponent would also collected the data of water table level in this area during both monsoon and non-monsoon seasons from PWD/TWAD.**	The Groundwater levels from the 27 number of observation wells of TWAD in Ariyalur have been analyzed for Post-Monsoon and Pre-Monsoon. 5 years average Ground water level in m Below Ground Level for pre and post monsoon is provided under Section 3.6, Chapter-III.	**3-45**
4.	**The Proponent shall conduct cumulative impact study on the agricultural area due to mining, crushers and other activities around the site area.**	Although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius along with this subject project works out to >5 Ha. As such cluster situation applicable and this EMP is prepared. There are no working quarries in the area. The baseline monitoring carried out for this project reflects the cumulative impact of the existing scenario..	**7-3**
5.	**The details of surrounding well and cumulative impact on groundwater shall be part of the EIA study.**	Details of hydrogeological scenario of this project is provided under Section 3.6, Chapter-III.	**3-39**
6.	**The socio economic impact assessment due to project needs to be carried out within 10km buffer zone from mines.**	Nearby villages were visited for conducting study to know about socio-economic conditions. The details are provided under Section 3.2.4, Chapter-III. Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1.0	**3-8**

		Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.	
7.	**A detailed report on the green belt development already undertaken is to be furnished. They also need to submit the proposal for greenbelt activities for the proposed mine (s).**	In the lease area, safety barrier 7.5m around the periphery and 50m safety zone for vari and road. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2200 trees will be planted in and around the lease area. Details are provided under Section 4.6.4, Chapter-IV.	**4-16**
8.	**Proposal for CER activities should be furnished out taking into consideration the requirement of the local habitants available within the buffer zone as per Office Memorandum of MoEF&CC dated 01.05.2018.**	Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1.0 Lakh under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.	**4-19**
9.	**A detailed mining closure plan for the proposed project shall be submitted.**	In the mine closure stage all necessary measures will be taken as per Act & Rules, There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. The mine closure plan is provided in Figure 4.5, Chapter-IV.	**4-14**
10.	**A detail report on the safety and health aspects of the workers and for the surrounding habitants during operation of mining for drilling and blasting shall be submitted.**	The details of occupational health and safety is provided under Section 4.8, Chapter-IV.	**4-19**
11	**The recommendation for the issue of "Terms of Reference" is subjected to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and 0.A.No.102/2017 and 0.A.No.404/2016 (M.A.No. 758/2016, M.A.No .920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016**	Agreed	--

	and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).		
12	**Details of the lithology of the mining lease area shall be furnished.**	Lithology map is enclosed as Figure 3.20, Chapter-III.	**3-44**
13	**A study shall be conducted on the number of trees (name of the species, age) present in the mining lease applied area and how it will be managed during mining activity.**	An ecological survey of the study area was conducted with reference to listing of species and assessment of the existing baseline ecological conditions. Details are provided under Section 3.5, Chapter-III.	**3-33**
14	**The project proponent shall adhere to all the conditions imposed in the Mine plan approval vide Lr.No.1507/MM10/2018/ LK/Ary. Dated 09.01.2019 by the A.D Mines, Department of Geology and Mining – Ariyalur District.**	Agreed	**--**
B.	**Additional ToR**		
1.	**Details of study on social impact including livelihood of people.**	Nearby villages were visited for conducting study to know about socio-economic conditions. The details are provided under Section 3.2.4, Chapter-III. Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1.0 Lakh under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.	**3-8**
2.	**A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.**	The significance of impact on biological environment due to mining and allied activities on various fronts is described in Table 4.13, Chapter-IV.	**4-15**
3.	**Reserve funds should be earmarked for proper closure plan.**	In the mine closure stage all necessary measures will be taken as per Act & Rules, There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. The mine closure plan is provided in Figure 4.5, Chapter-IV.	**4-17**
4.	**A detailed plan on plastic waste**	Single use plastics/ use and throwaway plastics	**4-22**

	management shall be furnished. Further the proponent should strictly comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forests (EC2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.09.2019 under Environment (Protection) Act, 1986. In this connection the project proponent has to furnish the action plan.	will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.	
5.	**A detailed post COVID health management plan for workers as per ICMR and MHA guidelines for the State Govt. guideline may be followed and report shall be furnished.**	The regulations and guidelines of the State Govt. will be adhered to.	--
B. Standard ToR			
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.**	This is a proposed project. No mining has been carried out in this lease area so far by the proponent.	**2-12**
2	**A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given**	Precise area communication letter was obtained from the Industries (MMC2) Department vide Lr.No. 9020/MMC.2/2018-1 dated 12.10.2018. (Annexure-1)	**A-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.**	The production capacity, quantity of waste, its management and mining technology in mine plan and EIA, etc., are compatible with one another.	--
4	**All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).**	• Project coordinates superimposed in satellite imagery and given as Figure No - 2.4 in Chapter – II. • The geology and geomorphology map is provided in Figure No.3.18, 3.19, Chapter-III. The Lithology map and Soil map are provided under Figure No. 3.20, 3.21, Chapter-III. The 10km Radius Index plan showing buffer zone is given in Figure No.3.1 in Chapter –	**2-6** **3-42** **3-43** **3-44** **3-45** **3-2**

		III.	
5	**Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.**	Replied in Standard ToR point no.4	--
6	**Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.**	Not Applicable	--
7	**It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.**	• The proponent has framed a well-planned environmental policy. Its details are provided under Section 10.2.1, Chapter-X. • The Mines Manager will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided in Figure No.10.1, Chapter-X.	**10-1** **10-3**
8	**Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.**	Various risks likely to arise due to mining activities are detailed under section 7.4, Chapter-VII. This being an opencast mine, subsidence is not applicable. There is no drilling or blasting involved in this project.	**7-4**
9	**The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.**	The study area chosen for collecting existing environmental status covers 10 km radial distance from the project periphery (Figure No - 3.1). Data given in the report is for the life of the mine.	**3-2**

10	**Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.**	• The land use of the study area was studied to demarcate various LULC categories and its details are provided under section 3.4, Chapter-III. • The land use pattern at present and at the end of the quarrying period has been provided under section 4.5.1, Chapter-IV. • The post mining land use has been provided in Table No. 4.14. .The post mining land use plan showing afforestation and water body is shown in Figure No- 4.5.	**3-28** **4-17**
11	**Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.**	There is no generation of mineral rejects in the applied area. The topsoil that would be generated during the present plan period is proposed to be utilized for afforestation.	**2-12**
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.**	There is no forest land in the lease area.	--
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.**	There is no forest land in the lease area.	--
14	**Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.**	Not Applicable	--
15	**The vegetation in the RF / PF areas in the study area, with necessary details, should be given.**	There is no forest land in the lease area.	--
16	**A study shall be got done to ascertain the impact**	The mining lease area and the 10 km buffer	**4-20**

	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.	zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.	
17	**Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.**	Replied in Standard ToR point No.16	--
18	**A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.**	A detailed study of flora and fauna composition in the core and buffer zone of the project has been made through primary field surveys. The details are furnished in para 3.5, Chapter III.	**3-33**
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**	Not Applicable	--

	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 w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).**	Not Applicable	--
21	**R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation &Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should he undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoml programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shilling of village(s) including their R&R and socio-economic aspects should be discussed in the Report.**	The mining activities will be carried out within the mine lease area only. The entire mine lease area is a patta land in proponent's possession. There is no population within the ML area. Hence, the question of R& R does not arise.	**7-4**
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**	• The baseline data on micro- meteorology, ambient air quality, Water quality, noise level, soil and flora & fauna are collected during Summer Season (March to May 2022) and detailed in para 3.3 to 3.5 of Chapter-III. • Monitoring stations were selected taking into account, wind direction and location of sensitive receptors. Free silica composition in PM10 sample has been done and the values are found to be Below Detectable Limit (DL 0.05mg/m3) which is well within the prescribed limit of 5mg/m3.	**3-17**

	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.**	• Air quality modeling details are furnished in para 4.2.2 and its continuous sub paras in Chapter-IV of EIA report. • The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. • The model simulations are done for the air pollutant arising from the mining operations, namely, PM10, PM2.5. Ground Level Concentration (GLC) have been computed using hourly meteorological data. • The Isopleths of PM10, PM2.5 concentrations for with control measures scenario have also been drawn and these are given in Figure No.4.1 and 4.2. • It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM10 are within the statutory limits in each case.	**4-3**
24	**The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.**	The total water requirement for this project will be 5.0 KLD comprising 1.0 KLD for drinking water and domestic use, 3.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The water balance diagram for the same is shown in Figure No 4.3.	**4-8**
25	**Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.**	Not Applicable.	**--**
26	**Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.**	• Towards surface runoff management, a garland drain will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to	**4-9**

		the downstream users. The surface runoff management structures diagram is given in Figure No 4.3, Chapter-IV. • The methods for reducing water consumption and rainwater harvesting is provided in section 4.3.4, Chapter-IV.	
27	**Impact of the Project on the water quality, both surface and groundwater. should be assessed and necessary safeguard measures, if any required, should be provided.**	• There is a Vari flowing across the lease area in the east west direction. A safety distance of 50m has been left based on precise area conditions. Earthen bund formation on both sides within the lease will be done. Besides there are also other vari courses in S.F.No.240/10 on the western side and another vari in S.F.228/10. Safety distance of 50m has been left for this also. Good plantation will also be carried out in the safety zone. Besides, There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations. • Mining operations are proposed to be quarried upto a depth of 2.55m only. The groundwater table in this area is much below this level. There is no groundwater intersection envisaged	**4-10**
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.**	Mining operations are proposed to be quarried upto a depth of 2.55m only. The groundwater table in this area is much below this level. There is no groundwater intersection envisaged	**4-10**
29	**Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of**	Replied above in Standard ToR point No.27.	--

	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.**	• The area applied for mining lease is a gentle plain terrain. • Mining operations are proposed to be quarried upto a depth of 2.55m only. The groundwater table in this area is much below this level.	**2-2** **4-10**
31	**A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the. Project. Phasc-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.**	In the lease area, safety barrier 7.5m around the periphery and 50m safety zone for vari and road. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2200 trees will be planted in and around the lease area. Details are provided under Section 4.6.4, Chapter-IV.	**4-17**
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.**	From this proposed quarry the entire output will be transported to the Chettinad Cement Plant on the southern side of the lease area. Details of the impact on logistical system is provided under Section 4.9, Chapter-IV.	**4-20**
33	**Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.**	This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.	**2-15**
34	**Conceptual post mining land use and**	The post mining land use has been provided	**4-16**

	Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	in Table No. 4.13. The post mining land use plan showing afforestation and water body is shown in Figure No- 4.4.	
35	**Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed**	Details of occupational health and safety aspects are given under the subsections of Para 4.8, Chapter-IV.	**4-22**
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**	• Details of the socio-economic survey conducted in the buffer zone has been provided in Para 3.2.4, Chapter-III. • Public health facilities will be further aimed to be developed through CER activities wherein periodic health checkups, medical camps for the locals will be conducted.	**3-9**
37	**Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.**	Nearby villages were visited for conducting study to know about socio-economic conditions, including aspirations and requirements of the people for a better living and collected relevant data. The details are provided under section 3.2.4, Chapter-III.	**3-9**
38	**Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.**	Detailed environmental management plan is provided in Chapter-X.	**10-1**
39	**Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.**	This draft EIA/EMP report will be exposed to public consultation as per mandatory procedures through the District Collector and State Pollution Control Board officials after giving 30 days advance notice in two local newspapers about the scheduled date and time for conduct of the public hearing procedures. The opinions, concerns and objections of stakeholders will be recorded during the public hearing. All the public queries and the replies to the query by the	**7-1**

		project proponent and officials concerned will be recorded and incorporated in the EIA/EMP report for approval by SEIAA, Tamil Nadu.	
40	**Details of litigation pending against the project, if any, with direction /order paced by any Court of Law against the Project should be given.**	• There is no litigation pending against the project.	--
41	**The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.**	• The cost of the project is Rs. 50,00,000 /- /- • Towards EMP measures, Rs.12.80 Lakhs is allocated under capital cost. Besides, Rs.12.80 lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue.	**11-16**
42	**A Disaster management Plan shall be prepared and included in the EIA/EMP Report.**	The disaster management plan has been provided under section 7.4, Chapter-VII.	**7-3**
43	**Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.**	• The proposed Roughstone and Gravel Quarry will benefit this region in the fields of employment opportunities, improved per capita income for local people, improved social welfare facilities in respect of education, health, infrastructural etc. • Direct employment to about 14 people and indirect employment to scores of people. • By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.1 Lakhs for various activities under CER for all the three projects together. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.	**8-1**

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CHAPTER - I

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 PURPOSE OF THE REPORT:

Chettinad Cement Corporation Pvt. Ltd. propose to operate Lime Kankar Quarry Lease over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu and has initiated action towards obtaining environmental clearance.

This project involves the production of 97,196 Tonnes of Lime Kankar upto a depth of 2.55m bgl for the period of 5 years. It will meet the part requirement of the Kilapaluvur Cement Plant of the proponent.

Although the individual lease area of this project is less than 5 Ha, the other existing and proposed lime kankar quarries within the 500m radius cluster along with this subject project works out to >5 Ha. Hence, this proposal is considered under Category – B1 and as per MoEF & CC notification necessitates preparation of EIA/EMP report and public hearing. The details of the quarries located within the 500m radius of the project is given vide **Annexure-3**. A cumulative impact study has been carried out and furnished in **Para 7.3, Chapter-VII.**

This EIA/EMP report is prepared based on standard and additional Terms of Reference issued by SEIAA, Tamil Nadu vide letter no. SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 dated 24.09.2020 and Extension ToR vide Letter No.SEIAA-TN-F.No.7193/SEAC/TOT-760/Extn,dated: 08.08.2023 is in conformance of the generic structure prescribed by MOEF&CC in their notification of September 2006 and the approved mining plan.

1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT:

Table 1.1 Identification of project

1	**Project Name**	Lime Kankar Quarry Lease of Chettinad Cement Corporation Pvt. Ltd.
2	**Extent**	4.370 Ha
3	**Production**	97,196 Tonnes of Lime Kankar for a period of 5 years
4	**Ultimate Depth**	2.55m (0.30m Topsoil followed by 2.25m of Lime Kankar)
5	**Land Classification**	Patta land registered in the name of the company
6	**Location**	**Survey Number:** 226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8,

		242/1, 242/2, 242/3, 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1(P) and 242/10B2
		Village: Kallankurichi
		Taluk: Ariyalur
		District: Ariyalur
		State: Tamil Nadu

Table 1.2: Identification of Project Proponent

1	**Proponent Name**	Chettinad Cement Corporation Pvt. Ltd.
2	**Address**	Ariyalur Works, Trichy Road, Kilapaluvur, Ariyalur District- 621707
3	**Contact Number**	9698011144
4	**Email-ID**	tech@chettinadcement.com

Chettinad Cement Corporation Private Ltd is operating 3 cement plants is Tamil Nadu. The capacity of these cement plants are provided below:

Table 1.3: Capacity of Cement Plants

Cement Plant	Capacity
Puliyur cement unit, Karur Taluk	1.7 MTPA
Karikalli, Guziliamparai Taluk	4.5 MTPA
Keelapalur, Ariyalur Taluk	5.5 MTPA

Towards the requirement for raw material in their Kilapaluvur plant, the company has purchased Lime Kankar bearing lands and applied for mining lease. This proposed Lime Kankar Quarry Lease will meet the part requirement of this cement plant.

Table 1.4: Statutory Approvals

S.No	Statutory Approval	Authority	Letter Number and Date	Reference
1.	**Precise Area Communication Letter**	Industries (MMC2) Department	Lr.No.9020/MMC.2/2018-1 dated 12.10.2018	**Annexure-1**
2.	**Mining Plan Approval**	Department of Geology & Mining,	1507/MM10/2018/LK/Ary, dated 09.01.2019	**Annexure-2**
3.	**Details of other quarries within 500m radius**	Department of Geology & Mining,	Rc.No.77/G&M/2016 dated 27.08.2018	**Annexure-3**

Based on the conditions of Precise Area Communication letter, the following safety distances will be maintained:

Table 1.5: Safety Distances

7.5m	All along the lease boundary
10m	Village road located in S.F. No. 226/2A on the north.
10m	Cart track in S.F. No. 241/9 passing on the east.
50m	Vari in S.F.No.240/10
50m	Vari in S.F.No.228/10
50m	Vari in S.F.No.226/1,2B,2C and 2D

Besides, the high tension powerline passing in S.F.Nos. 241/1B,6A,7 and 8 has to be shifted 50m away from periphery of the quarrying boundary before execution of lease deed.

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

Table 1.6: Brief Description of Nature of project

1.	**Sector**	1(a), Non-Coal Mining
2.	**Type**	Fresh Project
3.	**Category**	B1 (Cluster Situation)
4.	**Mineral Mined**	Limekankar
5.	**Major/Minor Mineral**	Minor
6.	**Mining method**	Opencast Semi mechanized Mining
7.	**End use**	Lime Kankar mined out from this quarry will be used in Kilapaluvur Cement Plant

Table 1.7: Location of the project

S.No	Particulars	Details
1.	**Location**	Kallankurichi Village, Ariyalur Taluk & District, Tamil Nadu
2.	**Corner Coordinates**	**Latitude:** 11°09'46.692" - 11°09'58.092" N **Longitude:** 79°05'41.346 - 79°05'48.888" E
3.	**Toposheet Number**	58 M/4

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

1.3.1 IMPORTANCE TO THE COUNTRY AND REGION:

Chettinad Cement is operating its Kilapaluvur Cement Plant near Ariyalur since 2009 and the existing production capacity of the plant is 5.5 MTPA Cement along with 3x15 MW Captive Thermal Power Plants. The cement Plant requires both Cement grade Limestone and Lime Kankar for Cement manufacturing. Lime Kankar is required for blending with high/low grade Limestone to meet the requirement of raw material. Accordingly, the Company has applied for new Lime Kankar Quarry Leases (Minor Mineral) in Ariyalur Region. This proposed Lime Kankar Quarry Lease will meet the part requirement for the Kilapaluvur Cement Plant.

This project in the area will provide both direct and indirect employment opportunities through allied opportunities in logistics, trading, repairing works etc., improved per capita income for local people, improved social welfare facilities like infrastructural build-up, improvement in facilities due to the proposed CER activities of the proponent etc.

1.4 SCOPE OF THE STUDY:

Particulars	Details
Proposal no	SIA/TN/MIN/44467/2019
File no	7193/2020
SEAC meeting for issue of TOR	166th SEAC Meeting held on 30.07.2020
SEIAA meeting for issue of TOR	397th SEIAA Meeting held on 21.09.2020
Terms of Reference	Received from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020. Dated:24.09.2020 and Extension ToR Lr No.SEIAA-TN/F.No.7193/SEAC/TOR-760/Extn, dated:08.08.2023.
Baseline Data Collection	Carried out by Creative Engineers & Consultants , Chennai for Summer Season (March – May 2022)

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

- Collection of primary and secondary data relevant to the project.
- One-Season baseline monitoring for environmental parameters such as air, water, noise, soil, flora & fauna, etc. Analysis of parameters in in-house laboratory.

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

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

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CHAPTER - II

PROJECT DESCRIPTION

CHAPTER 2

PROJECT DESCRIPTION

2.1 TYPE OF PROJECT:

This project involves the mining of 97,196T of Lime Kankar for a period of 5 years upto a depth of 2.55m bgl in Kallankurichi Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu for captive consumption in Kilapaluvur Cement Plant using mechanized opencast mining method.

2.2 NEED & JUSTIFICATION FOR THE PROJECT:

A) Availability of good quality proved reserves:

Lime Kankar occurs over the entire spread of lease area below the top soil which is proved by trial pits in the adjacent area and also availability of lime Kankar in the adjacent mines.

B) Techno economic viability of the project :

Mechanized opencast method of mining which is to be used in this project is a proven technology in our country. The mined lime kankar will be used for manufacturing of cement in the Company's Cement plant at Kilapaluvur.

C) Need of the project

With the rapid development and the never-ending demand in the construction sector, the need of cement is well established. M/s. Chettinad Cement is operating a 5.5 MTPA Cement plant at Kilapaluvur near Ariyalur. The cement Plant requires both Cement grade Limestone and Lime Kankar for Cement manufacturing. Lime Kankar is required for blending with high/low grade Limestone to meet the requirement of raw material. Accordingly, the Company proposes new Lime Kankar Quarry Leases (Minor Mineral) in Ariyalur Region in addition to the existing Captive Limestone Mines. Kallankurichi Lime Kankar Quarry Lease is one among the quarries to be opened and operated. Since the reserves availability is less, the peak production of 75,000 Tonnes per Annum (TPA) of Lime Kankar will be mined in year 1 itself and the balance mineable negligible quantity of mineable reserves will be mined in the remaining period. During the entire lease period of 5 years a total of 97,196 T of limes kankar will be mined.

D) Economic and Socio-Economic Benefits:

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

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

2.3 LOCATION:

A brief description of the mining area, along with the location, coordinates, accessibility, etc. has been details below in Table No.2.1.

Table 2.1: Mine site description

Location	Kallankurichi village, Ariyalur Taluk & District, Tamil Nadu.
Survey No.	226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3, 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1(P) and 242/10B2
Coordinates	**Latitude:** 11°09'46.692" - 11°09'58.092" N **Longitude:** 79°05'41.346 - 79°05'48.888" E
Nearest Village	Aminabad – 0.8Km (NW)
Nearest Town	Ariyalur – 2.5Km (SW)
Nearest Highway	NH-136 (Ariyalur – Perambur) – 1.9Km (SW) SH-139 (Ariyalur – Reddipalayam) – 4.3Km (S) NH-81 (Chidambaram – Trichy) – 8.9Km (SE)
Nearest Railway Station	Ariyalur Railway Station – 3.3Km (SW)
Nearest Airport	Trichy Airport – 60 Km (SW)
Accessibility	The lease area can be approached from Kollapuram – Illuppaiyur Road that is connected to NH-136 (Ariyalur – Perambur) on the southern side of the lease area.
Topography	Plain terrain, dry lands with scarce vegetation.
Drainage	Kallar River – 3.4Km (E) There is a Vari flowing across the lease area in west to east direction. Another Vari is flowing adjacent the QL area in western side.

Location map is provided in **Figure No.2.1.** The approachability map is provided in **Figure No.2.2.** Corner co-ordinates of the lease area and satellite imagery are shown in **Figure No. 2.3 & 2.4** respectively. Village map for 500m radius from the lease is shown in **Figure No. 2.5.**

Figure 2.1: Location Map

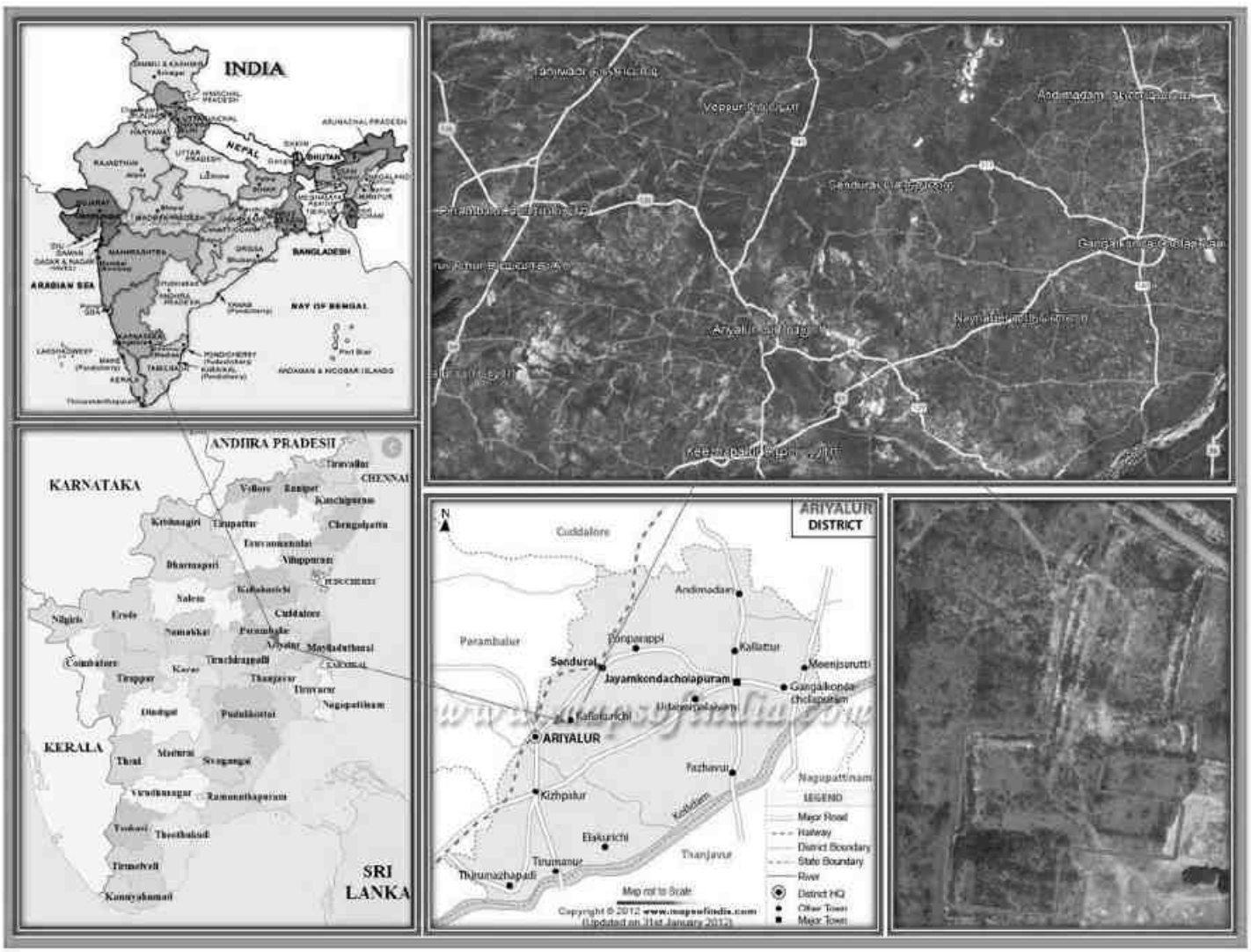


Figure 2.2: Approachability Map

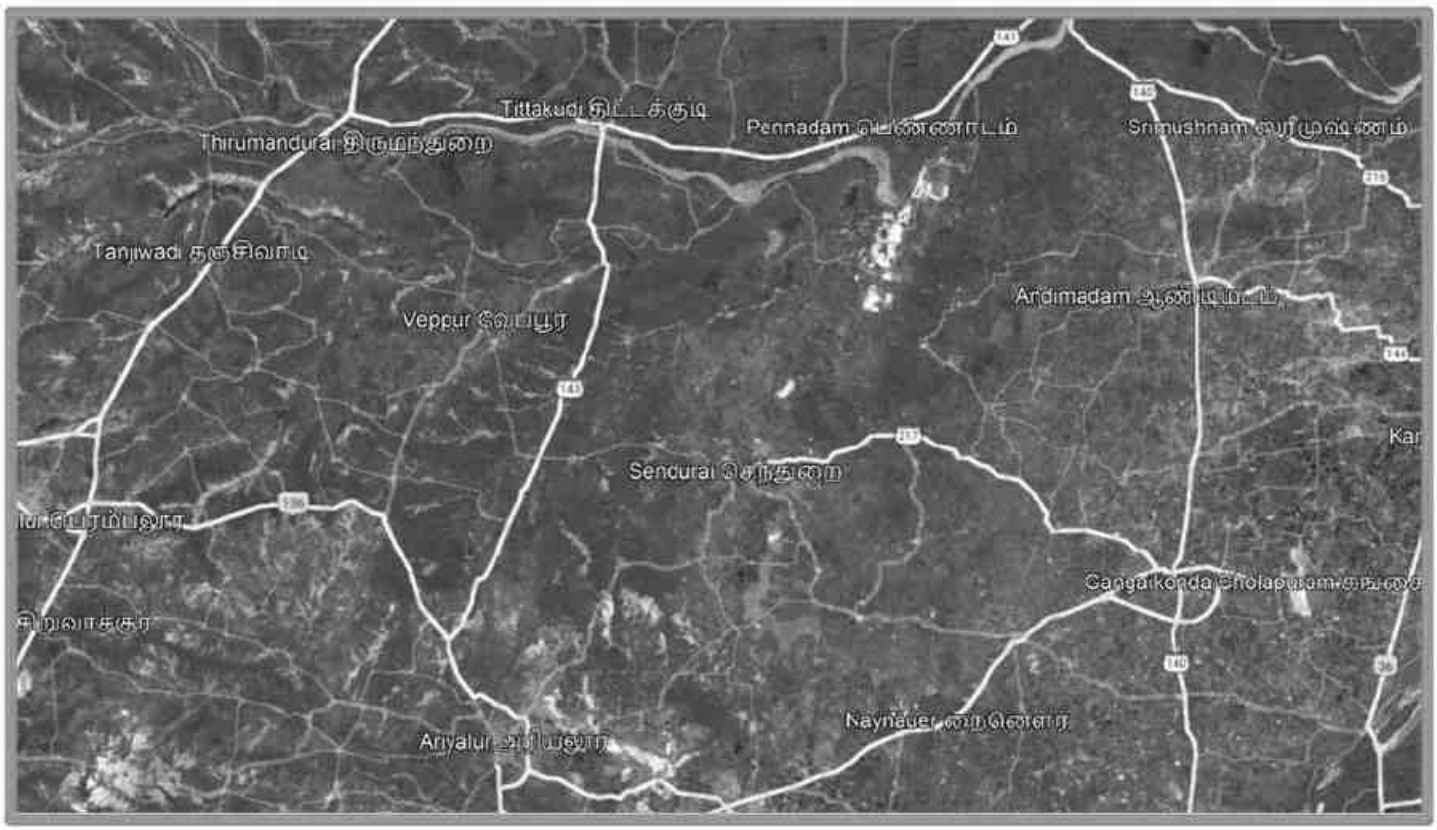


Figure 2.3: Lease Plan

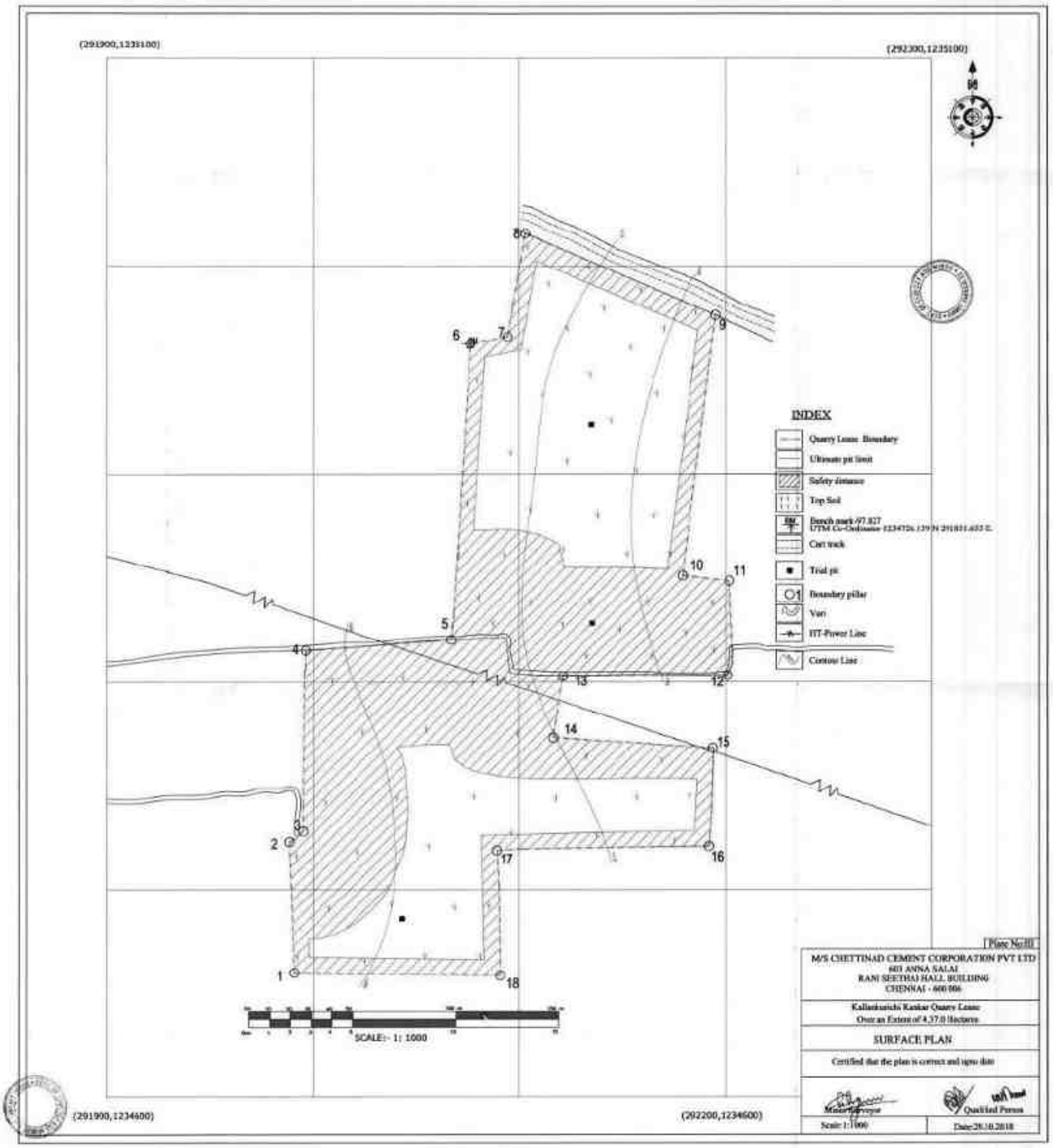
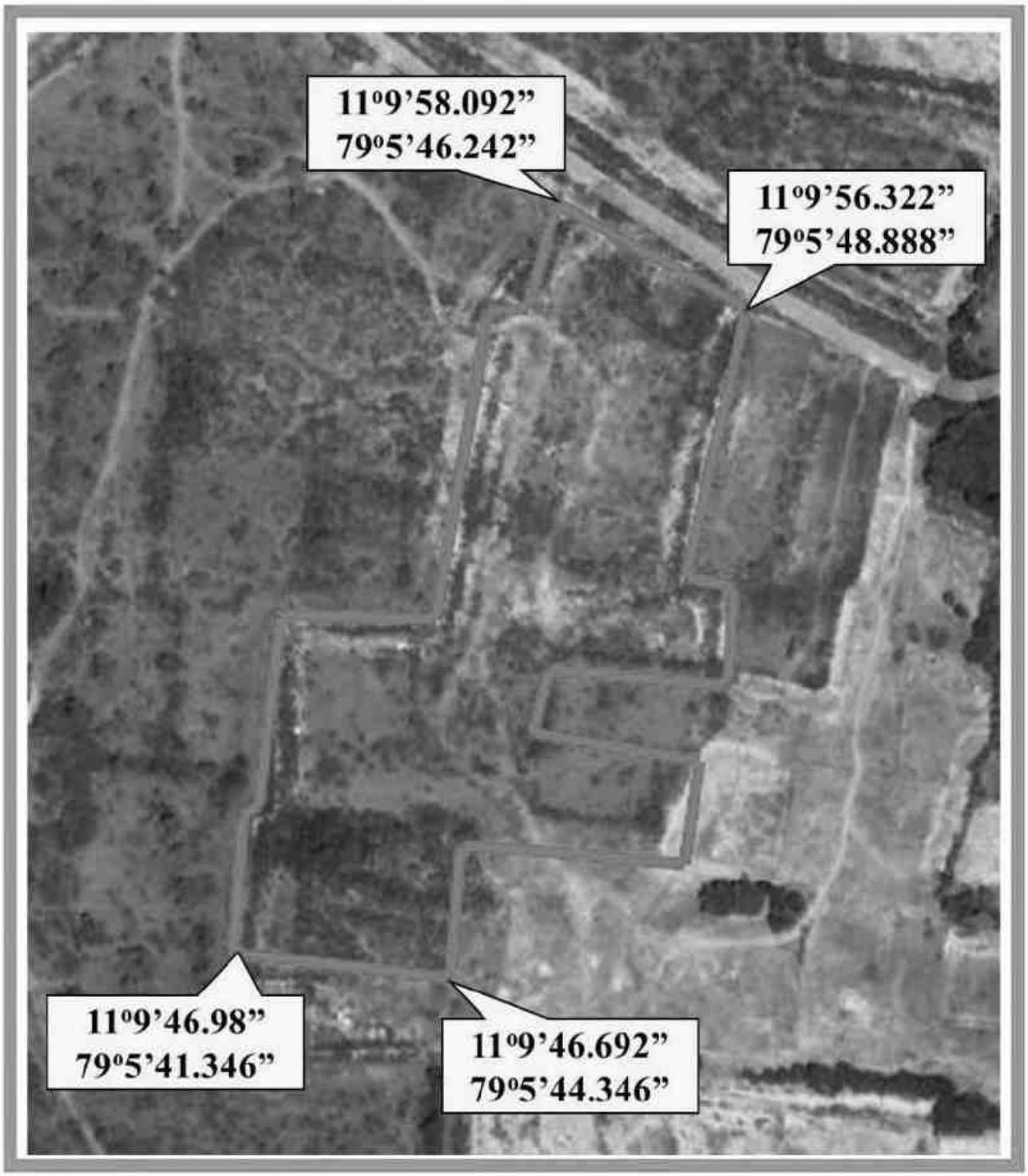
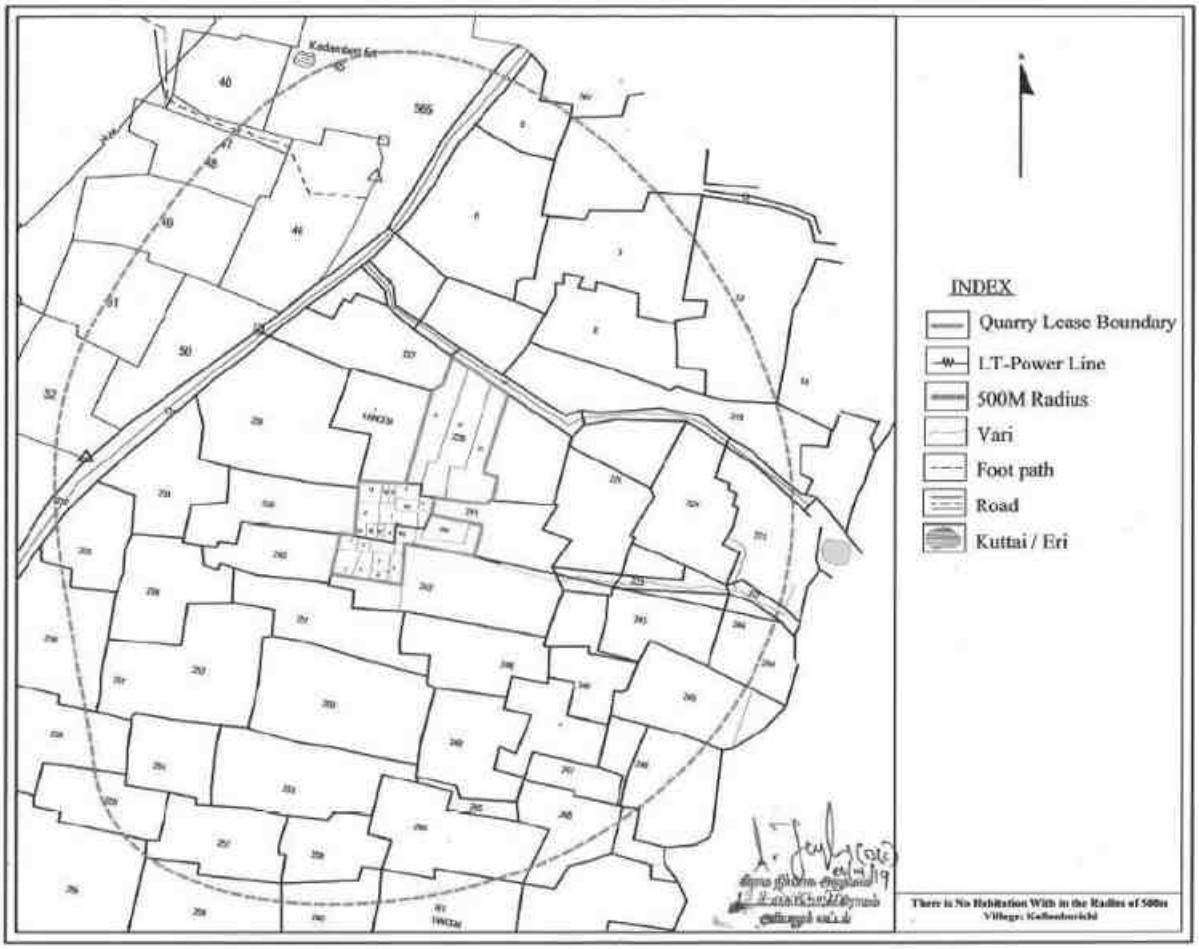


Figure 2.4: Satellite Imagery Showing Corner Co-ordinates of the Project Area



SITE PHOTOGRAPH

Figure 2.5: Village Map



2.4 LAND CLASSIFICATION:

The lease area of 4.370 Ha is a patta land in the name of the applicant Chettinad Cement Corporation Pvt Ltd. vide Patta No. 2412. The survey no. wise area breakup has been provided below:

Table 2.2: Survey Number wise Area Breakup

S.F. No	Sub Division	Area (Ha)
226	2B	0.730
	2C	0.800
	2D	0.705
241	1A	0.110
	1B	0.035
	2	0.120

	3A	0.030
	3B	0.045
	3C	0.025
	4	0.060
	5	0.170
	6A	0.040
	6B	0.120
	7	0.095
	8	0.060
242	1	0.045
	2	0.035
	3	0.110
	4	0.160
	5	0.070
	6	0.035
	9	0.090
	10A (P)	0.070
	10B1 (P)	0.410
	10B2	0.200
Total		**4.370**

2.5 GEOLOGY:

The lease area forms part of the Trichy-cretaceous formations, have been studied in detail during the past several decades in view of their Geological and paleontological interest.

Table 2.3: Geological Formation

Geological Age	Formations with geological period		Lithology
Recent and Quaternary	-		Alluvium, Kankar, Laterite, etc.,
Palaeocene	Niniyur (Danian)		Varigated clays with nodulesof limestone and marl with occasional boulders of flint and chert
Cretaceous	Ariyalur (Maestrichtian)	Upper	White friable sandstone and purple clays
		Lower	Loose conglomerates and yellow fossil ferrous limestone, marls and hard limestone clays and sandstone
	Trichinopoly (Turonian to Senonian)		Calcareous, gritty sandstone,shell limestone and conglomerate sandstone

Kankar has developed extensively and ranges in thickness of about 2.25 meters. The formation of kankar is evidently due to the alternating wet and dry spells of tropical climate, which has caused leaching out of the clayey and siliceous portions in the top layer of limestone. Thus though the kankar is porous, pisolitic and red in colour due to dispersion of

iron oxide, it analyses very high in calcium carbonate content (generally 85 to 95 percent CaCO3). The fragments of shells as well as cementing calcareous medium make the Kankar hard and difficult to break. The kankar is at present being mined for use as road metal, and for manufactures slaked lime in country kilns for use in construction.

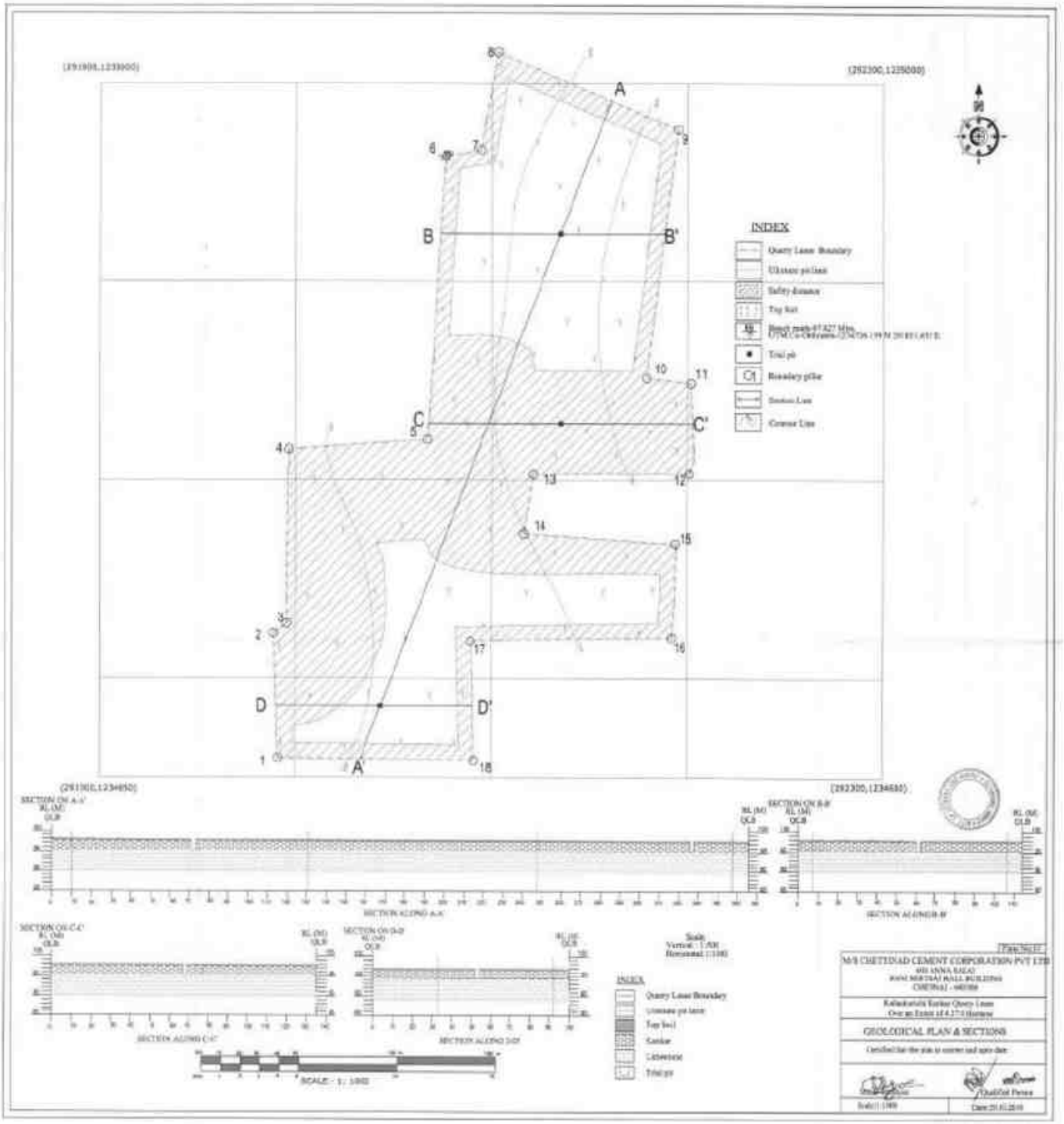
Thin cappings of laterite have developed over the limestones in Periyanagalur and Valajanagaram areas (southern block). Fragments of shell material are also found in the laterite. Most of the soils in the area are of residual nature and are generally clayey. When wet they are highly plastic and slushy. Generally, the soil mostly of a sandy nature is found.

Geological sequence:

Topsoil/Lime Kankar
Arenaceous Limestone and
Sandstone Shell Limestone-I
Arenaceous Limestone and
Sandstone Shell Limestone-II
Conglomerate bed
Arenaceous Limestone and
Sandstone Green Siltstone
Clays

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 adjacent mine in this belt

Figure 2.6: Geological Plan & Cross Section



2.6 SIZE AND MAGNITUDE OF THE OPERATION:

- The mining will be done by open cast semi mechanized mining method.
- Life of mine will be 5 years.
- It is proposed to mine 97,196 T of Lime Kankar for a period of five years upto a depth of 2.55m as per approved ToR.
- There will be no generation of mineral rejects as the entire estimated mineable Kankar reserves are to be recovered. The topsoil that would be generated during plan period is proposed to be utilized for afforestation purposes in the Safety barrier area.

2.6.1 RESERVES:

The existence of mineralization in the area applied for Quarry Lease has been ascertained from the nearby existing ML granted CCCPL mine where the thickness of Limekankar and Topsoil clay were proved by Trial pits and prospecting works. Five numbers of trial pits will be excavated after obtaining the quarry lease i.e., during the first year of operation. Topsoil is found to a depth of 0.3 m BGL and Lime Kankar is found to a depth of 2.25 m BGL. Based on the volume of excavation and its weight, the Bulk Density of both litho units was measured. Bulk Density of 2.00 Tonnes/cu.m and 2.25 Tonnes/cu.m is considered for Topsoil and Lime Kankar respectively.

Table 2.4: Geological and Mineable Reserves

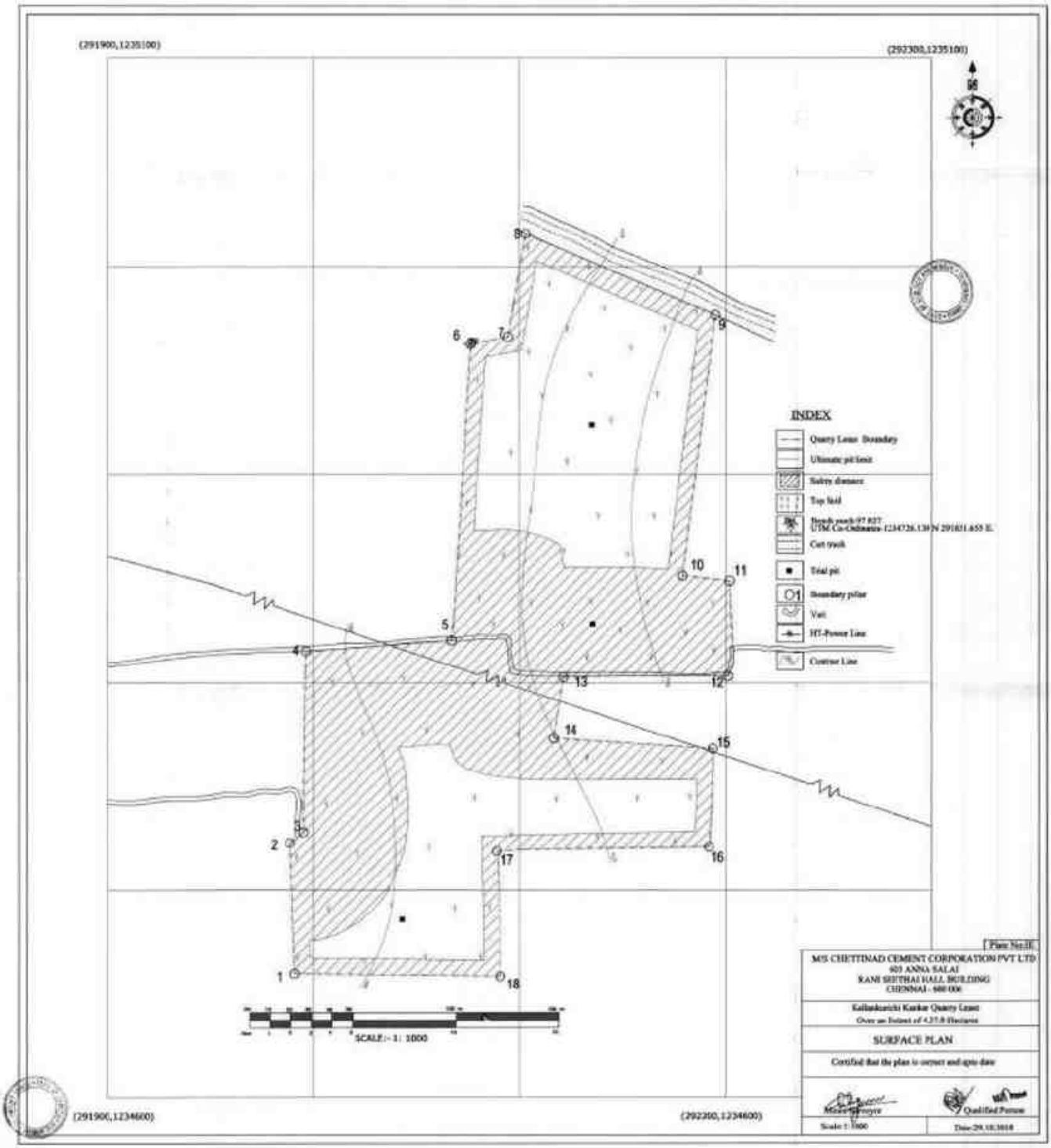
S.No	Particulars	Extent (Ha)	Reserves
1	In-situ Geological Reserves	4.37.0	2,21,231
2	Blocked up Reserves	2.46.0	1,24,035
3	Mineable Reserves	1.91.0	97,196

The mineable reserve calculations are done after leaving safety distance of the following:

- 7.5 meters to the adjoining patta lands situated around the applied lease area,
- 10 m to the village road located in patta land in S.F.No. 226/2A situated on the northern side of the applied area,
- 10 metres to the cart track in SF No.241/9 passing on the eastern side of the applied area,
- 50 meters to the vari in S.F.No. 240/10 situated on the western side of S.F.No. 241/3A and to another vari in S.F.No. 228/10 situated on the northwestern side of the applied area in S.F.No. 241/1A,
- 50 meters for the Vari in SF No.226/1, 2B, 2C and 2D.

However high tension power line passing NW-SE in SF Nos. 241/1B, 6A, 7 and 8 has to be shifted 50 meters away from the periphery of the quarrying lease boundary. Hence no safety distance is considered for power line

Figure 2.7: Surface Plan



2.6.2 MINING METHOD:

The method of mining by opencast method without drilling and blasting will be carried out. In topsoil one bench is maintained with 0.3m height and 3m width and face kept at 45° slope. In mineral one bench is maintained with 2.25m height and 6m width with 60° slopes.

Table 2.5: Details of Equipments

SI. NO	NAME OF THE EQIPMENT	CAPACITY	REQUIRED
1	Excavator/Loader	TATA Hitachi	1
2	Tipper	20 Tonnes	2

2.6.3 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION:

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

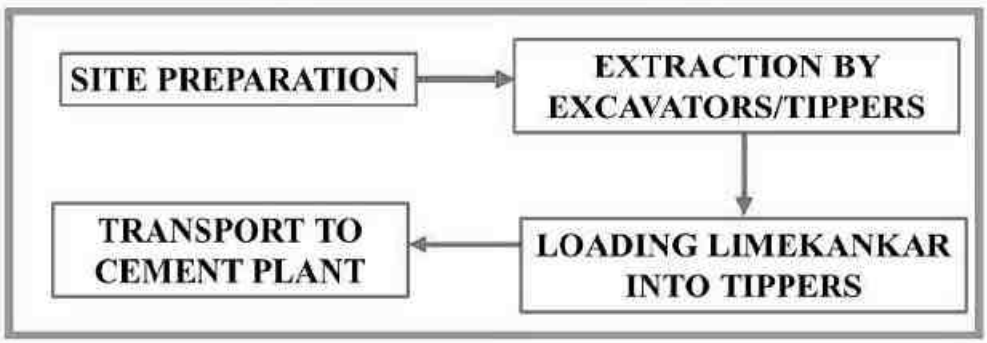
Table 2.6: Proposed Schedule of Implementation

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

2.6.4 TECHNOLOGY AND PROCESS DESCRIPTION:

The quarry operations, involve direct excavation, loading and transportation. No drilling and blasting is involved in mining lime kankar. The Quarry Lease area comprises of two blocks namely Block-I and Block-II. An Excavator of 0.9 cu.m capacity will be deployed for formation of benches and the quarried out mineral will be loaded into tippers for transporting it from the mine pit to the plant. In topsoil, one bench will be maintained with 0.3 m height and 3 m width at 45° slope. In Lime Kankar, a bench of 2.25 m height and 6 m width will be maintained at 60° slope.

Figure 2.8: Process Flow Diagram



2.7 PROJECT DESCRIPTION:

2.7.1 PAST PRODUCTION:

This is a proposed project. No mining has been carried out in this lease area so far by the proponent.

2.7.2 PLAN PERIOD-PRODUCTION & WASTE DISPOSAL:

The advancement of the pit will be from the center side of the lease area starting from East and progress towards western side of the lease area upto 2.55m from 100m RL to 97.4m RL during the present plan period. The mining operations will be carried out in the first and second benches. There is no generation of mineral rejects in the applied area. The topsoil that would be generated during the present plan period is proposed to be utilized for afforestation.

Table 2.7: Production Schedule During Plan Period

Year	Block	Lime Kankar ROM (Tonnes)	Top Soil (Tonnes)	Ore: OB Ratio
I	Block I & II	74,999.08	8,888.76	1 : 0.1185
II	Block II	9,999.42	1,185.1	1 : 0.1185
III	Block II	4,999.18	592.48	1 : 0.1185
IV	Block II	4,999.18	592.48	1 : 0.1185
V	Block II	2,199.24	260.64	1 : 0.1185
Total		**97,196.10**	**11,519.46**	**1 : 0.1185**

The applicant has proposed to carry out 97,196 T of lime kankar up to a depth of 2.55m BGL for the period of Five years.

Figure 2.9: Year wise Plan & Cross Section

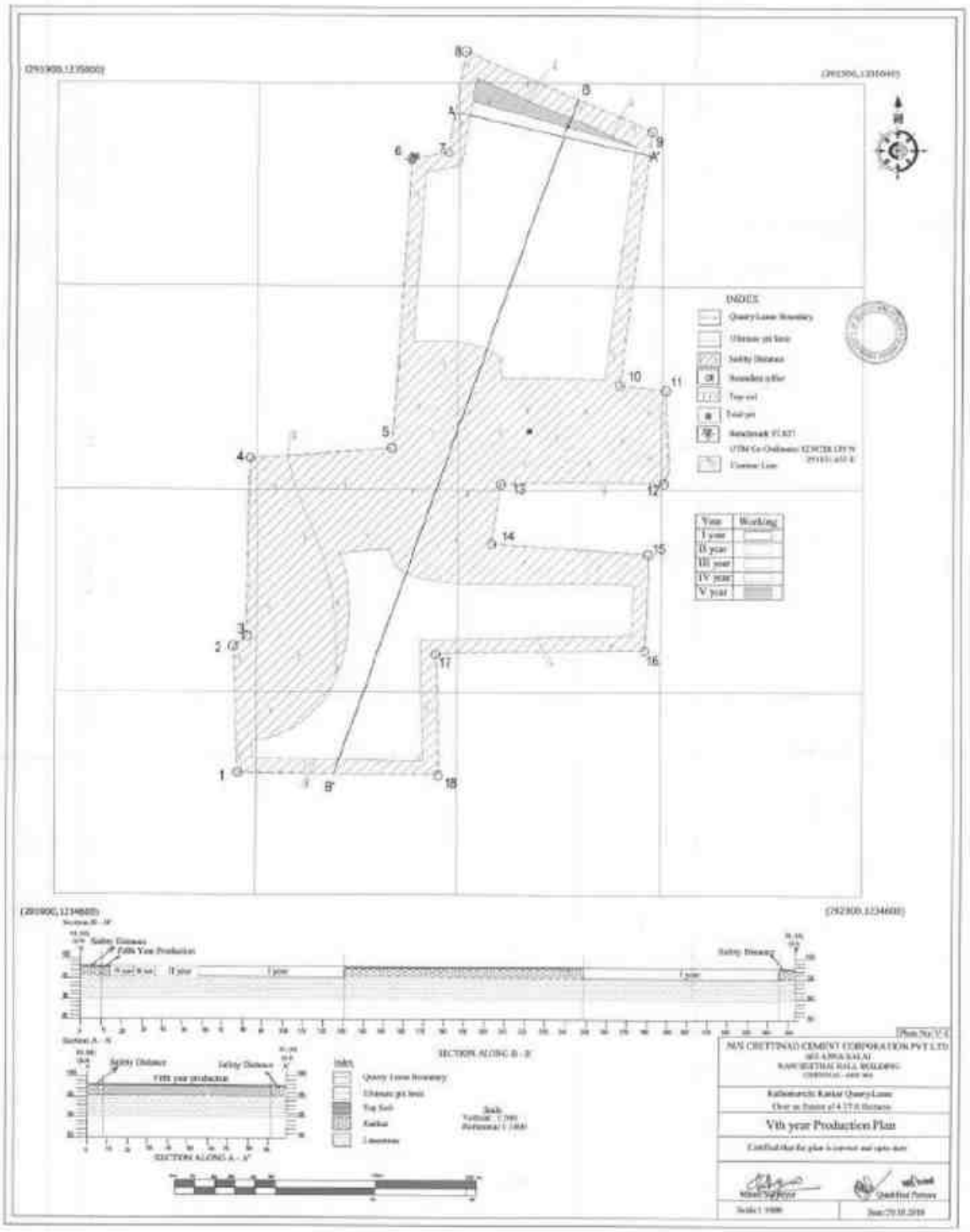
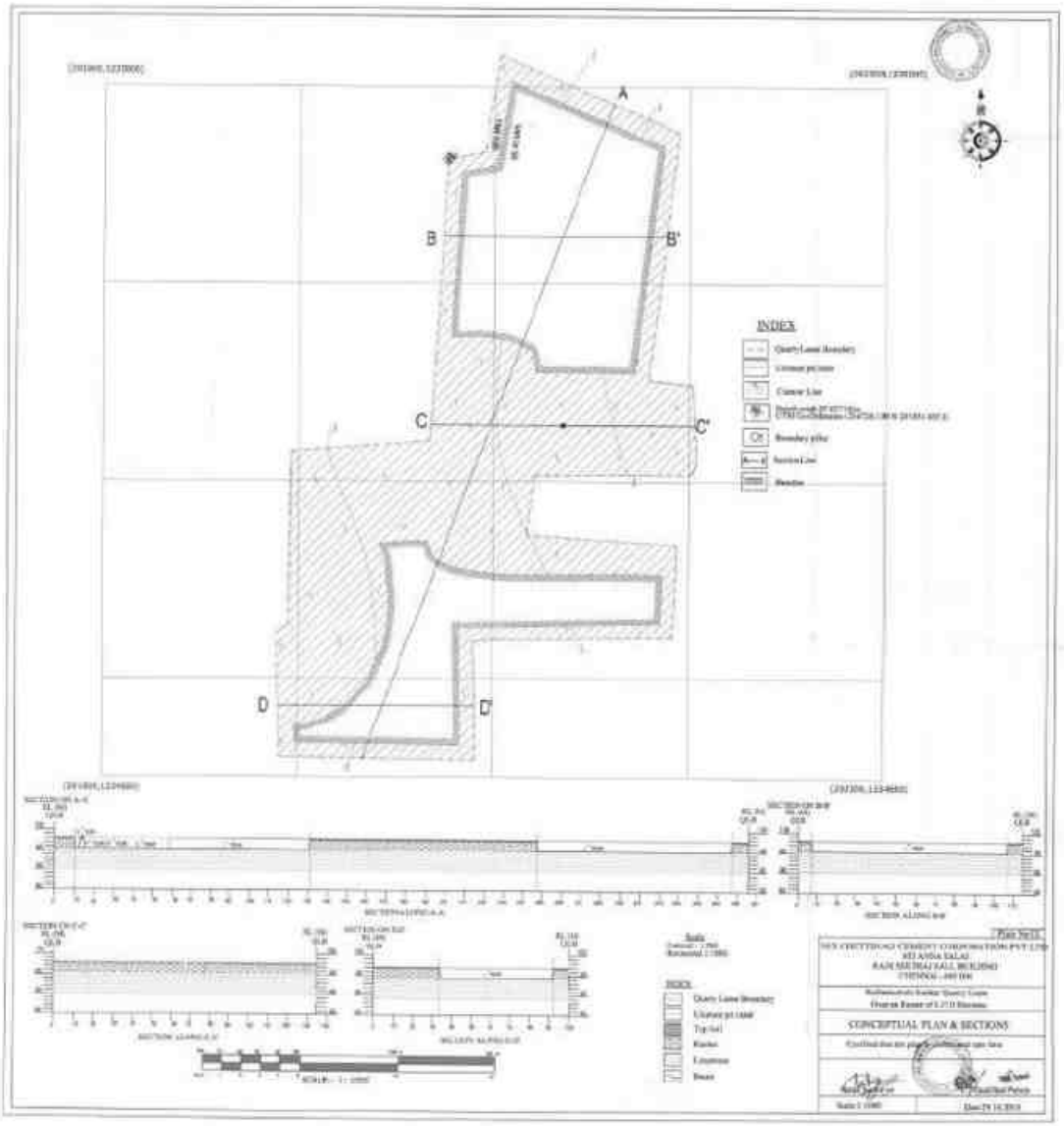


Table 2.8: Ultimate Pit Dimensions

LENGTH(m)	WIDTH(m)	DEPTH(m)
139.0	80.27	2.55

The ground water table on the surface in this area is quite deeper. Hence, ground water intersection in not envisaged. The Conceptual Plan & Cross section are shown in **Figure No. 2.10.**

Figure 2.10: Conceptual Plan & Cross Section



2.7.3 LAND DEGRADATION/UTILIZATION:

The land use pattern at present and at the end of the quarrying period has been provided below.

Table 2.9: Land Use

S.No	Land Use	Present Area (Ha)	Area in use – End of 5 years period (Ha)
1	Mining \Excavation	Nil	1.910
2	Infrastructure & Road	Nil	0.010
3	Greenbelt and Plantation	Nil	2.430
4	Unutilized Area	4.370	0.000
5	Roads	Nil	0.020
	Total	**4.370**	**4.370**

Ultimately the entire mined out area of 1.910 Ha will be used for storing rainwater. 0.03 Ha will be the mine roads & infrastructure, 2.430 Ha will be covered with vegetation.

2.7.4 PROJECT REQUIREMENTS:

Table 2.10: Project Requirements

<table>
<tr><td>Manpower</td><td>14 People directly and more than 50 people indirectly</td></tr>
<tr><td>Water Requirement and Source</td><td>Water Requirement: 5 KLD
<table>
<tr><th>Details</th><th>Quantity (KLD)</th></tr>
<tr><td>Drinking water and Domestic Use</td><td>1.0</td></tr>
<tr><td>Dust Suppression</td><td>3.0</td></tr>
<tr><td>Green belt</td><td>1.0</td></tr>
<tr><td>Total</td><td>5.0</td></tr>
</table>
Source: The required water will be procured from outside agencies.</td></tr>
<tr><td>Power Requirement</td><td>No electricity needed for mining operation. The minimum power requirement for office, etc will be met from state grid.</td></tr>
<tr><td>Site Services</td><td>This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.</td></tr>
<tr><td>Project Cost</td><td>Rs. 50,00,000 /-</td></tr>
<tr><td>Funds allocated for socio-economic development</td><td>Rs.1.0 Lakh is allocated under CER budget.</td></tr>
</table>

2.8 DESCRIPTION OF MITIGATION MEASURES:

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

2.9 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY:

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

2.10 CONCLUSION:

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

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CHAPTER - III

DESCRIPTION OF ENVIRONMENT

CHAPTER 3

DESCRIPTION OF ENVIRONMENT

3.1 GENERAL:

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

Monitoring was carried out systematically and meticulously as per relevant IS codes, CPCB, MoEF&CC guidelines during **Summer Season (March 2022 to May 2022)** The details of the study are given in this chapter.

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

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

Table 3.1: Type of Baseline Data

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

Figure 3.1: Study Area Map

Table 3.2: Environmental Setting of the Study Area

S.No	Particulars	Name	Distance	Direction
1	Nearest highway	NH-136 (Ariyalur – Perambur))	1.90Km	SW
		SH-139 (Ariyalur – Reddipalayam)	4.3Km	S
		NH-81 (Chidambaram – Trichy)	8.9Km	SE
2	Nearest Railway Station	Ariyalur Railway Station	3.3Km	SW
3	Nearest Airport	Trichy Airport	60Km	SW
4	Nearest villages	Pallakaveri	0.8Km	SE
		Venkataramapuram	0.9Km	NE
		Kollapuram	1.0km	SW
		Aminabad	0.8Km	NW
5	Nearest Town	Ariyalur	2.5Km	SW
6	Nearest Major Water Bodies	Kallar River	3.4Km	E
		Vanchyiam odai	3.7Km	SW
		Chempan Odai	7.5Km	NW
		Mettal odai	6.3Km	SW
		Marudaiyar River	8.4km	SW
		Kundiyar River	9.5km	SW
7	Reserved / Protected Forests	Nil	--	--
8	Notified Archaeologically important places, Monuments	Nil	--	--
9	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972*	Nil	--	--
10	Defence Installations	Nil	--	--
11	Seismic Zone	Zone-II (Least Active)	--	--
12	Other Industries in the study area	Mining leases of other companies, cement plant are present.		

3.2 SOCIO-ECONOMIC CONFIGURATIONS OF THE AREA:

3.2.1 GENERAL:

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

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

3.2.2 SECONDARY DATA DESCRIPTION:

The proposed lease is located in Kallankurichi Village, Ariyalur Taluk, & District. Based on 2011 census data, in the 10km radius there are 32 Rural villages from Ariyalur Taluk, & District. The demographic profile of the study area is given below:

Table 3.3: Social, Economic and Demographic Profile of the Study Area

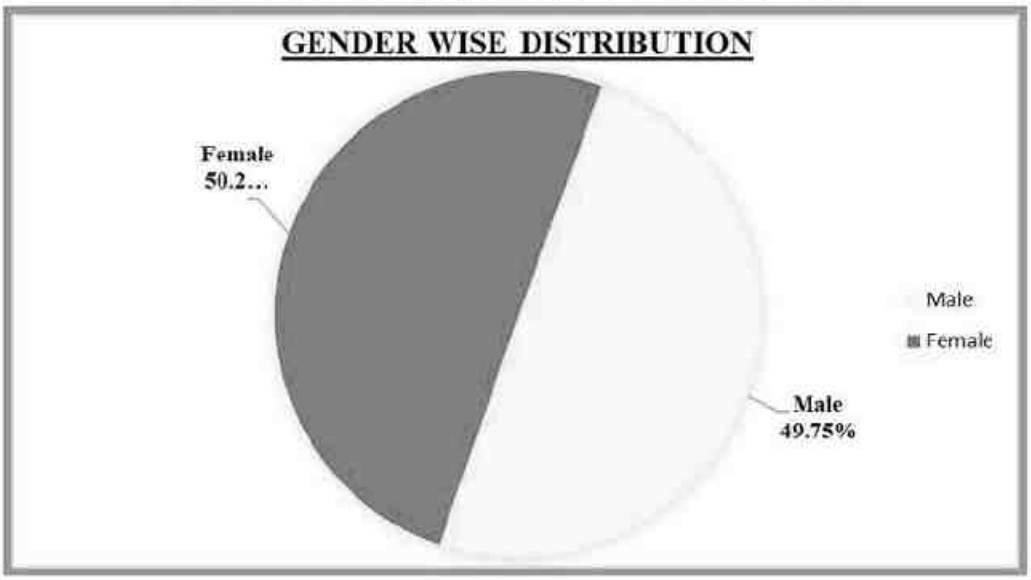
Details	Population	Percentage
A. Gender-wise distribution		
Male Population	51773	49.75
Female Population	52303	50.25
Total	**104076**	**100**
B. Caste-wise population distribution		
Scheduled Caste	25922	24.91
Scheduled Tribes	527	0.51
Other	77627	74.59
Total	**104076**	**100**
C. Literate and Illiterate population		
Literate Males	36556	35.12
Literate Females	27334	26.26
Total Literate Population	**63890**	**61.39**
Illiterate Males	15217	14.62
Illiterate Females	24969	23.99
Others Population	**40186**	**38.61**
Total	**104076**	**100**
D. Occupational structure		
Main workers	43838	42.12
Marginal workers	9923	9.53
Total Workers	**53761**	**51.66**
Total Non-workers	50315	48.34
Total	**104076**	**100**

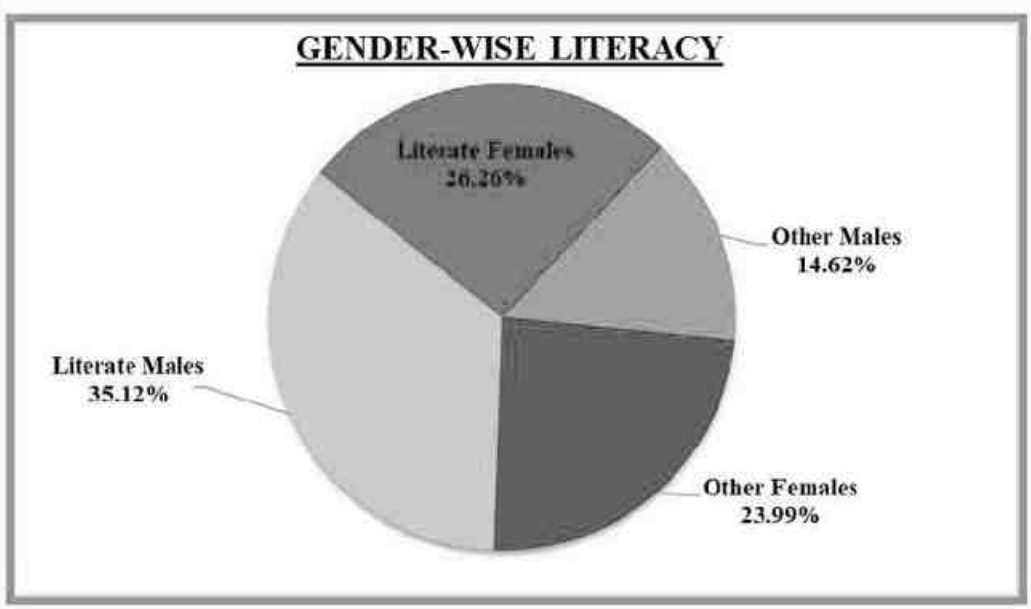
The total population of these 32 rural villages is 1,04,076 in which the male population is 51773 (49.75%) and the female population is 52303 (50.25%). This shows that the male and female population ratio is almost equal. Among the total population 0.51% belong to Scheduled Tribes, 24.91 % are Scheduled Caste and the balance 74.59 % people belong to other castes. Among the total population, 61.39% of the people are literate.

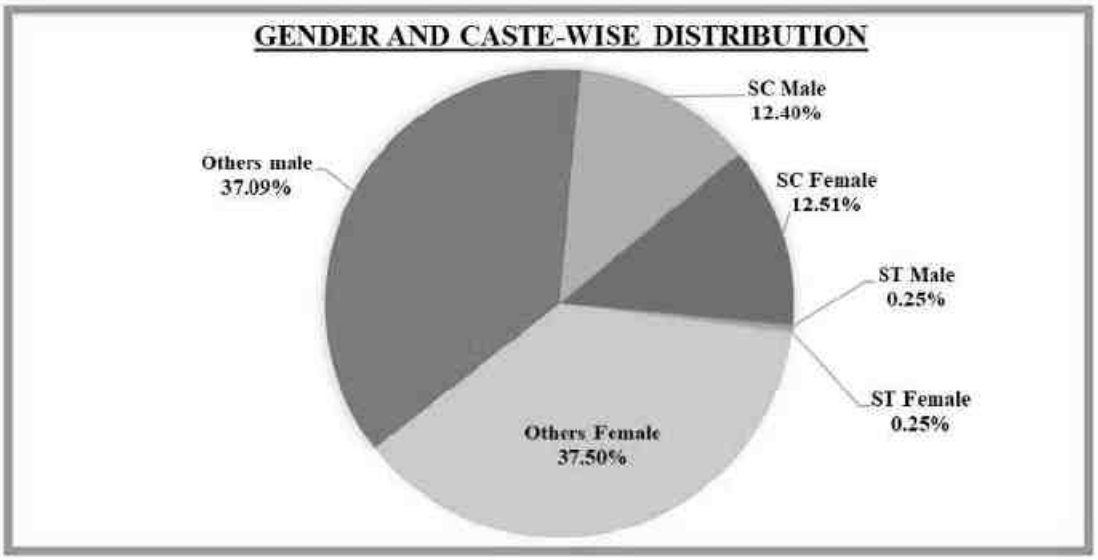
Among the total population, 57.22% are literate males and 42.78% are literate females. This shows that the male literates are slightly more than the female literates.

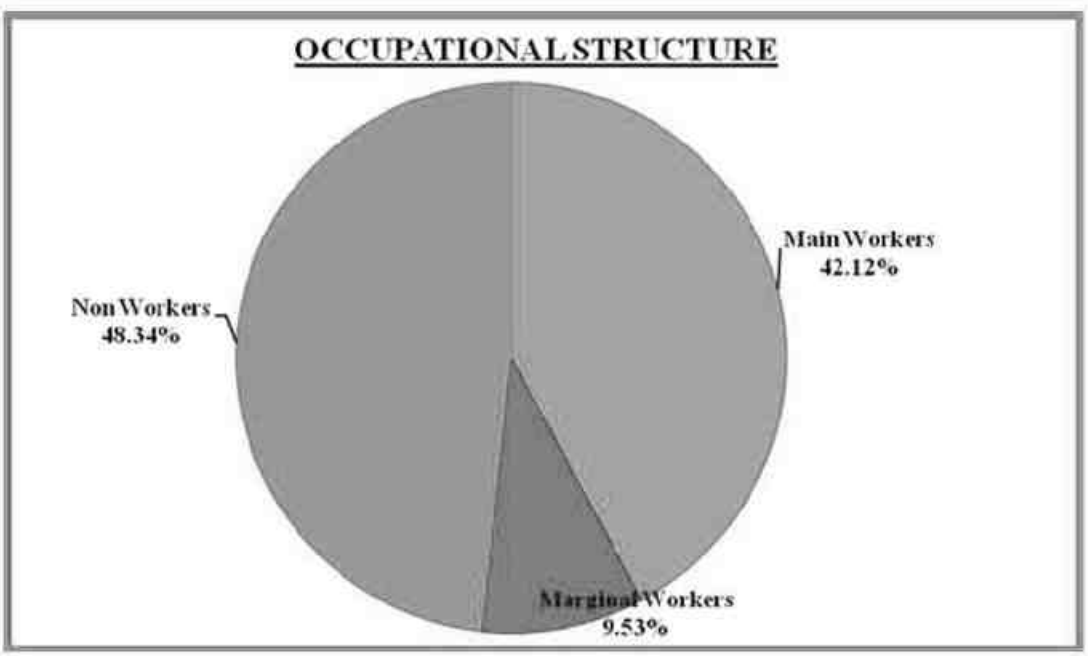
The village wise population, literacy levels and occupational structure details area given in **Annexure-4 and 5.** The demographic structure within the buffer zone is shown diagrammatically in **Figure No – 3.2.**

Figure 3.2: Demographic Structure in Buffer Zone









3.2.3 DETAILS OF AMENITIES:

Based on 2011 census data, regarding the educational facilities, 32 rural villages have educational facilities. There are totally 75 Primary Schools functioning in these 32 rural villages. Among them 10 villages have one primary school, 7 villages have 2 primary schools, 11 villages have 3 primary schools, 2 villages has 4 primary schools & 2 villages has 5 primary schools With regards to educational facilities, from Primary School level to Senior Secondary School

level, there is availability of some schools in the area. However, beyond this, college level education is not available in the buffer zone. Out of 32 villages, 20 villages have primary health sub centers. Better medical facilities are available in the nearby larger towns. Details of the infrastructural faciltiies in the area is provided under Table No.3.7.

Table 3.4: Primary Schools in the Buffer Zone Rural Villages

S.No	Villages	Number of primary schools	Total
1	10	1	10
2	7	2	14
3	11	3	33
4	2	4	8
5	2	5	10
Total	**32**		**75**

Table 3.5: Education Facility Availability

Particulars	Available in village
Govt Primary School	75
Govt Middle School	37
Govt Secondary School	12
Govt Senior Secondary School	2
Govt Arts and Science Degree College	0
Govt Engineering College	0
Govt Medicine College	0
Govt Management Institute	0
Govt Polytechnic	0
Govt Vocational Training School/ITI	1

Table 3.6: Healthcare Amenities Availability

Particulars	Available in village
Primary Health Centre	2
Primary Heallth Sub Centre	20
Maternity And Child Welfare Centre	7
TB Clinic	2
Dispensary	2
Veterinary Hospital	4
Family Welfare Centre	2

Table 3.7: Infrastructure Facilities

Particulars	Available in village
Tap Water-Treated	30
Covered Well	15
Hand Pump	17
Tube Wells/Borehole	28
Spring	6
Post office	2
Bus services	32

Commercial Bank	3
Cooperative bank	7

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

3.2.4 SAMPLE SURVEY:

3.2.4.1 OBJECTIVE:

The objective of the study is to understand the present socio-economic condition, availability of existing infrastructure facilities in the area & to know the needs of the people in the project peripheral villages, to provide an implementable future CER proposal pertaining to specific needs addressing local requirements.

3.2.4.2 APPROACH:

Nearby villages were visited for conducting study to know about socio-economic conditions, including aspirations and requirements of the people for a better living and collected relevant data. Informal discussions were conducted in the villages to capture the overall scenario of the village including their socio-economic problems and the aspirations, desires of the community in overall terms.

Salient details of the study:

- Studied villages have different community people which include different religion and different castes.
- Predominantly the study area is dry, barren land with sprodic agriculture dependent on rain.
- Patches of plantation and agriculture are observed during the monsoon season.
- Majority of the people are small farmers and others are working in the nearby mines and cement industries.
- Since agriculture is predominantly rainfed and the water is available only for few months, during the rest of the time they have less employment opportunities. Other occupations include construction workers, vendors, etc.
- Other allied activities livestock rearing and poultry farming are also found.

- Reasonably better amenities like approach road bus facility, electricity, mobile phone connectivity, Public Distribution System , banks etc are available.
- Bore well is the main source for drinking water. There are OHT's, Ground level tanks, public taps are available .
- Education facilities from primary upto higher secondary school are available locally.
- Basic medical facilities are available locally.
- Higher education faciltiies and also better medical facilities are available in Ariyalur and Trichy, etc.
- Chettinad Cement Corporation Private Ltd through their CER measures of existing mines and cement plant has carried out improvements in road, transport facilities, school infrastructural facility, water provision, etc. around the plant area. Besides, it has also brought about direct and indirect benefits to scores of people by way of employment opporutunities in the plant (direct and indirect), vendors, shops, renting of houses, etc.

3.2.4.3 IDENTIFIED CER ACTIVITIES:

The following activities are identified based on the survey, which will be modified and implemented based on the needs and requirements of the local people:

- Improvement in infrastructural facilities for nearby schools.
- Provision of common RO water facility for locals
- Carrying out activities for improvement of natural resource augmentation like water conservation, harvesting, tree plantation, energy conservation measures etc.

3.3 EXISTING ENVIRONMENTAL QUALITY

3.3.1 MICRO-METEOROLOGY

3.3.1.1 General:

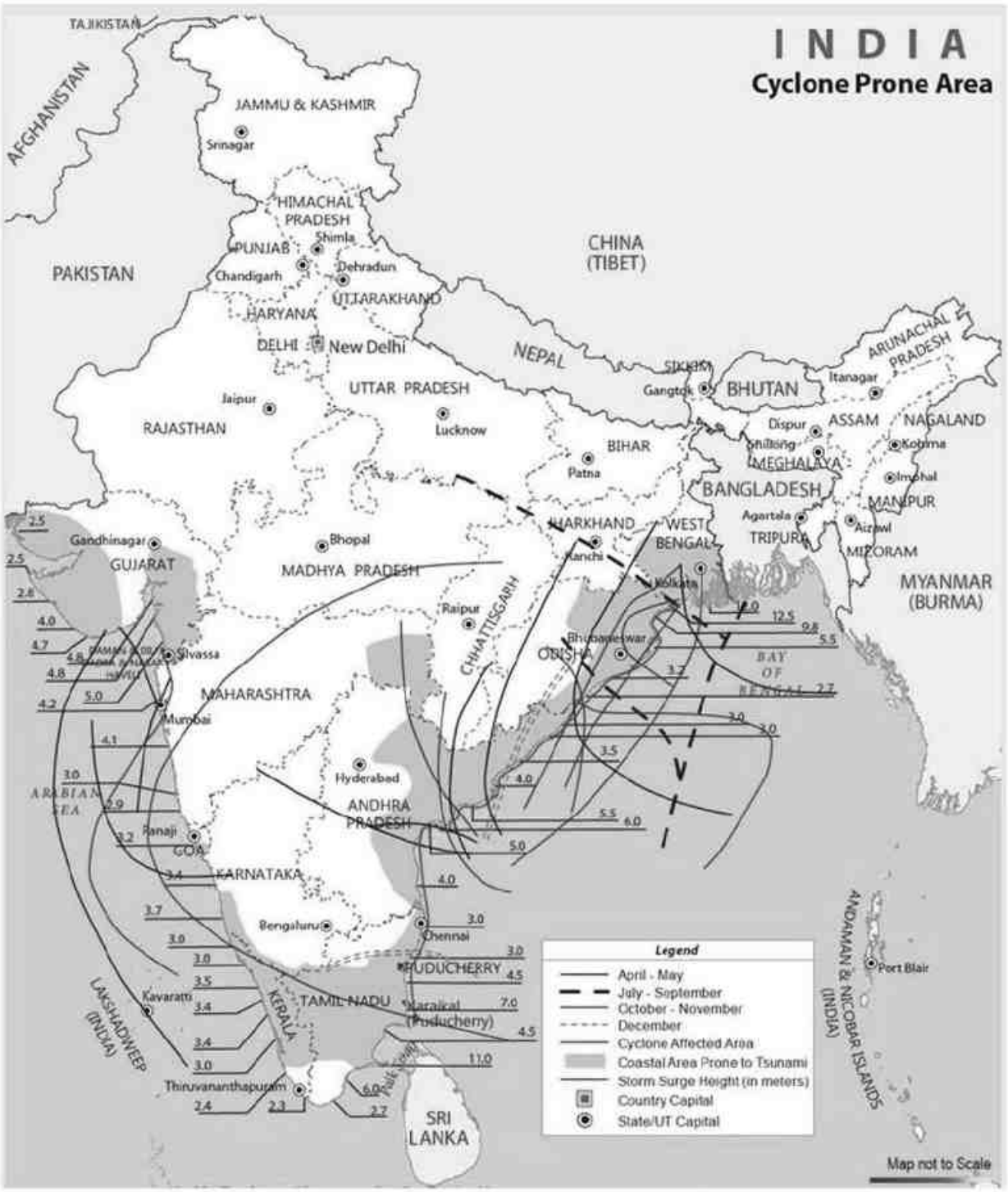
The meteorological conditions in an area regulate the dispersion of air pollutants being released into the atmosphere. The principal variables are horizontal convective transport i.e. wind speed and direction and vertical convective transport, i.e. mixing height, stability class and topography of the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

3.3.1.2 Historical Meteorological Data:

A. Cyclones And Depressions

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

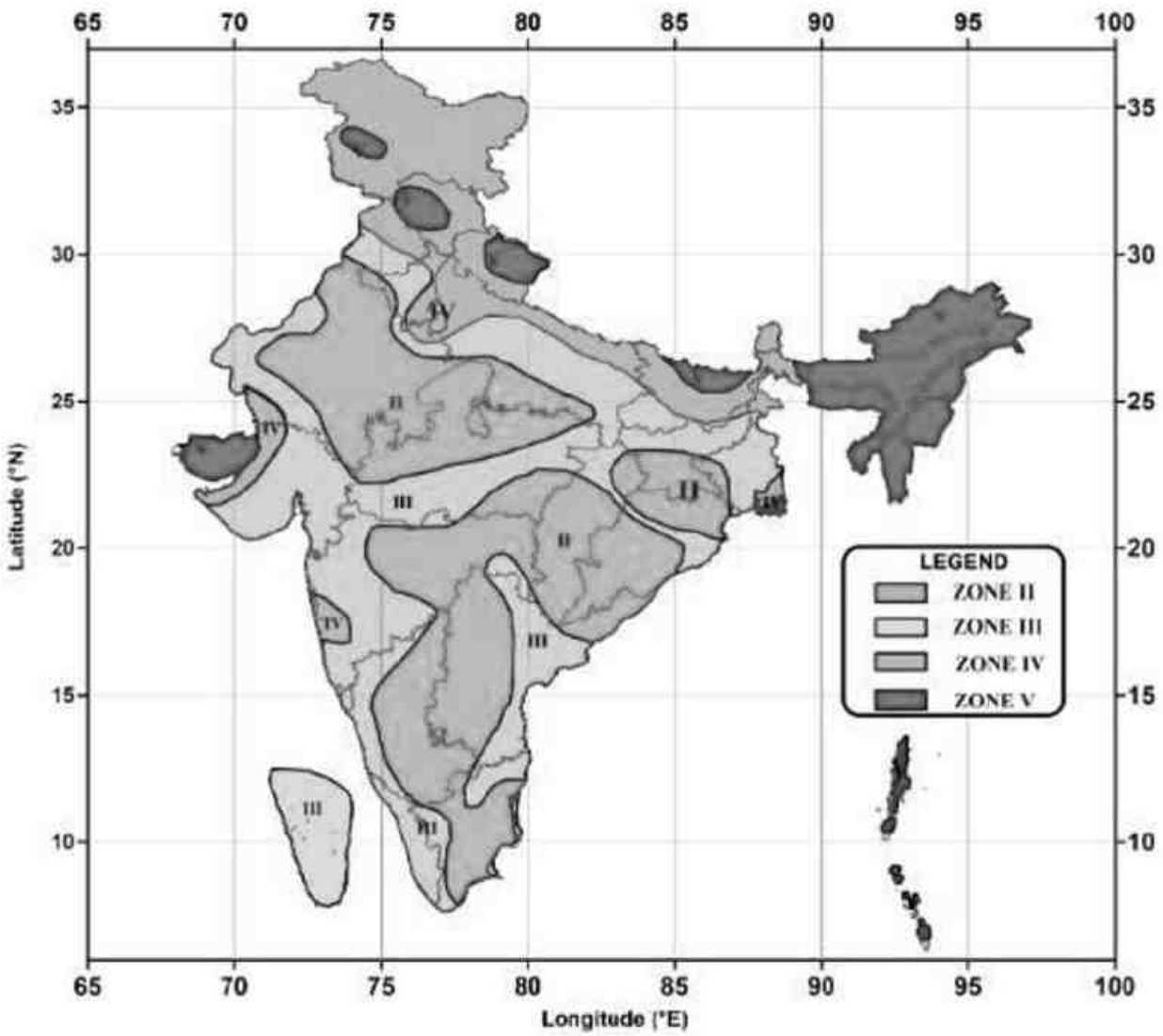
Figure 3.3: Cyclone Prone Areas



B. SEISMIC DATA

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

Figure 3.4: Seismic Zone Map of India



C. Climate and Rainfall Data:

The climate of Ariyalur district is sub-tropical. The average rainfall wheli the district receives daring Northeast monsoon is 485 mm and during southwest monsoon is 357mm respectively . The normal onset of Southwest monsoon is first week of June whereas for Northeast monsoon is second week or October, The annual rainfall normal (1970.-2000) of Ariyilar district is 949 mm.5Projections; of rainfall over Ariyabin- for die periods 2010-2040 (2020s), 2040-2070 (2050s) and 2070-2100 (2080s) with reference to the baseline (1970-2000) indicate a decrease of 2.0%. 3.0% and 3.1.)% respectively is given in **Table No.3.8.** Rainfall histograms are presented in **Figure No - 3.5 & 3.6**.

Table 3.8: Average Annual Rainfall Data (2012-2021)

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Rainfall
2012	10.26	11.1	44.64	215.27	73.81	215.05	219.15	281.78	142.85	200.84	106.61	16.04	1537.4
2013	0.5	15.84	17.46	1.95	23.69	30.12	25.14	194.66	118.83	102.85	233.9	118.4	883.34
2014	0.85	5.16	0	0	179.76	21.94	91.06	135.01	35.37	306.85	209.59	144.91	1130.5
2015	14.11	0	1.59	79.09	92.45	64.4	75.23	89.55	39.72	115.89	548.65	285.57	1406.25
2016	0.04	0	0.01	0	119.86	57.61	49.59	179.49	50.16	65.93	55.41	41.1	619.2
2017	60.91	0.01	6.88	0	3.06	45.02	12	66.04	99.16	66.82	254.12	88.92	702.94
2018	30.73	0.01	1.38	0.93	5.5	55.19	32.41	87.1	16.54	223.15	279.22	33.53	765.69
2019	0.73	0.87	0.01	0	1.56	5.38	59.77	130.1	277.01	189.97	293.44	248.8	1207.64
2020	18.26	0.63	0.08	8.85	27.65	27.86	127.82	77.81	104.89	110.97	236.52	481.36	1222.7
2021	348.76	27.96	4.73	16.73	77.21	56.97	54.09	132.28	129.35	302.09	658.23	89.6	1898
Cumulative	485.15	61.58	76.78	322.82	604.55	579.54	746.26	1373.82	1013.88	1685.36	2875.69	1548.23	11373.66

Source – IMD GRID – Ariyalur report

Figure 3.5: Total Rainfall

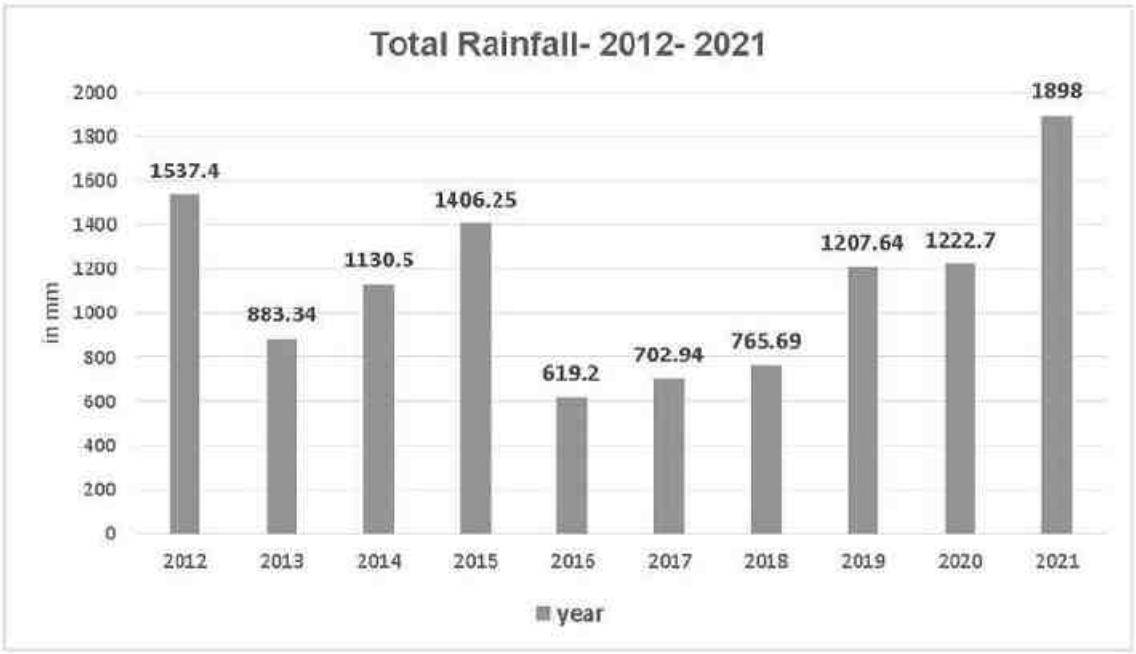
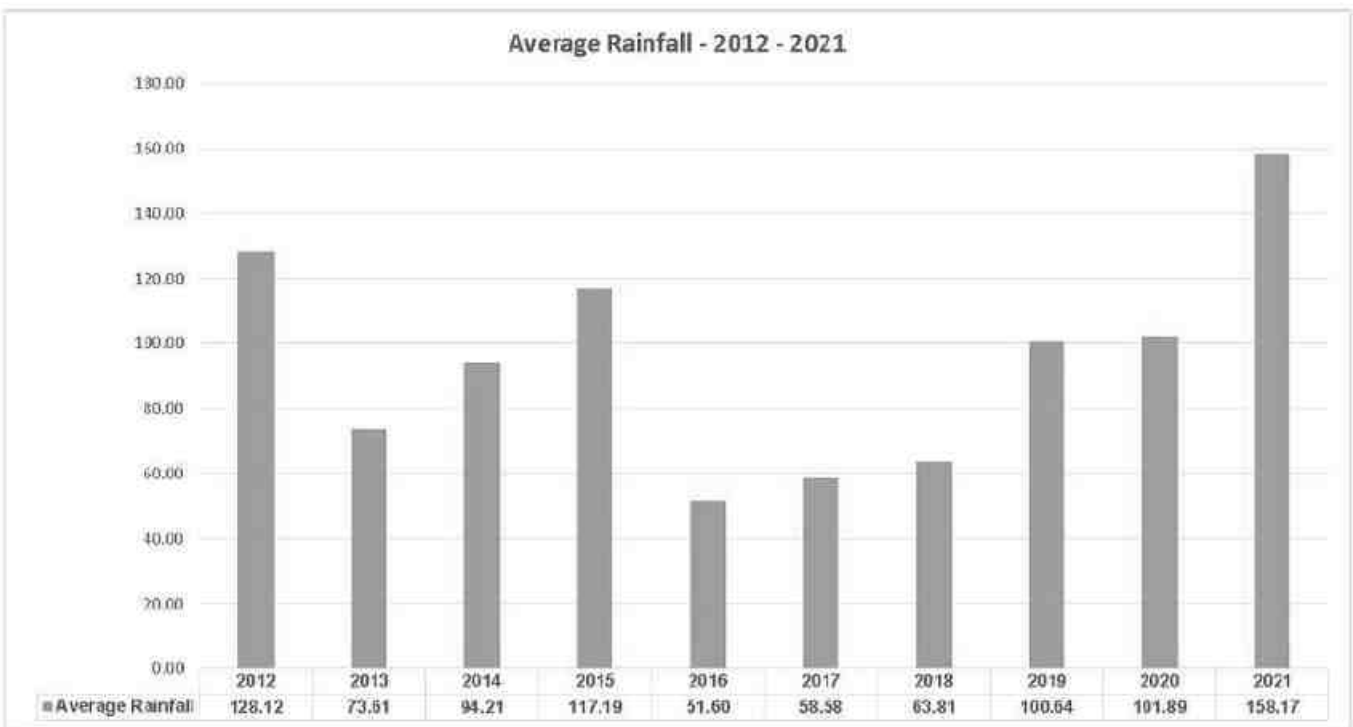


Figure 3.6: Average Annual Rainfall



3.3.1.3 SITE SPECIFIC METEOROLOGICAL DATA:

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

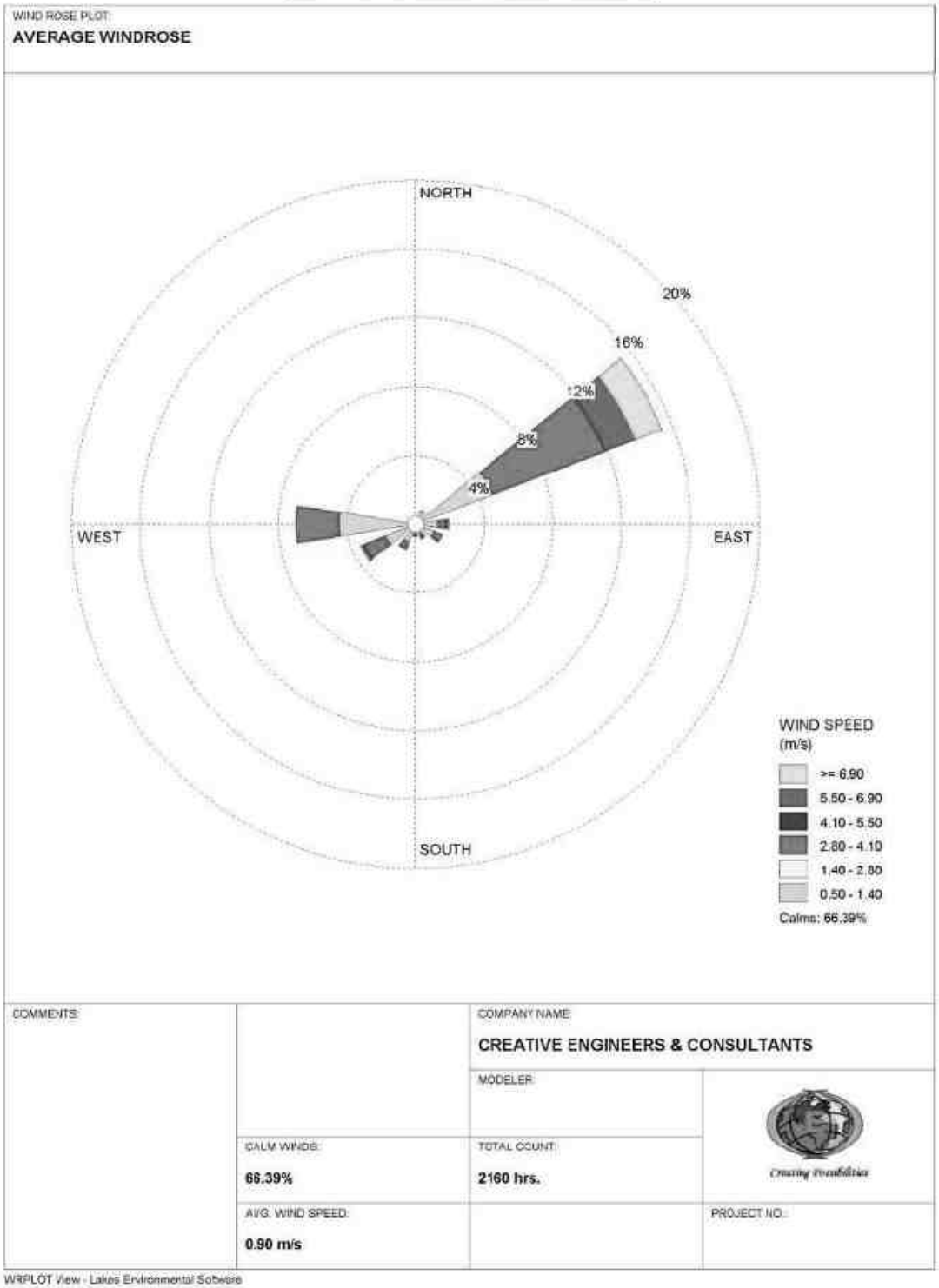
DATA ANALYSIS:

The temperature in the area during the study period ranged from 20.0°C to 41.3°C while the relative humidity varied between 26.0 – 92.7%. The wind speed during the study period ranged from <1.8 to 14.0 Km/hr. The predominant wind direction is from NE. The meteorological data are presented in **Table no – 3.9.** The average wind rose is depicted in **Figure No - 3.7.**

Table 3.9: Meteorological Data

Season: Summer Season (March – May 2022)			
S.NO	**PARAMETERS**	**MIN**	**MAX**
1	Temperature In ^{0}c	20.0	41.3
2	Humidity in %	26.0%	92.7%
3	Wind speed in km/hr	<1.8	14.0
4	Predominant wind direction from	NE	

Figure 3.7: Average Wind Rose



3.3.2 AMBIENT AIR QUALITY (AAQ):

Ambient Air quality has been assessed through a network of 5ambient air quality stations. The following methodology has been considered for design of ambient air quality monitoring network in the area:

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

Table 3.10: Air Quality Monitoring

1.	**Monitoring Period**	Summer Season (Mar 2022 – May 2022)
2.	**Monitoring Location**	The location map showing Ambient Air Quality study stations are shown in **Figure No- 3.8.**
3.	**Methodology**	
	Parameter	**Protocol**
	a. Particulate Matter (PM10)	Gravimetric (IS 5182: Part 23:2017)
	b. Particulate Matter PM2.5	Gravimetric (IS 5182: Part 24:2019)
	c. Sulphur Dioxide	Colorimetric (West & Gaeke Method) (IS 5182: Part 02: 2017)
	d. Nitrogen Dioxide	Colorimetric(Modified Jacob & Hocheiser Method) (IS 5182: Part 06:2017)
	e. Carbon Monoxide	CO Monitor
	f. Silica	Colorimetric (Molybdate Method) NIOSH 7601 -2003
4.	**Monitoring Frequency**	2 days in a week, 4 weeks in a month for 3 months in a season.

Table 3.11: Air Quality Monitoring Locations

S.NO	LOCATION CODE	LOCATION	DISTANCE FROM CORE ZONE (Km)	DIRECTION
1	A1	Near lease area	0.3km	E
2	A2	Venketramanapuram village	1.7 km	NE
3	A3	Kollapuram Village	1.2 km	SW
4	A4	Palla kaveri village	0.9 km	SE
5	A5	Aminabad village	0.9 km	NW

Figure 3.8: Ambient Air Quality Study Stations

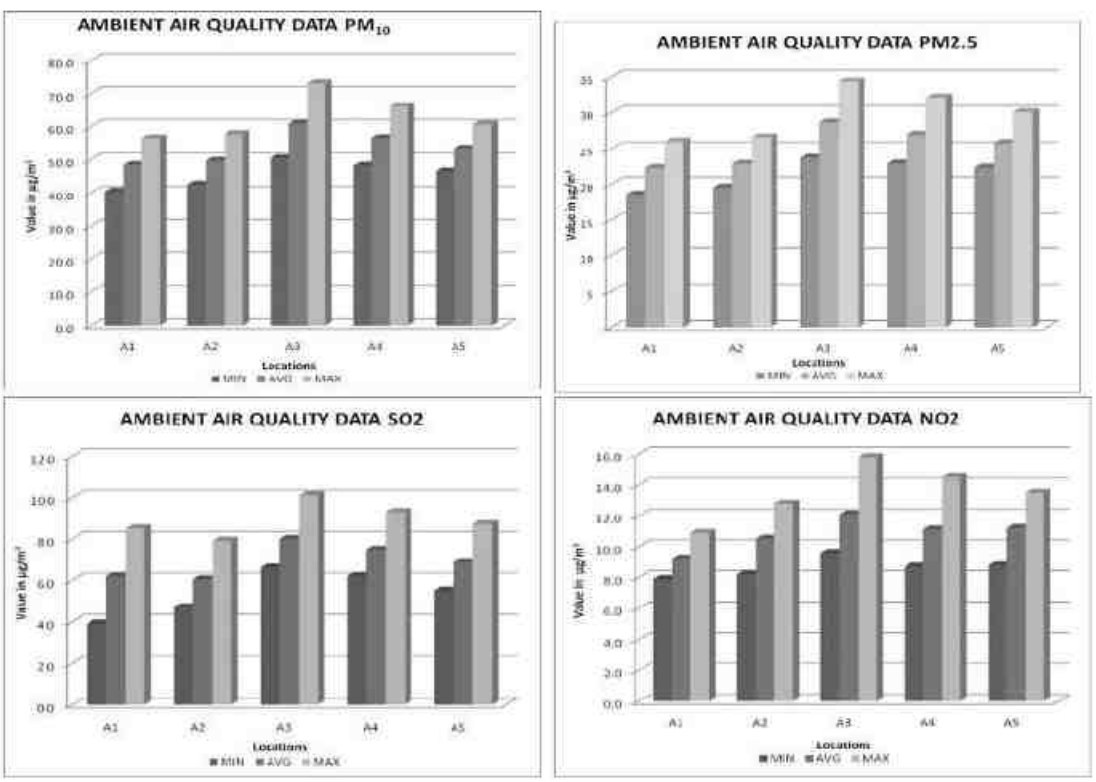
Table 3.12: Ambient Air Quality Data

All Value in µg/m^3

PARAMETERS	Cat.*	PM_{10}			$PM_{2.5}$			SO_2			NO_2		
LOCATIONS		MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX
A1- Near lease area	I	40.4	48.5	56.5	18.6	22.3	26.0	3.9	6.2	8.5	7.9	9.2	10.9
A2-Venketramanapuram village	R	42.5	49.7	57.8	19.6	22.9	26.6	4.7	6.0	7.9	8.2	10.5	12.8
A3-Kollapuram Village	R	50.4	61.0	73.2	23.7	28.6	34.4	6.6	8.0	10.1	9.6	12.1	15.8
A4-Palla kaveri village	R	48.2	56.6	66.2	22.9	26.9	32.2	6.2	7.5	9.3	8.7	11.1	14.5
A5-Aminabad village	R	46.5	53.4	60.7	22.3	25.7	30.1	5.5	6.9	8.7	8.8	11.2	13.5
NAAQ Limits		PM_{10}			$PM_{2.5}$			SO_2			NO_2		
	*	100			60			80			80		
	**	100			60			80			80		

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

Figure 3.9: Ambient Air Quality Data



3.3.2.1 Results and Discussion:

The AAQ monitored data for all locations for above parameters are shown in **Table No - 3.12 and** in **Figure No - 3.9.** Ambient Air Quality data during the study period is given in **Annexure – 9.** From the table it is seen that, in the ambient air, the PM_{10} values were in the range of 40.4-73.2 µg/m3. PM2.5 values were in the range of 18.6-34.4 µg/m3. SO2 levels were ranging from 3.9– 10.1 µg/m3. NO2 levels were ranging from 7.9-15.8 µg/m3.

The existing Ambient Air Quality levels for PM_{10}, $PM_{2.5}$, SO_2 and NO_2, are within the NAAQ standards prescribed CPCB limits of 100 µg/m^3, 60 µg/m^3, 80 µg/m^3 & 80 µg/m^3. The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m^3)

3.3.3 WATER ENVIRONMENT:

Assessment of baseline data on water environment includes Identification of water resources, Collection of water samples and Analyzing water samples collected for physico-chemical parameters as per standards. The water sampling was carried out for 4 locations. Details of the same has been provided below:

Table 3.13: Water Quality Monitoring

1.	**Monitoring Period**		Summer Season (Mar 2022 – May 2022)		
2.	**Monitoring Location**		The location map showing water sampling locations are given in **Figure No.3.10.**		
	Code	**Location**	**Sample Type**	**Distance**	**Direction**
	W1	Near Mine Lease Area	Bore well	0.3 km	E
	W2	Venketramanapuram Village	Bore well	1.7 km	NE
	W3	Palla kaveri Village	Bore well	0.9 km	SE
	W4	Aminabad village	Bore well	0.9 km	NW
3.	**Methodology**		Sampling - IS 3025 Part - I		
			Analysis – IS 3025 relevant parts / APHA 23rd Edition		

Figure 3.10: Location of Water Sampling Stations

Table 3.14: Summary of Water Quality Data

Season	Summer Season (Mar 2022 – May 2022)	
Monitoring Locations	4 locations	
Parameters	**Range of values**	**Limits***
pH at 25 °C	6.87 – 7.52	**6.5-8.5**
Total Dissolved Solids, mg/L	440 – 760	**2000**
Chloride as Cl-, mg/L	99.8 – 196	**1000**
Total Hardness (as CaCO3), mg/L	296 – 384	**600**
Total Alkalinity (as CaCO3), mg/L	242– 340	**600**
Sulphates as SO42-, mg/L	71 – 215	**400**
Iron as Fe, mg/L	BDL(D.L - 0.01) – 0.07	**0.3**
Nitrate as NO3, mg/L	1.80 – 3.97	**45**
Fluoride as F, mg/L	0.26 – 0.42	**1.5**

3.3.3.1 Results and Discussion:

The results of the 4 bore well water sample analysis are shown in **Table No - 3.14.** The pH values of bore well water were ranging in between 6.87 – 7.52 TDS values were in the range of 440 – 760 mg/L. Chloride values were ranging from 99.8 – 196 mg/L. Iron content was found to be in the range BDL(D.L - 0.01) – 0.07 mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications. The water quality data is provided in **Annexure-10.**

3.3.4 NOISE ENVIRONMENT:

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

Table 3.15: Noise Level Monitoring

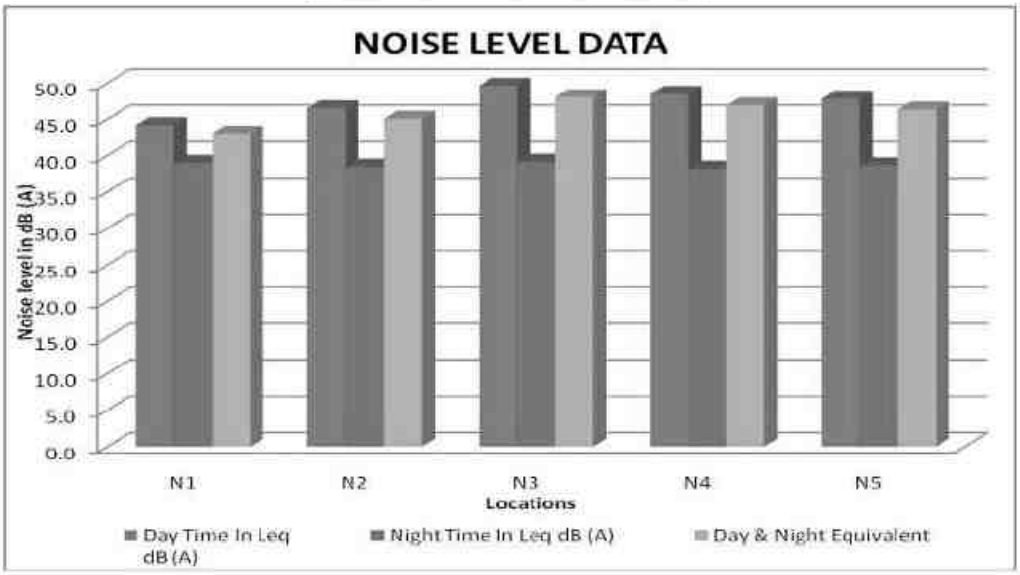
1.	**Monitoring Period**	Summer Season (Mar 2022 – May 2022)		
2.	**Monitoring Location**	The location map showing noise monitoring locations are given in **Figure No.3.11.**		
	Code	**Location**	**Distance**	**Direction**
	N1	Near Mine Lease Area	0.3km	E
	N2	Venketramanapuram village	1.7 km	NE
	N3	Kollapuram Village	1.2 km	SW
	N4	Palla kaveri village	0.9 km	SE
	N5	Aminabad village	0.9 km	NW
3.	**Methodology**	Noise levels were measured using sound level meter manufactured by (Model No - SL- 4001, Make - Lutron). Sound Pressure Level (SPL) measurements were measured at all locations where ambient air quality monitored; one reading for every hour was taken for 24 hours.		
4.	**Monitoring Frequency**	Once during monitoring period		

Figure 3.11: Location of Noise Sampling Stations

Table 3.16: Ambient Noise Level in dB (A)

Date and time of monitoring	N1	N2	N3	N4	N5
Day Equivalent	44.2	46.5	49.6	48.5	47.8
Night Equivalent	39.0	38.5	39.1	38.2	38.7
Day & Night Equivalent	43.0	45.1	48.1	46.9	46.3
Limits: As per CPCB: Work zone Exposure in 8 hr - 90 dB(A) As per MoEF&CC: Residential: Day equivalent - 55 dB(A); Night equivalent - 45 dB(A)					

Figure 3.12: Noise Level Data



3.3.4.1 Results and Discussion:

The results of noise levels for all locations are given in **Table No-3.16**.The noise values for all above locations are shown in a comparative chart given in **Figure No - 3.12.** In the buffer zone, day Equivalent Noise (Leq-d) noise levels were ranging from 44.2 dB(A) to 49.6 dB(A) and night Equivalent Noise (Leq-d) levels ranged between 38.2 dB(A) to 39.1 dB(A).While comparing with the MOEF&CC Norm of 55 dB(A) for day time and 45 dB(A) for night time, the monitored ambient noise levels were within the limit values for Residential areas.

3.3.5 SOIL CHARACTERISTICS:

Soil samples were collected in 2 locations in the core and buffer zone to analyse the physiochemical characteristics of the soil in the area. Elaborate details of the same has been provided below.

Table 3.17: Soil Quality Monitoring

1.	**Monitoring Period**	Summer Season (Mar 2022 – May 2022)		
2.	**Monitoring Location**	The location map showing soil sampling locations are given in **Figure No.3.13.**		
	Code	**Location**	**Distance**	**Direction**
	S1	Mine Lease Area	-	-
	S2	Kollapuram Village	1.2 km	SW
3.	**Methodology**	Composite soil samples using sampling augers and field capacity apparatus.		
4.	**Monitoring Frequency**	Once during monitoring period		

Figure 3.13: Location of Soil Sampling Stations

Table 3.18: Soil Quality Data

S.No	Parameters	Unit	S1	S2
1	pH at 25°C	-	7.05	7.24
2	Electrical Conductivity	(µmhos/ cm)	95.46	58.92
3	Dry matter content	%	98.62	98.47
4	Water Content	%	1.38	1.53
5	Organic Matter	%	0.54	0.65
6	Soil texture	-	Loam	Sandy Clay Loam
7	Grain Size Distribution i. Sand	%	50.24	45.67
8	ii. Silt	%	36.89	24.68
9	iii. Clay	%	12.87	29.65
10	Phosphorous	µg/g	0.65	0.92
11	Sodium	mg/kg	1456	940
12	Potassium	mg/kg	1072	710
13	Total Nitrogen	mg/kg	186	212
14	Total Sulphur	%	BDL(D.L.0.02)	BDL(D.L.0.02)

3.3.5.1 Results and Discussion:

Results of the soil samples show that the pH values were ranging between 7.05 to 7.24 and Electrical Conductivity values were ranging between 58.92 – 95.46 µmhos/cm. Soils are generally silt loam and loam type. Organic matter values were ranging between 0.54 – 0.65 %. Phosphorus values were ranging between 0.65 – 0.92 µg/g. Potassium values were ranging between 710 -1072 mg/kg. Sodium values were ranging between 940- 1456 mg/kg. Total Sulphur values were observed to be BDL. The soil quality data for the 2 samples collected and analyzed are provided in **Table No – 3.18.**

3.4 LAND ENVIRONMENT - LANDUSE & LAND COVER

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

3.4.1 DATA USED AND METHODOLOGY

For the present study on land use pattern of buffer area around the proposed stone and gravel quarry, an archived historical data of Landsat 8 data shas been used as base data acquired on April 2022 has been used to generate the require landuse map showing their spatial pattern

within the buffer area. The table showing data used for generation of information on landuse and subsequent GIS analysis is given below

Table 3.19: RS satellite image used for the present study

S.No	Type of Data	Date	Generated Map
1.	Sentinel 2	April 2022	Landuse (LU) Map showing 10 Km buffer zone

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

Figure 3.14 : Landsat 8 Satellite Data of the Study Area

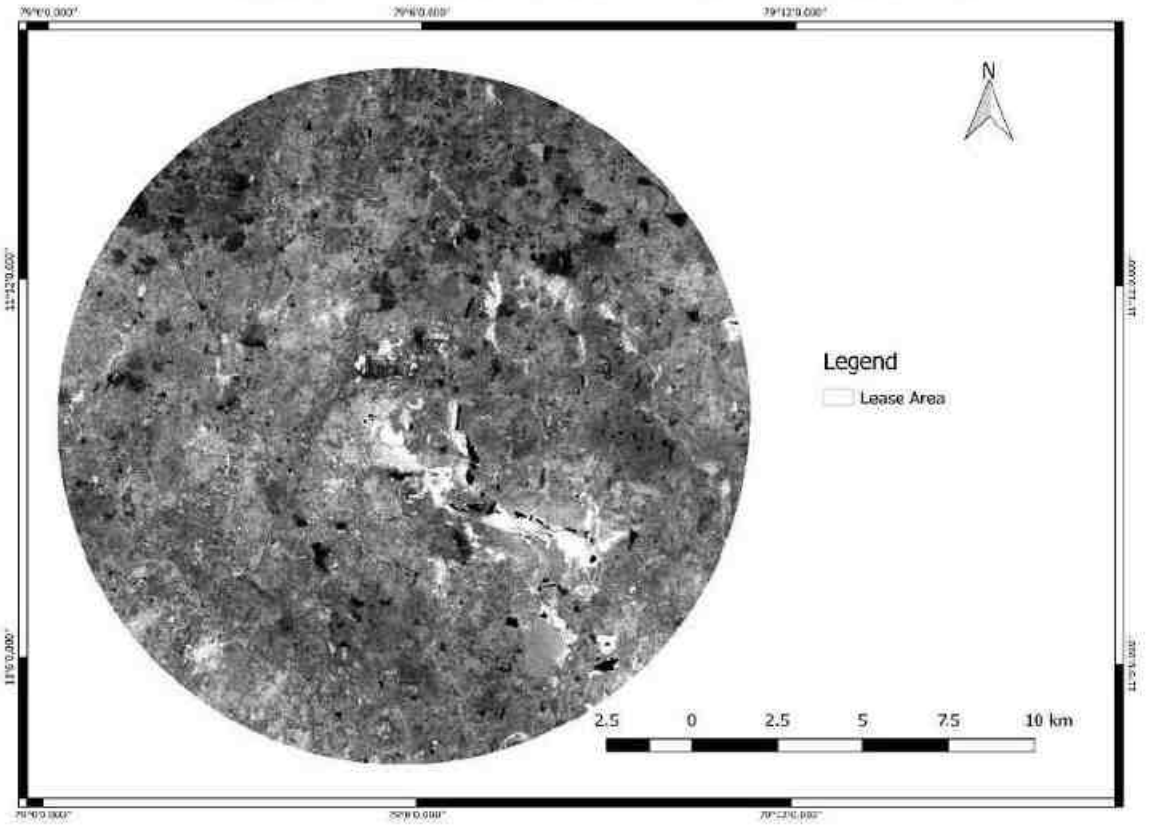


Table 3.20: Major Landuse Units of the Study Area

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

Such LandUse and Land cover (LULC) categories have been verified using field check and identified sample sites within the buffer area, verified on field and transferred into gis geo-coordinates using observation coordinates received from hand held GPS (global positioning system) instrument. Thus, an interpreted final landuse map has been generated using above such elaborate procedure and transformed into GIS environment for its spatial distribution and area estimation. Spatial nature and extent of various landuse categories within the buffer area is discussed is given below:

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

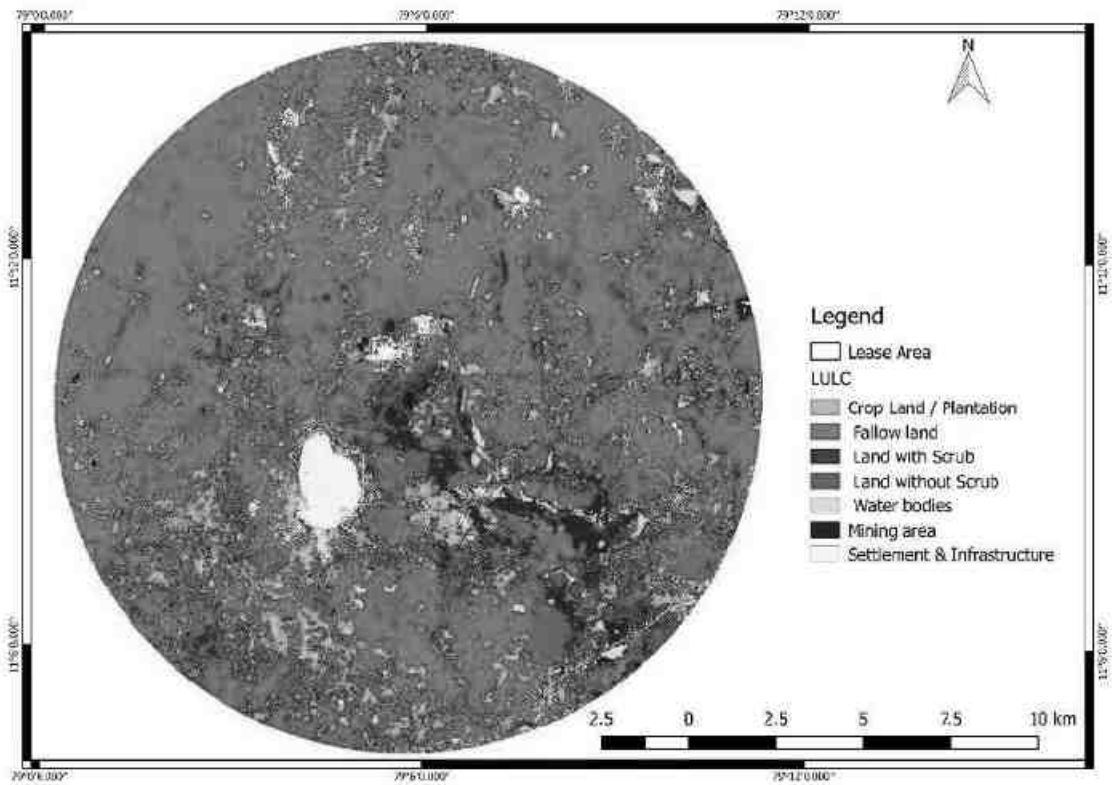


Table 3.21: Area Estimation of Landuse Categories in Buffer Zone

S.No	Landuse Feature	Area (Sq.Km)	Percentage
1	Agriculture/ Plantation	45.16	13.96
2	Fallow Land	175.75	54.32
3	Land With Scrub	37.64	11.63
4	Land Without Scrub	37.12	11.47
5	Water bodies	4.93	1.52
6	Mining	13.16	4.07
7	Settlement	9.79	3.02
	Total	**323.54**	**100**

From the above table it is seen that 13.96 % of the buffer area is classified under the Agriculture/ Plantation followed by 54.32 % of fallow land, 11.63 % constitutes land with scrub, 11.47 % constitutes land without scrub and the balance falls under other land use categories.

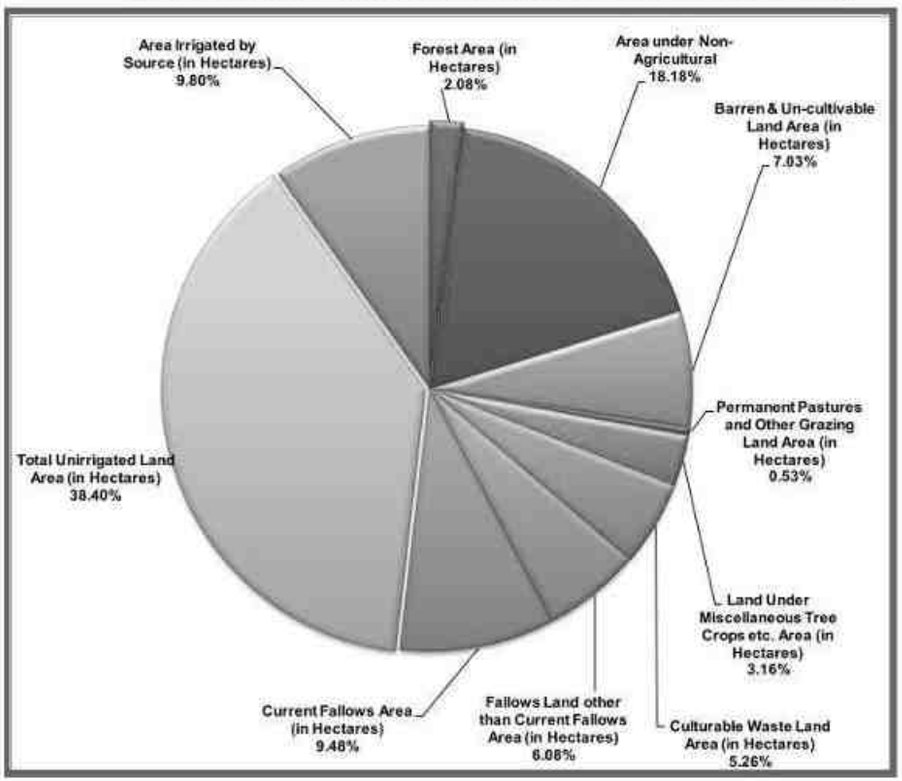
3.4.2 LAND USED BASED ON REVENUE RECORDS:

The lease area and the study area for the land use pattern (10 km radius) has been divided into four zones viz. Zone-I (0-2 km), Zone-II (2-5 km), Zone-III (5-10 km) and Zone-IV (0-10 km) respectively. The land use pattern of the study area falling within 10 km radius around the proposed project area is presented in Table no - 3.22. Village wise land use pattern is provided in **Annexure-11.**

Table 3.22: Land Use Pattern of the Study Area Falling Within 10 Km Area in (Ha)

VILLAGE NAME	Total Geographical Area	Forest Area	Area under Non-Agricultural Uses	Barren & Un-cultivable Land Area	Permanent Pastures and Other Grazing Land Area	Land Under Miscellaneous Tree Crops etc. Area	Culturable Waste Land Area	Fallows Land other than Current Fallows Area	Current Fallows Area	Total Un irrigated Land Area	Area Irrigated by Source
0- 2 KM	1770.49	0	226.68	122.77	9.98	174.14	7.38	189.66	476.9	443.62	119.36
2 - 5 KM	6632.32	0	1858.44	297.69	12.72	165.33	407.85	650.49	203.35	2617.12	419.33
5-10 KM	24291.07	680.69	3858.86	1878.88	149.66	694.17	1303.6	1148.65	2417.64	9494.44	2664.48
0-10 KM	**32693.88**	**680.69**	**5943.98**	**2299.34**	**172.36**	**1033.64**	**1718.83**	**1988.80**	**3097.89**	**12555.18**	**3203.17**

Figure 3.16: Landuse within the Buffer Zone Area



3.5 BIOLOGICAL ENVIRONMENT:

Study of the biological environment of any area comprises of well-planned ecological survey for the floristic and faunal composition of the areas through various scientifically planned techniques.

3.5.1 FLORA:

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

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

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

3.5.1.1 Sampling Methodology:

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

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

represented is recorded at quadrats level. A total of 5 quadrats were laid down in core area and a total of 20 quadrats were laid out in four quartiles (5 each) of buffer area.

Quadrats method for flora : A total of 100 x 100 m Grid was laid for buffer zone of 300m from Core Zone. In that grid 10 × 10m sub-quadrat were laid down randomly within core, PIZ and 10kms buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and 5 × 5 m sub-quadrat nested within the quadrat for shrubs and two plot 1 × 1 m for herbs. The quadrats were laid apart to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, Mining area, Woking pit, Old quarries, agricultural areas, tank bunds, farm forestry plantations, natural forest area, avenue plantations, house backyards, etc. In each sample quadrate, individuals belonging to tree, shrub and herb species were recorded separately, and have been identified on the field. The prevailing land use and habitat quality has been noted down for each location on the field.

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

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

Whereas,

H´ is Shannon index of general diversity,

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

Evenness index was calculated as: E = H´/Hmax,

Whereas Hmax = log2 (number of species in the plot)

A.CORE ZONE:

The lease area is a non forest, private land. The lease area is dominated with Prosopis juliflora. There are 3 trees species from 2 families followed by 3 shurbs from 3 families and 2 herbs from 2 family were recorded in the core zone. The detailed list of plants found in the core zone are given in Table no – 3.23

Table 3.23: List of Floristic Species in the Core Zone

Sl.No	Species Name	Common Name	Family
Trees			
1	*Acacia nilotica*	Karuvelan	Fabaceae
2	*Morinda tinctoria*	Nuna	Rubiaceae
3	*Prosopis juliflora*	Cimaikkaruvel	Fabaceae
Shrubs			
1	*Lantana camara*	Unni chedi	Verbenaceae
2	*Cassia auriculata*	Fabaceae	Aavarampoo
3	*Jatropha glandulifera*	Vellaikattukottai	Euphorbiaceae
4	*Calotropis gigantea*	Yerukku	Apocynaceae
Herbs			
1	*Acalypha indica*	*Kupaimeni keeri*	Amaranthaceae
2	*Anisomeles indica*	marutti	Lamiaceae

In the lease area is dominated with thorny bushes and local Nuna and Avaram. There are no rare, endangered, threatened (RET) species were recorded and therer is no much diversity. Due to less species diversity in the lease area and tree species are common in the periphery of the lease area, no impact on the species diversity is envisaged.

C.BUFFER ZONE:

The Dominated species in the buffer zone are Albizia lebbeck, Acacia auriculiformis, Sygygium cumuni, Borassus flabellifer, Azadirachta indica, Prosopis juliflora, etc. The detailed list of plants found in the Buffer zone is given in Table no – 3.24.

Table 3.24: List of Floristic Species in the Buffer Zone

Sl.No	Species Name	Family	Local Name
Trees			
1	*Terminalia arjuna*	Combretaceae	Marudha Maram
2	*Mangifera indica*	Anacardiaceae	Maamaram
3	*Annacordium occidentalae*	Anacordiaceae	Munthiri
4	*Delonix regia*	Fabaceae	Gulmohar
5	*Annona squamosa*	Annonaceae	Siththa
6	*Tamarindus indica*	Fabaceae	Puli
7	*Musa paradisiaca*	Musaceae	Valzhiai
8	*Terminalia catappa*	Combretaceae	Badam Tree
9	*Murraya koenigii*	Rutaceae	Curry leaf
10	*Cassia fistula*	Fabaceae	Konrai
11	*Tectona grandis*	Verbenaceae	Tekku
12	*Acacia leucophloea*	Fabaceae	Valvelam
13	*Azadirachta indica*	Meliaceae	Vembu
14	*Borassus flabelliformis*	Arecaceae	Panna-maram
15	*Moringa oleifera*	Moringaceae	Murungai
16	*Leucaena leucocephala*	Fabaceae	Subabul
17	*Psidium guava*	Myrtaceae	Koyya
18	*Peltophorum pterocarpum*	Fabaceae	Kilukiluppai
19	*Madhuca longifolia*	Sapotaceae	Iluppai
20	*Casuarina equisetifolia*	Casuarinaceae	Savukku
21	*Prosopis juliflora*	Fabaceae	Seemai karuvel
22	*Cocus nucifera*	Arecaceae	Tennai
23	*Pithecellobium dulce*	Fabaceae	Kodukkapuli
24	*Albizia amara*	Fabaceae	Vagai
25	*Manilkara zapota*	Sapotaceae	Sappota
26	*Carica papaya*	Caricaceae	Pappali
27	*Citrus limon*	Rutaceae	Lemon
28	*Caesalpinia pulcherrima*	Fabaceae	Mayilkondrai
29	*Aegle marmelos*	Rutaceae	Vilvamaran
30	*Sygygium cumuni*	Myrtaceae	Naval
31	*Mimusops elengi*	Sapotaceae	Magizhamboo
32	*Acacia nilotica*	Fabaceae	Karuvelan
33	*Acacia auriculiformis*	Fabaceae	Pencile tree
34	*Ficus religiosa*	Moraceae	Poarasamaram
35	*Morinda tinctoria*	Rubiaceae	Nuna
36	*Ficus hispida*	Moraceae	Aarasu
37	*Polyalthia longifolia*	Annonaceae	Nietilingam
38	*Thespesia populnea*	Malvaceae	Puvarasu
39	*Phyllanthus emblica*	Euphorbiaceae	Nelli
40	*Samanea saman*	Fabaceae	Amaivagai
41	*Delonix elata*	Fabaceae	Perungondrai
42	*Ficus benghalensis*	Moraceae	Aalamaram
43	*Pongamia pinnata*	Fabaceae	Pungai
Shrubs			

Sl.No	Species Name	Family	Local Name
1	*Nerium indicum*	Apocynaceae	Arali
2	*Ixora casei*	Rubiaceae	Idlipoo
3	*Tecoma stans*	Bignoniaceae	*Yellow trumpetbush*
4	*Lawsonia inermis*	Lythraceae	Maruthani
5	*Ricinus communis*	Euphorbiaceae	*Amanakku*
6	*Hibiscus rosa-sinensis*	Malvaceae	Semparuthi
7	*Lantana camara*	Verbenaceae	nuni
8	*Justicia adhatoda*	Acanthaceae	Adathoda
9	*Jatropha glandulifera*	Euphorbiaceae	Vellaikattukottai
10	*Ziziphus jujuba*	Rhamnaceae	*Elanthai*
11	*Calotropis gigantea*	Apocynaceae	Earukku
12	*Boerhaavia diffusa*	Nyctaginaceae	Kagithapoo
13	*Vitex negundo*	Verbinaceae	Vanili
14	*Cassia auriculata*	Fabaceae	Aavarampoo
15	*Datura metel*	Solanaceae	Umatai
16	*Aloe vera*	Asphodelaceae	Chotthu kathalai
17	*Sida cordifolia*	Malvaceae	*Sida plant*
Herbs			
1	*Sida acuta*	Malvaceae	Palambasi
2	*Achyranthes aspera*	Amaranthaceae	*Nayuruvi*
3	*Croton sparsiflorus*	Euphorbiaceae	*Poodu sedi*
4	*Andrographis paniculata*	Acanthaceae	*Kirayt*
5	*Boerhavia erecta*	Nyctaginaceae	*Erect spiderling*
6	*Acalypha indica*	Amaranthaceae	*Kupaimeni keeri*
7	*Ocimum tenuiflorum*	Lamiaceae	Thulasi
8	*Parthenium hysterophorus*	Asteraceae	*Parthenium*
9	*Argemone mexicana*	Papaveraceae	*Mexican poppy*
10	*Anisomeles malabarica*	Lamiaceae	Peyimarutti
11	*Solanum incanum*	Solanaceae	Karimulli
12	*Anisomeles indica*	Lamiaceae	marutti
13	*Solanum nigrum*	Solanaceae	*Manatthakalli*
14	*Leucas aspera*	Lamiaceae	*Thumbai*
15	*Tridax procumbens*	Asteraceae	Vettukai poondu
16	*Tephrosia purpurea*	Fabaceae	Vayal poondu
17	*Phyllanthus niruri*	Phyllanthaceae	*Keelzhaneeli*
18	*Cleome viscosa*	Cleomaceae	*Naai velai*
19	*Vinca rosea*	Apocynaceae	Nithiyakalyani
20	*Tragia involucrata*	Euphorbiaceae	Kanchori
21	Solanum xanthocarpum	Solanaceae	Kandangkattari
22	*Sida rhombifolia*	Malvaceae	*Kurundotti*
23	*Amaranthus viridis*	Amaranthaceae	*Creen amaranth*
Climbers			
1	Asparagus racemosus	Asparagaceae	Tannir-vittan
2	Jasminum angustifolium	Oleaceae	Uccimalligai
3	Abrus precatorius	Fabaceae	Kundumani
4	Capparis rotundifolia	Capparaceae	Thoratti
5	Coccinia indica	Cucubitaceae	Kovai

Sl.No	Species Name	Family	Local Name
6	Cissus quadrangularis	Vitaceae	Pirandai
Crops			
1	*Musa paradisiaca*	Musaceae	Valzhai
2	*Sorghum vulgare*	Poaceae	Solam
3	*Sesbania grandiflora*	Fabaceae	Agati
4	*Gossypium hirsutum*	Malvaceae	Paruththi
5	*Capsicum annuum*	Solanaceae	Red chilli
Grasses			
1	*Kyllinga nemoralis*	Cyperaceae	Velutta nirbasi
2	*Cyperus rotundus*	Cyperaceae	korai pullu
3	*Chloris barbata*	Poaceae	Kodai pullu
4	*Cynodon dactylon*	Poaceae	Arugampillu

There are no rare, endangered, threatened (RET) species and it is not rich in bio diversity, from the discussion with locals, it is observed that agricultural activities are almost absent in most of the areas due to poor soil quality, inconsistent rainfall, nonavailability of water, high labor cost, nonavailability of manpower, less yield and poor economics.

3.5.2 FAUNA:

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

Observation: Domesticated animals like Cows, Buffalos, Dogs, Cats etc., are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. The list of fauna within the study area is given in Table No – 3.25.

Table 3.25: List of Fauna in the Buffer Zone

S.No	Common Name	Scientific name	IWPA, Schedule
Mammals			
1	Common Indian Hare	Lepus ruficaudatus	IV
2	Indian Grey Mongoose	Herpestes edwardsii	II
3	Indian Palm squirrel	Funambuus palmarum	IV
4	Bonnet macaque	Macaca radiata	II
Birds			
1	Purple-rumped Sunbird	Nectarinia zeylonica	IV
2	Cattle Egret	Bubulcus ibis	IV
3	Indian Cuckoo	Cuculus micropterus	IV

4	Little Egret	Egretta garzetta	IV
5	Common Crow	Corvus splendens	V
6	Spotted Dove	Streptopelia chinensis	IV
7	Rose-ringed Parakeet	Psittacula krameri	IV
8	Common Kingfisher	Alcedo atthis	IV
9	Common Quail	Coturnix coturnix	IV
10	Common Myna	Acridotheres tristis	IV
11	House Sparrow	Passer domesticus	IV
12	Black Drongo	Dicrurus macrocercus	IV
13	Common Babbler	Turdoides caudatus	IV
14	Little Cormorant	Phalacrocorax niger	IV
15	Red-vented Bulbul	Pycnonotus cafer	IV
Reptiles			
1	Common Indian krait	Bungarus caeruleus	II
2	Rat Snake	Ptyas mucosa	II
3	Garden Lizard	Calotes versicolar	IV
Amphibians			
1	Common Indian toad	Bufo melanostictus	IV
Butterfly			
1	Lemon pansy	Junonia lemonias	IV
2	Small grass yellow	Eurema brigitta	IV
3	Lime butterfly	Papilio demoleus	IV
4	Common crow	Euploea core	IV
5	Stripped or common tiger	Danaus genutia	IV

3.6 HYDROGEOLOGICAL STUDY:

This section delves into the study of the hydrogeological scenario of the study area to evaluate the impact of mining activities on the nearby areas. The study area is considered to understand the nature of the general hydrogeological conditions of the area.

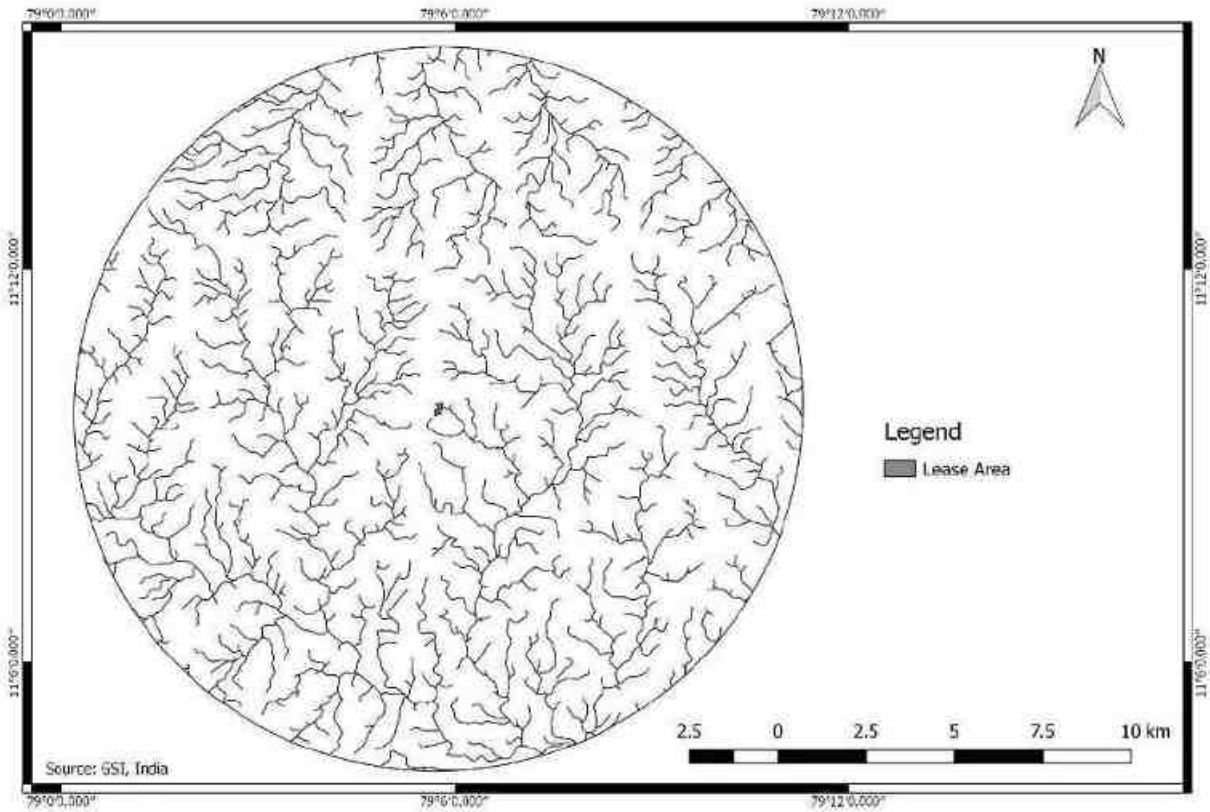
The geology of the area and subsurface conditions have been interpreted based on the exploratory data collected from different agencies, like Geological Survey of India, Central Ground Water Board, Govt. of India, PWD department , etc. Intensive well inventory of the area have been undertaken to establish the groundwater flow regimes. The hydrogeological properties of the aquifer existing in the study area have been evaluated through conducting aquifer performance test on representative wells. The test data has been analysed using standard computer aided techniques. The water table elevation map and aquifer parameters evaluated through pump test have been used to establish groundwater flow regime. The ground water resources potential and its utilization have been calculated as per GEC norms

3.6.1 PHYSIOGRAPHY AND DRAINAGE:

Physiography: The area applied for quarry lease exhibits almost plain topography covered by top soil and lime kankar formation. The limekankar formation is noticed below 0.3m (Avg) top soil for a thickness of 2.25 m. The general elevation of the QL area is 96 to 98 m aMSL.

Drainage: The area is almost flat and plain terrain with a gentle slope towards east. A Vari is flowing across the QL area in west to east direction. Another Vari is flowing aside the QL area in western side. As directed, Safety distance of about 50 m has been provided to both the Vari's and their flows will be maintained as such till the conceptual stage. There are no Perennial Rivers in the vicinity. Seasonal Kallar River drains the area and flows at a distance of 3.4 km in east direction. Seasonal Vanjiyam Odai flows at 3.8 km in south west.Seasonal River

Figure 3.17: Drainage Map



3.6.2 HYDROGEOLOGY:

Regional Hydrogeology:

Ariyalur district is underlain by the geological formations ranging in age from Archaean to Recent excluding Tertiary. The important aquifer systems in the district are constituted by weathered and fractured crystalline rocks. Groundwater generally occurs under phreatic conditions in the weathered mantle and under semi-confined conditions in the fractured zones at deeper levels. The thickness of weathered zone in the district is in the range of 2 to 15 m.

The porous formations in the district include shales, sandstones and clays of Jurassic age (Upper Gondwana), marine sediment of Cretaceous age, sandstones of Tertiary age and Recent alluvial formations. As the Gondwana formations are well compacted and poorly jointed, the movement of groundwater in these formations is mostly restricted. Groundwater occurs under phreatic to semi confined conditions in the inter-granular pore spaces in sands and sandstones and the bedding planes and thin fractures in shales. In the area underlain by Cretaceous sediments, ground water development is rather poor due to the rugged nature of the terrain and the poor quality of the formation water. Quaternary formations comprising mainly sand, clay and gravels are confined to semi confined in the major drainage courses in the district. The maximum thickness of alluvium is 30 m whereas the average thickness is about 15 m. Groundwater in these formations is being developed by means of dug wells

The major aquifer systems in the district are constituted by (1) Basal crystalline rocks consisting mainly of Charnockites, Granites and Gneisses of Archaean age and (2) Sedimentary formations range in age from Cretaceous to Recent.

Alluvial Formations:

In the river alluvium ground water occurs under water table condition. The maximum thickness is 37 m and the average thickness of the aquifer is approximately 12 to 15 m. These formations are porous and permeable, which have good water bearing zones.

Tertiary formation:

Tertiary formations are mainly Cuddalore Sand stone, mottled ferruginous clays and pebbles. The ground water occurs in semi-confined conditions and confined conditions with good ground

water potentials in these aquifers. The Specific Capacity in the Tertiary formations ranges from 40 to 1627 lpm/m/dd.

Cretaceous formations:

Cretaceous formations comprises white Sandy Limestones and Sandstones with fossils, Calcareous mottled Sand stones with fossils, Shell Lime stones, Clays, Sand stones with fossils, Basal Lime stone, Clays and Sandy beds with fossils. Ground water in the sandy clay lenses and fine sands underlain by white and black clay beds constitutes phreatic aquifers in the depth range 10.0 to 15.0 m below ground level. Phreatic aquifers in the limestone are more potential. The Specific Capacity in the cretaceous formation ranges from 18.77 to 90.66 lpm/m/dd.

Hard Rock formations:

Hard rock formations include Charnockites, Granites and Gneisses traversed by Quartz and Pegmatite veins. Ground water occurs under water table conditions in weathered mantle and semi-confined conditions in fractured zones depend on the joints, fracture and its development.

Figure 3.18: Geology Map

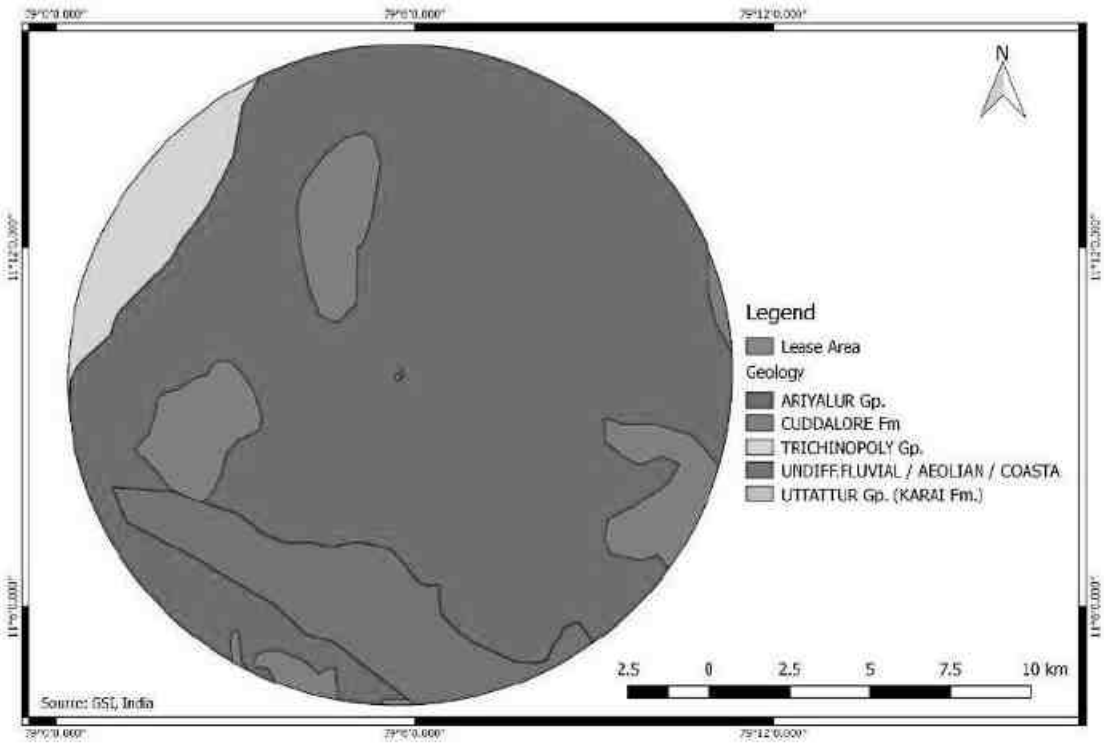
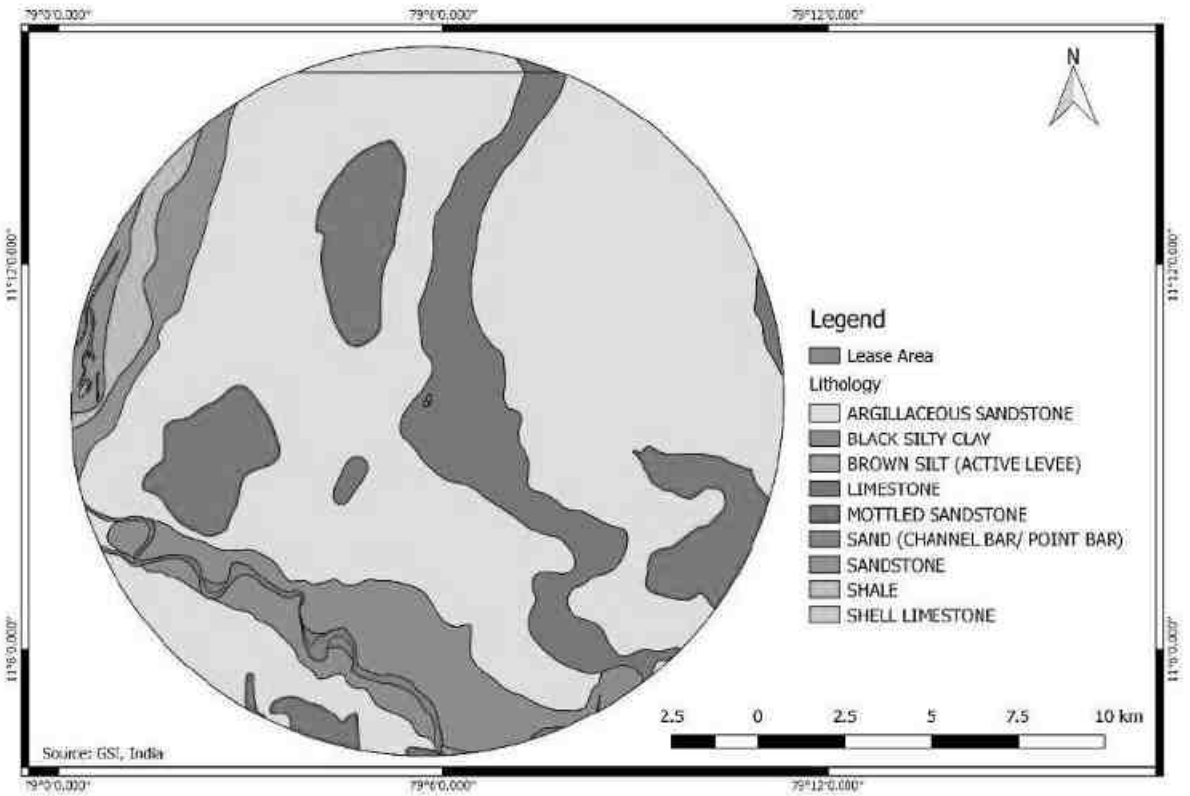
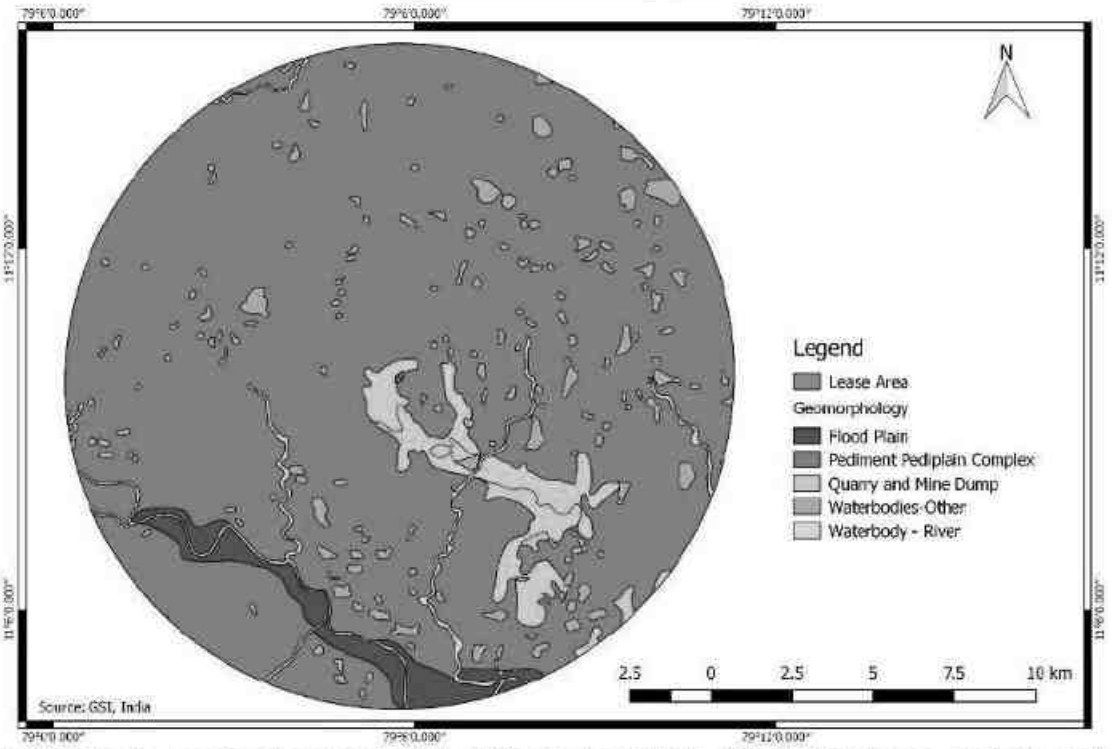


Figure 3.19: Geomorphology Map



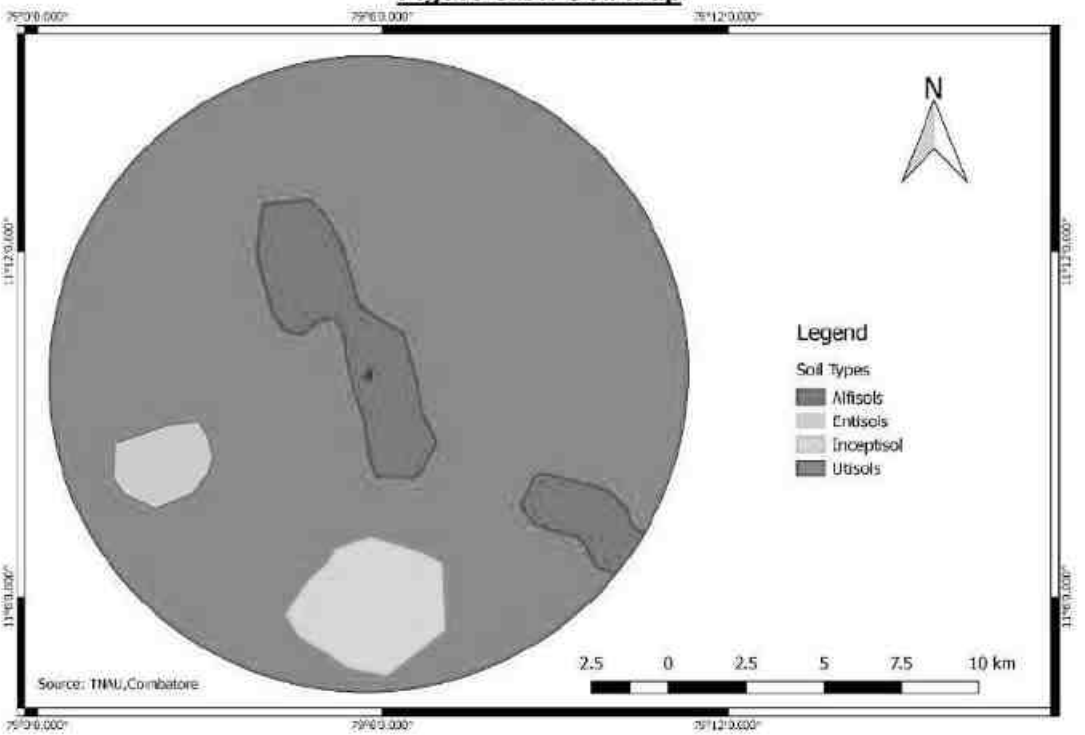
Lithology: The lithological map of the buffer zone has been provided. From this, it is seen that the study area is mainly dominated by Garnet Biotite Geneiss. The lease area falls under acid to intermediate charnokite with regards to lithology.

Figure 3.20: Lithology Map



Soil: The study area is characterized by Utisols, Inceptisol, Alfisols.The lease are falls under the category of Alfisols. The soil map is provided in Figure No.3.21.

Figure 3.21: Soil Map



3.6.3 WATER TABLE OF THE AREA:

The Groundwater levels from the 27 number of observation wells of TWAD in Ariyalur have been analyzed for Post-Monsoon and Pre-Monsoon. 5 years average Ground water level in m Below Ground Level for pre and post monsoon is as follows:

Table 3.26: Groundwater Level Pre Monsoon and Post Monsoon

	January	May
2017	28.8	31.7
2018	25.0	31.3
2019	26.9	30.0
2020	26.1	29.1
2021	24.6	27.9
Average	26.3	30.0

Figure 3.22: Pre-Monsoon Map

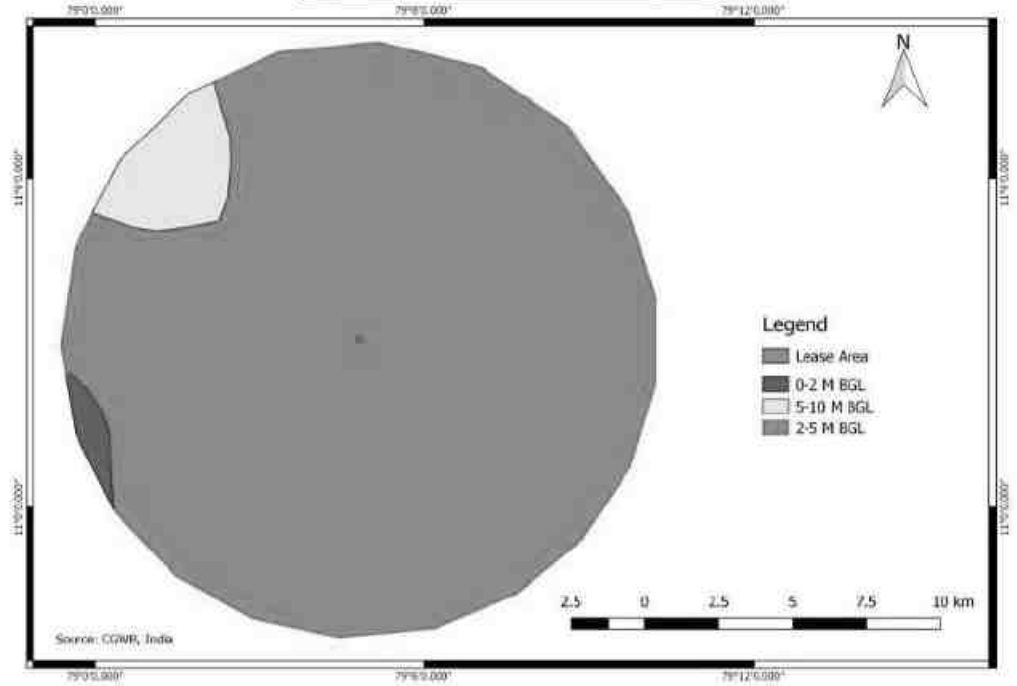
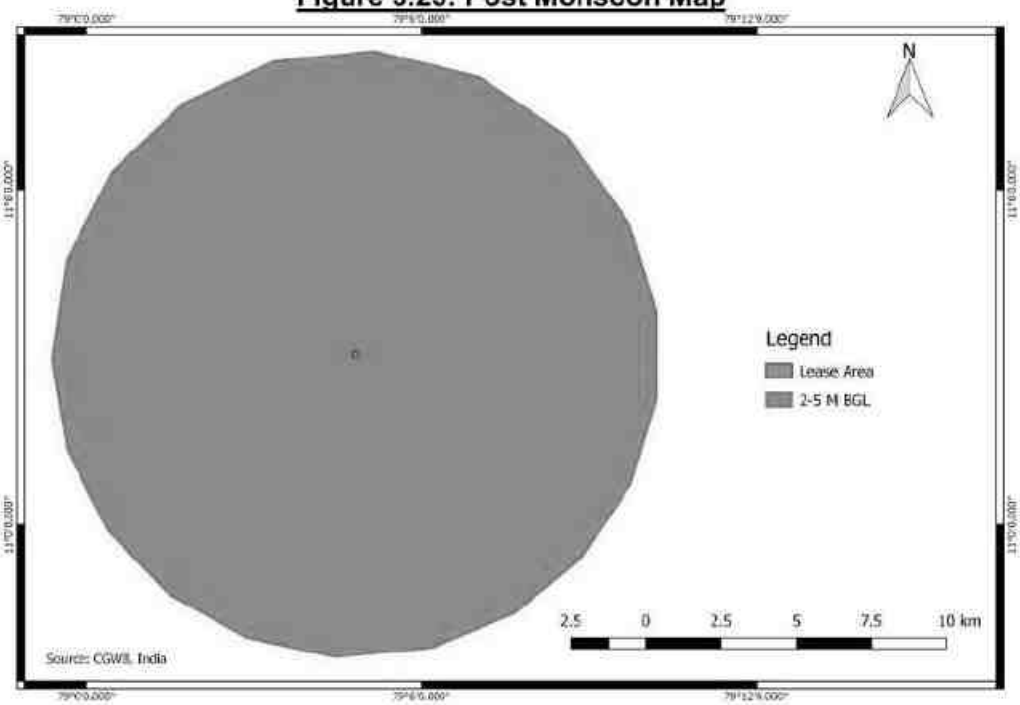


Figure 3.23: Post Monsoon Map



Ground water Condition in and around study area:

The Hydrological setting of this area is characterized generally by two aquifer system, comprising a water table aquifer in the over burden and limekankar and a semi-confined one in the sandstone occur below the limekankar formation.

The water table aquifer is normally developed for domestic water supply and small irrigation needs, through dug wells, constructed in the past. However, most of the dug wells inventoried during the field study are observed in dry condition The semi- confined aquifer is mostly developed through bore wells for agricultural purposes tapping this zone at depths of 60 to 80m. The over burden and limestone together could be grouped under one water table zone for hydrological purposes. These wells are recharged through The occurrence of groundwater mainly in the porous soil are weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer, after that there is no existence of groundwater.

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CHAPTER - IV

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

CHAPTER 4
ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 GENERAL

In this project Semi – Mechanized Open Cast mining will be carried out to quarry out Lime Kankar. Negligible environmental impact is envisaged from this project owing to the following reasons:

- Low quantum of production – Only 97,196T of Limekankar will be mined out during the period of 5 years. Out of this, 74,999T i.e; almost 77% of the total production quantity will be mined out in the first year itself.
- No Drilling and Blasting
- Less number of equipments of optimum capacity - Only 1 excavator and 2 tippers are proposed to be used in this project.
- Ultimate depth of mining is only 2.55m

Due to the above-mentioned reasons, there is no adverse impact envisaged on the environment. However, an assessment of anticipated impacts on components like air, water, noise, land, transport etc. has been carried out and the details of the same are elaborated in this chapter.

4.2 AIR ENVIRONMENT:

4.2.1 IMPACTS DUE TO PROJECT OPERATION:

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

- Excavation of material.
- Movement of HEMM such as Excavators, tippers etc.
- Loading and unloading operation
- Transportation

Besides, Gas emission will occur as a result of operation of diesel driven mining equipment, compressors, transporting vehicles, etc.

Particulate matter smaller than 10 microns, referred to as PM_{10}, can settle in the bronchi and lungs and cause health problems like Bronchitis, Emphysema, Bronchial Asthma, Irritation of mucus membranes of eyes, etc. Particles smaller than 2.5 micrometers ($PM_{2.5}$), tend to penetrate into the lungs and very small particles (<100 nanometers) may pass through the lungs to affect other organs.

Besides the above-mentioned fugitive dust emissions, atmospheric pollution can occur as a result of emission of SO_2, NO_x, CO etc., from diesel driven mining equipment, generator sets, etc. Larger suspended particles are generally filtered in the nose and throat and do not cause problems. Higher concentration of SO2, NOx, CO may cause some health effect on the human beings exposed to it. In case of this mine, the following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

Table 4.1: Impact and Mitigation Measures – Air Environment

S.No	Activity	Consequence	Mitigation Measures
1	Excavation and Loading	Dust emanation, Gaseous Emission	HEMM will be operated as per the manufacturer's guidelines
			Enclosures for operator cabin.
			Imparting sufficient training to operators on safety and environmental parameters.
			Proper maintenance of hauling equipments.
			Avoiding overloading of dumpers.
2	Transportation	Dust emanation, Gaseous Emission	Regular wetting of transport road using mobile water tanker.
			Proper maintenance of haul road and other roads
			Setting up of tyre wash facility in the transport road.
			Avoiding overloading of tippers
			Covering of loaded tippers with tarpaulins during transportation
			Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
3	Others	Dust emanation, Gaseous Emission	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area.
			Green netting will be carried out around the lease periphery on all sides.

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

Considering that the quantum of production is less, only 1 excavator, 2 tippers will be engaged. Besides, no drilling and blasting is involved. These equipments will be properly and regularly maintained. Besides, as mentioned earlier, regular vehicular emission tests will be done for the transport vehicles to ensure minimal impact due to carbon emissions. To further mediate the carbon emissions, a good greenbelt and plantation plan has been planned wherein 2200 number of plants will be planted in and around the lease area.

The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. Details of the modeling study / estimation including the modeling technique and post project air quality values are elaborated in the following paras.

4.2.2 AIR QUALITY IMPACT PREDICTION:

The model simulations are done for the air pollutant arising from the mining operations, namely, PM_{10}, $PM_{2.5}$. **Ground Level Concentration** (GLC) have been computed using hourly meteorological data.

Table 4.2: Emission Sources

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

4.2.2.1 Emission Factors

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

Table 4.3: Emission Factors

S.No	Activity	PM10	PM2.5	Unit
1	Ore Loading	1.5×10^{-3}	2.1×10^{-4}	Kg/T
2	Topsoil Removal	0.0052	0.00058	Kg/T
3	Hauling inside lease area	0.19	0.019	g/VKT

4.2.2.2 Emission Rates:

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

Table 4.4: Emission Rate

ACTIVITIES/POLLUTANTS	PM_{10} (g/sec)	$PM_{2.5}$(g/sec)
Ore Loading	0.003	0.000
Topsoil Removal	0.013	0.002
Hauling inside lease area	0.058	0.008
Total	**0.074**	**0.010**

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

B. ***Meteorological Conditions Used In Predictions:*** The hourly meteorological data has been generated for **Summer Season (March to May 2022)** and the same has been used in the predictions.

4.2.2.3 Results and Discussions

The results of the Peak GLC's for various environmental parameters with control measures are given below:

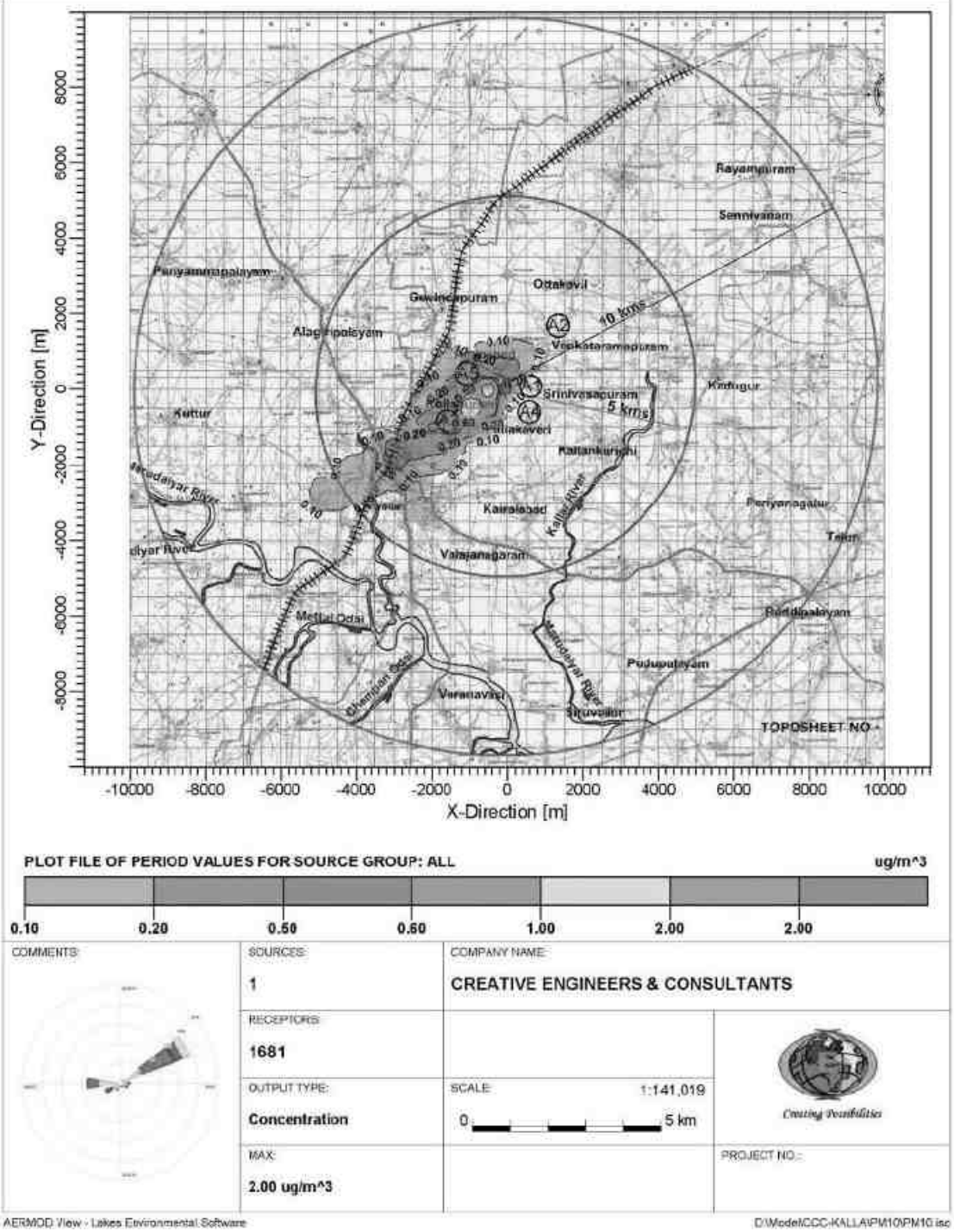
Table 4.5: Peak Incremental Concentration

S.No	Parameters	Peak incremental concentration $\mu g/m^3$
1	PM_{10}	2.00
2	$PM_{2.5}$	0.36

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

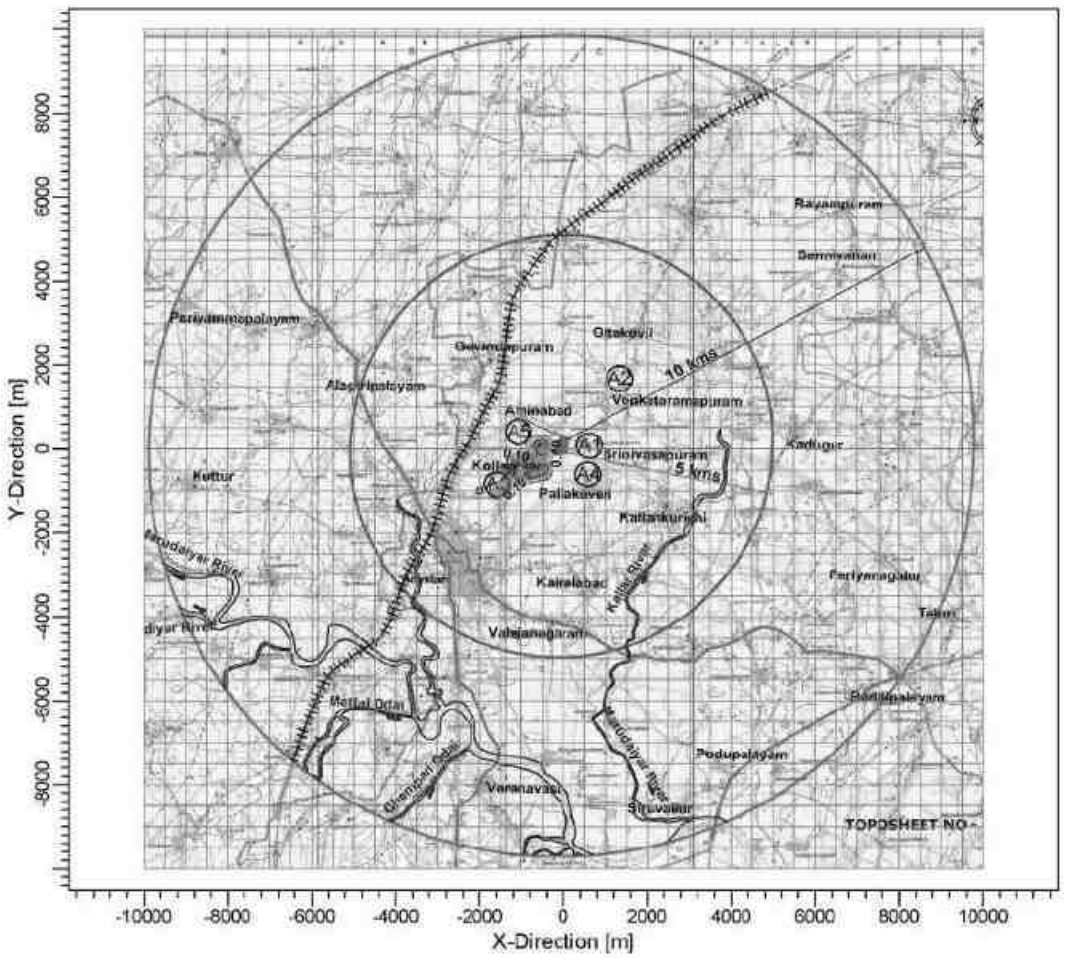
PROJECT TITLE:
MODEL

Figure 4.1: Isopleth of GLC Prediction for PM_{10}

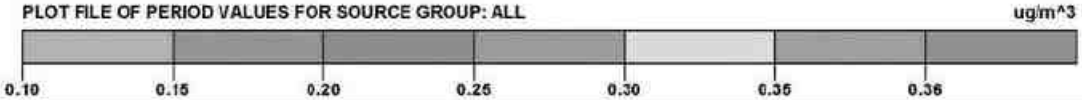


PROJECT TITLE:
MODEL-PM2.5

Figure 4.2: Isopleth of GLC Prediction for $PM_{2.5}$



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL — ug/m^3



COMMENTS	SOURCES: 1	COMPANY NAME: CREATIVE ENGINEERS & CONSULTANTS
	RECEPTORS: 1681	
	OUTPUT TYPE: Concentration	SCALE: 1:148,070 (0 — 5 km)
	MAX: 0.36 ug/m^3	PROJECT NO.:

Creating Possibilities

AERMOD View - Lakes Environmental Software — D:\Model\CCC-KALLA\PM25\PM25.isc

4.2.2.4 Predicted Ambient Air Quality:

The post project Concentrations of PM10, PM2.5, (GLC) (base line + incremental) after adopting necessary control measures is given in Table No - 4.6 to 4.7.

Table 4.6: Concentrations Of PM_{10} after Project Implementation

Values in $\mu g/m^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	Near lease area (Srinivasapuram village)	56.5	<1.0	57.5	-
2	Venketramanapuram village	57.8	<1.0	58.8	100
3	Kollapuram Village	73.2	<1.0	74.2	
4	Palla kaveri village	66.2	<1.0	67.2	
5	Amnebda village	60.7	<1.0	61.7	

Table 4.7: Concentrations Of $PM_{2.5}$ after Project Implementation

Values in $\mu g/m^3$

S. No	Location	Background Concentration	Predicted Incremental Concentration	Post Project Concentration	Statutory Limits
1	Near lease area (Srinivasapuram village)	26.0	<1.0	27.0	-
2	Venketramanapuram village	26.6	<1.0	27.6	60
3	Kollapuram Village	34.4	<1.0	35.4	
4	Palla kaveri village	32.2	<1.0	33.2	
5	Amnebda village	30.1	<1.0	31.1	

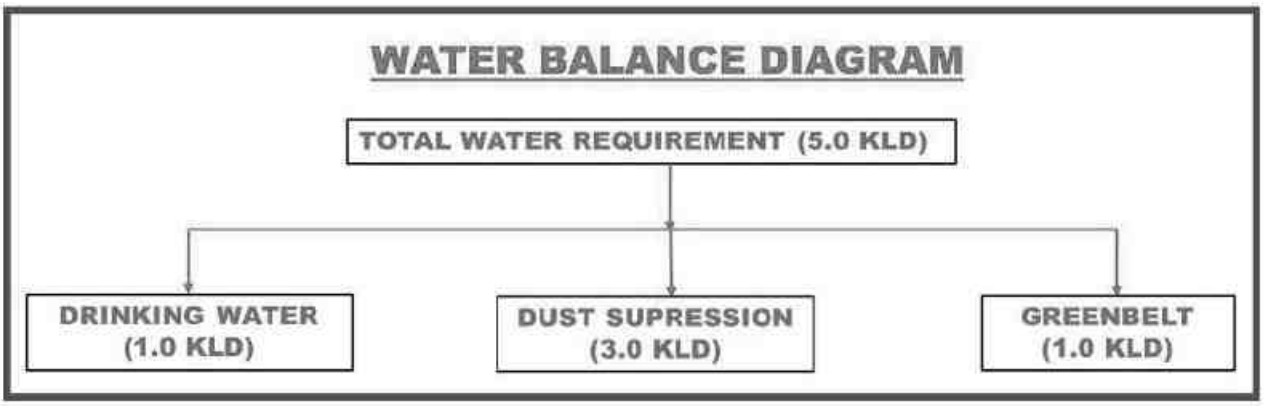
It can be seen that the resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM_{10} are in the range of 57.5 µg/m3 to 74.2 µg/m3 and with respect to PM2.5 are in the range of 27.0 µg/m3 to 35.4 µg/m3 which are within the statutory limits in each case. For preservation of environment in this mine strict enforcement of management schemes and regular air quality monitoring will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

4.3 WATER ENVIRONMENT:

4.3.1 WATER REQUIREMENT:

The total water requirement for this project will be 5.0 KLD comprising 1.0 KLD for drinking water and domestic use, 3.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. The water balance diagram for the same is shown in **Figure No 4.3.**

Figure 4.3: Water Balance Diagram



4.3.2 SOURCES OF WATER POLLUTION:

The existing water environment showing water quality at different sampling stations in the area has been described in Chapter-III.

Direct impact on human beings due to poor water quality consequent to mining operation can lead to various water borne diseases like diarrhea, jaundice, dysentery, typhoid, etc. Besides, the polluted water may not be useful for animal or human consumption, vegetation and may affect aquatic life, if effluents are not properly treated to remove the harmful pollutants.

The major sources of water pollution normally associated due to mining and allied operations are:

a. Domestic effluent.
b. Washouts from stockpile if any.
c. Disturbance to drainage course in the project area
d. Generation of mine pit water pumped out from deeper workings if any.

4.3.3 TREATMENT SCHEME:

A. Generation of domestic effluent:

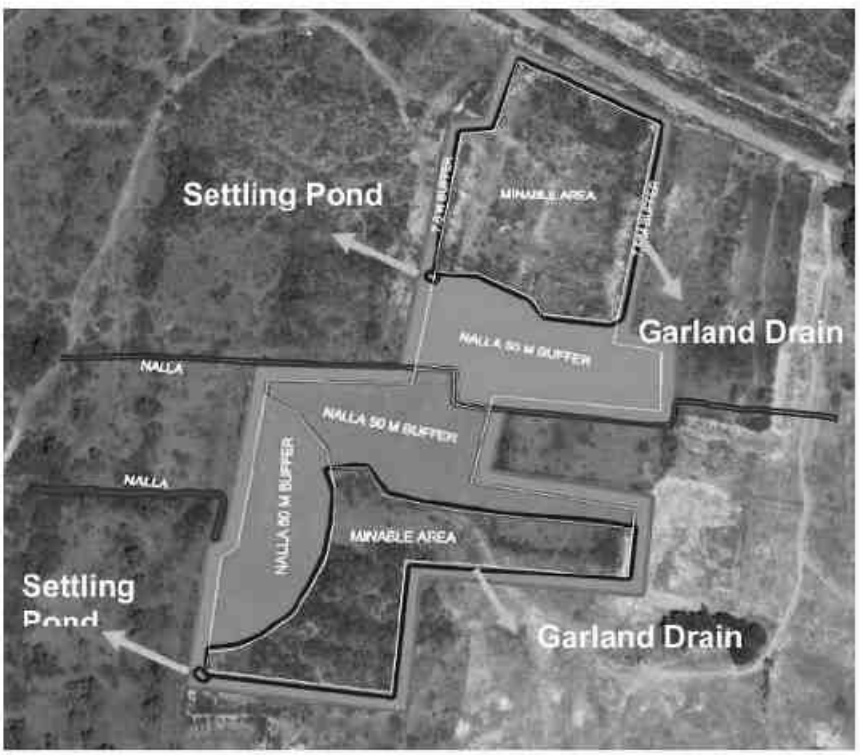
The domestic sewage to be generated from the project will be collected in septic tank with soak pits.

B. Washouts from overburden, ore stockpile, etc.

Since the entire material from the quarry face will be directly dispatched to the consumers, there will not be any stockpiles. There are no waste dumps in this quarry. As such there will not be any wash out due to stock pile or waste dumps.

The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc. Towards surface runoff management, a garland drain of length 990m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users. The surface runoff management structures diagram is given in **Figure No 4.4.**

Figure 4.4: Surface Runoff Management Structures



C. Disturbance to drainage courses

There is a Vari flowing across the lease area in the east west direction. A safety distance of 50m has been left based on precise area conditions. Earthen bund formation on both sides within the lease will be done. Besides there are also other vari courses in S.F.No.240/10 on the western side and another vari in S.F.228/10. Safety distance of 50m has been left for this also. Good plantation will also be carried out in the safety zone. Besides, There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.

PHOTOGRAPHS OF THE VARI

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

Mining operations are proposed to be quarried upto a depth of 2.55m only. The groundwater table in this area is much below this level. There is no groundwater intersection envisaged

4.3.3.1 STAGE OF GROUNDWATER DEVELOPMENT

Details of hydrological scenario of the study area were given in para 3.6, Chapter – III. The groundwater resource data of Ariyalur district was obtained from the data provided in the technical report of the National Water Mission, Ministry of Jal Shakti, Department of Water Resources, RD&GR – Notes on Ariyalur District.

Table 4.8: Ground Water Resources Estimation– Ariyalur Taluk (Ha.m)

Net Groundwater Availability	Existing Gross Draft for Irrigation	Existing Gross Draft for Domestic and industrial water supply	Existing Gross Draft for all uses	Stage of Ground water Development (%)	Category of Block
2877.84	1125.57	451.46	1577.03	55	Safe

From the table it is seen that the stage of groundwater development of Ariyalur where the study area falls is 55%. In view of this, this area can be categorized as 'Safe' from ground water development point of view. Thus there is scope for further ground water development.

4.3.4 REDUCING WATER CONSUMPTION OVER THE YEARS:

4.3.4.1 GENERAL METHODS:

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

4.3.4.2 RAINWATER HARVESTING PLAN

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

a) Development of garland drain around the quarry connected to settling tank.
b) Cleaning of drain periodically to prevent siltation
c) The supernatant clear water from the settling pond will drain into the nearby drainage on the western side of the lease.

d) Excess water, if any in consultation with local villagers and in line with government practices shall be provided to the downstream users.

4.4 NOISE AND VIBRATION:

4.4.1 NOISE ENVIRONMENT:

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

4.4.1.1 IMPACT PREDICTION DUE TO NOISE:

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

Table 4.9: Main Sources of Noise

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

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

Table 4.10: Impact of Noise Levels

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

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

In this project, there is no drilling and blasting involved. There will be hardly operation of 1 loader and 2 tippers in the lease area. Hence the effects of noise from the mining operation will be insignificant.

Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding villages.

4.4.1.2 CONTROL MEASURES FOR NOISE ENVIRONMENT:

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

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

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

4.5 LAND ENVIRONMENT:

The lease area of 4.370 Ha is a patta land in the name of the applicant Chettinad Cement Corporation Pvt Ltd. vide Patta No. 2412. The present land use pattern, and the post mining land use pattern is shown below:

Table 4.11: Land Use Table

S.No	Land Use	Present Area (Ha)	Area in use – End of 5 years period (Ha)
1	Mining \Excavation	Nil	1.910
2	Infrastructure & Road	Nil	0.010
3	Greenbelt and Plantation	Nil	2.430
4	Unutilized Area	4.370	0.000
5	Roads	Nil	0.020
	Total	**4.370**	**4.370**

4.5.1 LAND RECLAMATION:

There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. Hence, there is no external overburden dump involved. Ultimately the entire mined out area of 1.910 Ha will be used for storing rainwater. 0.03 Ha will be the mine roads & infrastructure, 2.430 Ha will be covered with vegetation.

Table 4.12: Land Use During Post Operational Period

S.No	Description	Land use (Ha.)			
		Plantation	Water body	Others	Total
1	Quarrying Pit	-	1.910	-	1.910
2	Infrastructure	0.010	-	-	0.010
3	Green Belt	2.430	-	-	2.430
4	Roads	-	-	0.020	0.020
	TOTAL	**2.440**	**1.910**	**0.020**	**4.370**

Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals.

4.6 BIOLOGICAL ENVIRONMENT:

4.6.1 EXISTING FLORA AND FAUNA:

Details of flora/fauna pattern in core and buffer zones have been described in chapter - III.

4.6.2 IMPACT OF MINING ON BIOLOGICAL ENVIRONMENT:

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

Table 4.13: Impact on Biological Environment

S.No	ISSUES	OBSERVATIONS
1	Clearance of vegetation due to mining and allied activities	No clearance of major vegetation is involved.
2	Retardation of tree growth, tip burning, etc, due to deposition of dust and the Particulate matter generated from the mining operation.	Necessary mitigative measures like dust suppression, proper maintenance of equipment's, roads will be carried out to prevent dust generation.
3	Proximity to national park/ wildlife sanctuary/reserve forest/mangroves/Coastline/estuary/sea	The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc.
4	Release of effluents into water body that also supplies water to wildlife	There is no proposal to discharge any effluent into nearby water bodies.
5	Proposed project could increase siltation that would affect nearby biodiversity area	Surface runoff management structures like garland drain, settling pond etc. as explained above will be constructed and as such there will not be any appreciable impact on surface water quality which in turn can affect the bio diversity of the area.
6	Activities of the project affects the breeding/nesting sites of birds and animals	In the present ML area, there is no wetland. A migratory bird needs sufficient wetlands with sufficient food, shelter, roosting places and nesting places which is not possible here.
7	Located near an area populated by rare or endangered species	There are no Schedule I animals
8	Risk of fall/slip or cause death to wild animals due to project activities	In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent falling of animals in the mine pits.
9	Project affects the forest-based livelihood/any specific forest product on which local livelihood depends	Not applicable
10	Project likely to affect migration routes	No migration routes are in the area.
11	Project likely to affect flora of an area, which have medicinal value	No such significantly important medicinal value species within the ML area and its nearby region.
12	The project likely to affect wetlands, fish breeding grounds, marine ecology	There are no any wetlands, fish breeding grounds, marine ecology nearby the ML area which will be affected due to this project.
13	Project affects the Agriculture, Forestry and Traditional Practices	Due to poor soil condition and non-availability of perineal water source, no major agricultural activity is carried out in and around the lease area. Only patches of plantation are observed in few places in the monsoon season based on water availability.
14	Impact on soil health and biodiversity	The lease area is covered with grasses and bushes only (Photograph of the site attached in Chapter-II). Besides, there is no waste generation, disposal or stacking involved in this project. As such no loss of soil health and Bio-diversity is expected.

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

4.6.3 CONTROL MEASURES FOR BIOLOGICAL ASPECTS:

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

4.6.4 GREEN BELT & PLANTATION:

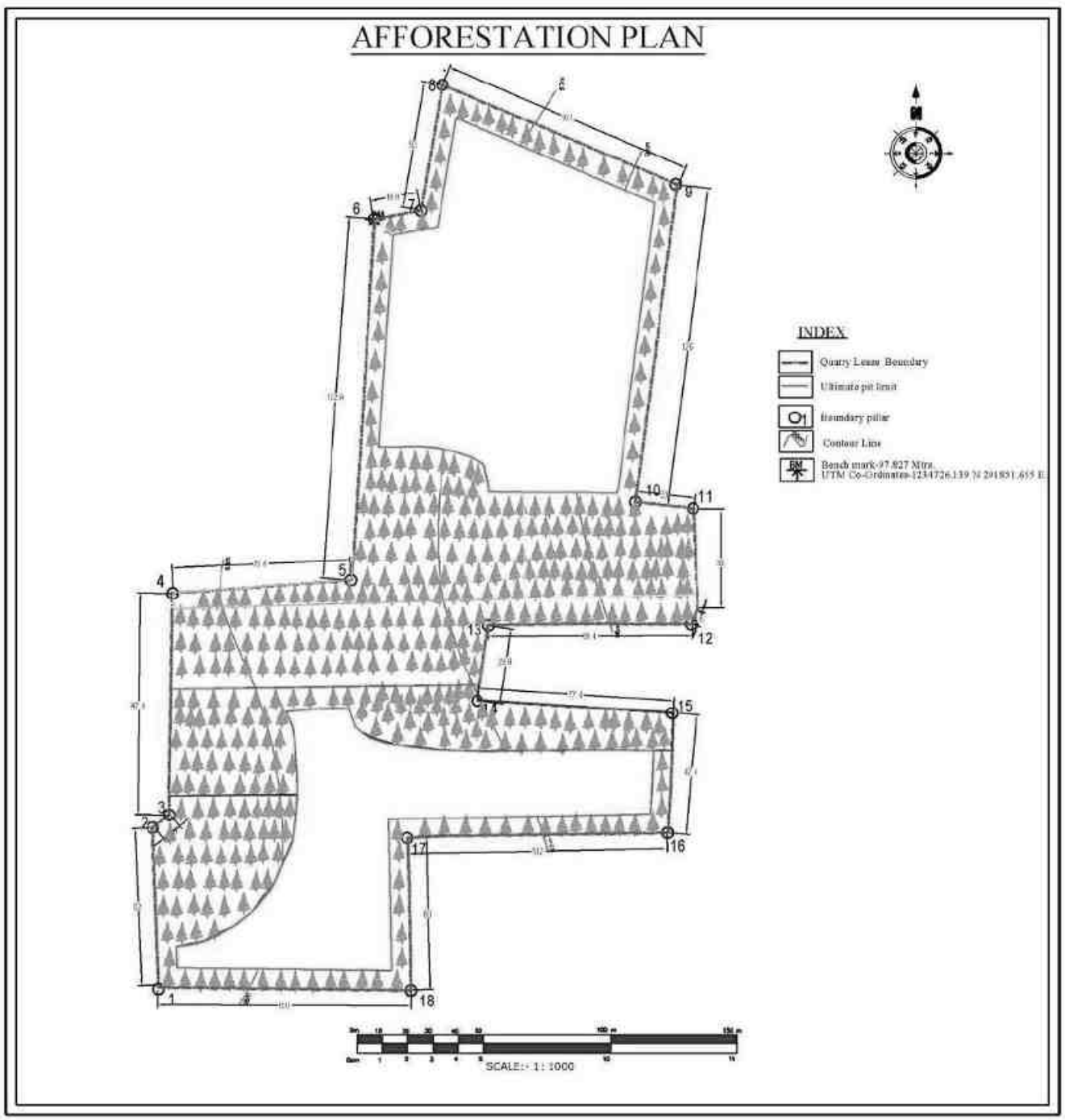
In the lease area, safety barrier 7.5m around the periphery and 50m safety zone for vari and road. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2200 trees will be planted in and around the lease area.

Table 4.14: Proposed Plantation

Year	No. of tress proposed to be planted	Name of the species
I	440	Pungai, Vagai, Vembu, Manjal konrai, Naval, Puvarasu, etc.,
II	440	
III	440	
IV	440	
V	440	
Total	**2200**	

Ultimately the entire mined out area of 1.910 Ha will be used for storing rainwater. 0.03 Ha will be the mine roads & infrastructure, 2.430 Ha will be covered with vegetation. The post mining land use plan showing afforestation and water body is shown in **Figure No- 4.5.**

Figure 4.5: Mine Closure Plan



4.7 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is in the proponent's possession. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here. The cart track and vari in proximity to the lease area not be disturbed by the proponent and sufficient safety barrier and protective measures has also been considered.

The mining operations in the proposed mine will employ about 14 persons directly and about 50 persons on indirect basis through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations as shown under.

- Project related logistical operations for transport
- Various trading services for consumer goods, spare parts, sundry items, etc.
- Contractual services connected with the project.
- Green belt and horticultural works in the project.
- Casual labor needs for various activities.

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

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

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

Table 4.15: CER Cost

Project Cost (Rs.)	Rs. 50,00,000 /-
CER Cost Requirement (2% of the Project Cost) (Rs.)	Rs. 1,00,000/-
Revised CER cost allocated (Rs.)	Rs. 1,00,000/-

However, towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in provision of facilities in nearby Government School.

4.8 OCCUPATIONAL HEALTH AND SAFETY:

4.8.1 BASELINE STATUS:

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

4.8.2 IMPACTS ON OCCUPATIONAL HEALTH DUE TO PROJECT OPERATIONS:

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

- Dust related pneumonia
- Tuberculosis
- Rheumatic arthritis
- Segmental vibration
- Miner's Nystagamus

4.8.3 MITIGATIVE MEASURES FOR OCCUPATIONAL HEALTH:

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

- Water sprinkling on haul roads etc.
- Green belt creation to arrest dust and reduce noise propagation.
- Acceptance of good control measures for reducing air pollution, as mentioned earlier in the chapter.
- Control of noise levels through good preventive maintenance of machineries, green belt creation, provision of ear plug to workers, etc.

- In addition to above measures, the following remedial steps are being and will be enforced to ensure minimization of occupational health and safety problems.
- Medical examination of workers by qualified doctors, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

4.8.4 MITIGATIVE MEASURES FOR SAFETY ASPECTS:

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

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

4.9 LOGISTICAL SYSTEM:

The limestone mined out from this quarry will be transported to the cement plant of the proponent.The expected peak transport will be as follows:

Table 4.16: Details of Transportation

Sl.no	Particulars of activity	Quantity
A	Maximum Material Transported (T/year)	74,999.08
B	No of days in a year	300
C	Transport hours per day	8
D	Truck capacity in T	20
	Trips per hour	2 Trips/hr

From the above table it is seen that there will be about 2 trips per hour during the first year. Subsequently as the production will reduce in the forthcoming years, the number of trips will also reduce to 1 Trip per hour. The transport route can easily absorb this negligible traffic due to

this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:

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

4.10 WASTE MANAGEMENT:

Solid Waste: Since the entire mined out material will be used there will not be any solid waste generation from this project.

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

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

- Ensuring availability of different colour bins for collection of different types of waste.
- Storing of Hazardous waste material in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc.

- Ensure that there are no leakages/spillages of hazardous wastes.
- Ensuring that the fire extinguisher system is available at hazardous material storage area.

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

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

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CHAPTER - V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

CHAPTER 5

ANALYSIS OF ALTERNATIVES

5.1 ALTERNATE TECHNOLOGY:

This is a proposed quarry in which Semi – Mechanized Open Cast mining without drilling and blasting will be carried out. As this method is techno economically proven, consideration of an alternate technology is not warranted.

5.2 ALTERNATE SITE:

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

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CHAPTER - VI

ENVIRONMENTAL MONITORING PROGRAMME

CHAPTER 6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 GENERAL

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

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

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

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

6.2 MONITORING SCHEDULES FOR VARIOUS PARAMETERS

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

Table 6.1: Environmental Monitoring Schedule

S.No	Environmental Parameters	Parameters to be monitored	Monitoring area coverage /locations	Frequency of monitoring
1	Air Quality	Sulphur dioxide (SO_2), Oxides of Nitrogen (NO_2), Respirable Particulate Matter ($PM_{2.5}$ and PM_{10}).	2 locations in the buffer zone and 1 work zone locations.	Yearly Once
2	Water Quality	General, Physical, and chemical parameters	Ground Water samples (around the project area) and Mine Pit water samples	Pre and Post Monsoon
3	Noise	Leq. Lmax Lmin, Leq Day & Leq Night dB(A)	Work zone locations and buffer zone villages	Yearly Once
4	Socio Economic Environment	Socio Economic Survey, Review of implementation of CER activities proposed	Buffer Zone	Yearly basis
5	Occupational Health	Occupational health survey to detect early incidence of diseases, Audiometry Test for workers in noise prone area and review of safety matters.	Staff and Workers involved in the project	Once in a year
6	Greenbelt	Maintenance	Within the lease area	Regularly

6.3 LEGISLATIVE AND REGULATORY FRAME WORK:

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

Table 6.2: Environmental Standards

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

Table 6.3: National Ambient Air Quality Standards

[भाग III—खण्ड 4] भारत का राजपत्र : असाधारण 3

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

No. B-29016/20/90/PCI-I.—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	- Improved West and Gaeke
		24 hours**	80	80	-Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 hours**	80	80	- Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m³	Annual*	60	60	- Gravimetric - TOEM
		24 hours**	100	100	- Beta attenuation
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m³	Annual*	40	40	- Gravimetric - TOEM
		24 hours**	60	60	- Beta attenuation
5	Ozone (O_3) µg/m³	8 hours**	100	100	- UV photometric - Chemiluminescence
		1 hour**	180	180	- Chemical Method
6	Lead (Pb) µg/m³	Annual*	0.50	0.50	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours**	02	02	- Non Dispersive Infra Red (NDIR) spectroscopy
		1 hour**	04	04	
8	Ammonia (NH_3) µg/m³	Annual*	100	100	-Chemiluminescence -Indophenol blue method
		24 hours**	400	400	

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C_6H_6) $\mu g/m^3$	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m^3	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m^3	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m^3	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

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

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

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

SANT PRASAD GAUTAM, Chairman
[ADVT-III/4/184/09/Extv.]

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

Table 6.4: IS – 10500 :2012 Standards

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

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

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

Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts

(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, *Max*	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, *Max*	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, *Max*	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, *Max*	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, *Max*	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, *Max*	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl_2), mg/l, *Max*	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, *Max*	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, *Max*	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, *Max*	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, *Min*	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, *Max*	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, *Max*	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, *Max*	0.1	0.3	IS 3025 (Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, *Max*	0.5	No relaxation	Clause **6** of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO_3), mg/l, *Max*	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C_6H_5OH), mg/l, *Max*	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, *Max*	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, *Max*	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO_4) mg/l, *Max*	200	400	IS 3025 (Part 24)	May be extended to 400 provided that Magnesium does not exceed 30
xxi)	Sulphide (as H_2S), mg/l, *Max*	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, *Max*	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as $CaCO_3$), mg/l, *Max*	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, *Max*	5	15	IS 3025 (Part 49)	—

NOTES

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

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

Table 6.5: Noise Level Standards

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

Note :

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

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

A "decibel" is a unit in which noise is measured.

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

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

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

Exposure time (in hr. per day)	Limit in dB(A)
8	**90**
4	**93**
2	**96**
1	**99**
½	**102**
¼	**105**
1/8	**108**
1/16	**111**
1/32	**114**

6.4 ENVIRONMENTAL MONITORING COST:

For environmental monitoring budgetary allocation is also made. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

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CHAPTER - VII

ADDITIONAL STUDIES

CHAPTER 7
ADDITIONAL STUDIES

7.1 GENERAL:

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

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

7.2 PUBLIC CONSULTATION:

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

7.3 RISK ASSESSMENT:

In this project no major risk is envisaged as it is a very simple operation of small magnitude with less period of working. However, a risk analysis is carried out and given below:

S.No	Factors	Causes of risks	Control measures
1.	Removal of material	a) Bench may slide due to its unconsolidated nature. b) Vibration due to movement of vehicles in the benches.	a) There is no bench proposed in this project. b) Only one hydraulic excavator/JCB is proposed. No impact envisaged.
2.	Drilling	a) Due to high pressure of compressed air hoses may	• No drilling is involved in this project.

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

his being a small-scale project that too working in a safe area, no major disaster is expected. The management and the EMC will be able to deal with the situations efficiently keeping in view of the likely sources of dangers in the mine.

7.4 REHABILITATION AND RESETTLEMENT (R & R) PLAN:

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

7.5 MINE CLOSURE PLAN:

In the mine closure stage all necessary measures will be taken as per Act & Rules, There is no proposal for back filling, reclamation and rehabilitation. The quarried pits after the end of life of mine will be properly fenced all around to prevent inherent entry of public and cattle and all the statutory requirements will be fulfilled. The mine closure plan is provided in **Figure 4.5.**

7.6 CUMULATIVE IMPACT STUDY:

As mentioned earlier, this is a Limekankar quarry located in Kallankurichi village, Ariyalur Taluk & District, Tamil Nadu. The details of the other quarries located within the 500m radius of the project considered for cumulative impact study now (**Annexure-3)** has been provided below in Table No.7.1 and Figure No.7.1 below:

Figure 7.1: Vicinity Map

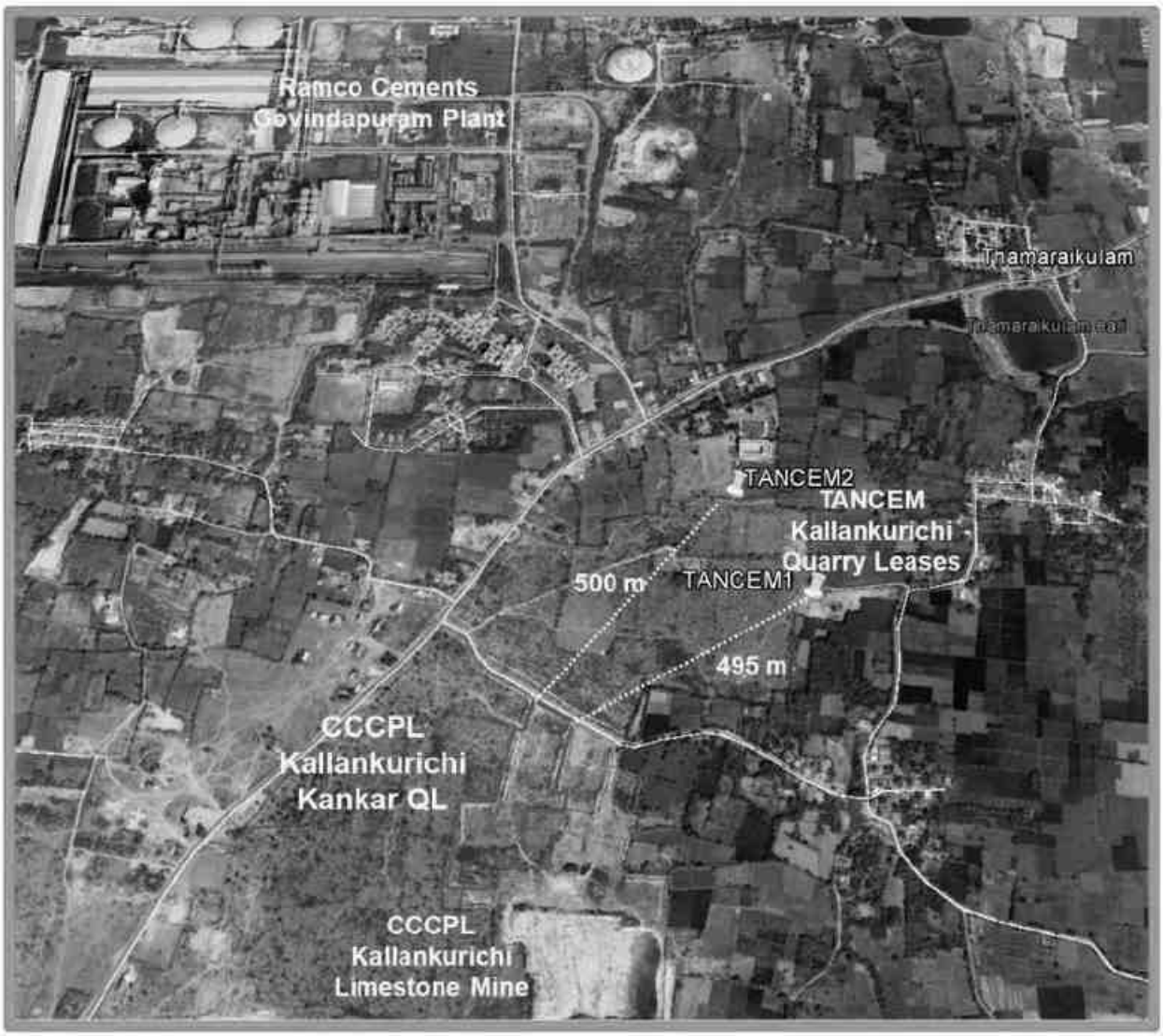

Table 7.1: Details of quarries within 500m radius

Sl.No	Name of the Quarry Owner	Taluk & Village	S.F.No.	Hectares	Name of the Mineral	Lease Period
Existing Quarries						
1.	Chettinad Cement Corporation Private Ltd.	Ariyar Talukm Kallankurichi Village	245/1A,1B etc.	4.92.5	Limestone	08.07.2013 – 07.07.2033
Proposed Mines						
1	Tamilnadu	Ariyar	8/1 (Part)	4.64.5	Lime Kankar	-

	Cement Corporation Ltd.	Talukm Kallankurichi Village	& 13 (Part)			
2	Tamilnadu Cement Corporation Ltd.	Ariyar Talukm Kallankurichi Village	11/4, 13 (Part)	3.96.5	Lime Kankar	-
Expired and Abandoned Mines						
--Nil--						
Total				**13.535**		

From that above it is seen that, although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius along with this subject project works out to >5 Ha.

As such cluster situation applicable and this EMP is prepared. There are no working quarries in the area. The baseline monitoring carried out for this project reflects the cumulative impact of the existing scenario.

Since the production from this lease is verfy low mainly in year 1 only involving simple mining operation with no Drilling and Blasting for a shallow depth of 2.55m only no significant impact on cumumative basis is expected to be contributed from this lease.

* * * * * * * *

CHAPTER - VIII

PROJECT BENEFITS

CHAPTER 8
PROJECT BENEFITS

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

- Direct employment to 14 people.
- Indirect employment to 50 people.
- Financial gains for the governments, through collection of various taxes like royalty, GST, etc.,
- Increase in General Awareness of the People.
- Continual improvements of the local amenities for the local society
- Improvement of the General Living Standard of the People in the Vicinity
- Overall Improvement in HDI (Human Development Index)
- Growth of Allied Industries in the Area.
- Improvement in Per Capita Income.
- Providing certain facilties for the local schools and panchyats

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

By means of carrying out the socio-economic development activities, local community development is expected. Towards the same, the proponent has planned to allocate Rs.1 Lakhs for various activities under CER. The activities will be implemented once the mining operations commence. From the CER activities allocated for various social welfare activities, the villages near the lease area will be benefited.

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CHAPTER - IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

CHAPTER 9
ENVIRONMENTAL COST BENEFIT ANALYSIS

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

ToR for this project has been received from SEIAA, Tamil Nadu vide their letter No. Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 dated 24.09.2020. Environmental cost benefit analysis is not prescribed in the terms of reference. Hence, it is not applicable for this project.

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CHAPTER - X

ENVIRONMENTAL MANAGEMENT PLAN

CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION:

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

10.2 COMPONENTS OF THE ENVIRONMENTAL MANAGEMENT PLAN:

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

10.2.1 ENVIRONMENTAL POLICY:

The proponent has frame a well-planned Environment, Health and Safety Policy. The policy is provided below in Figure No.10.1. Additionally, the Environmental management cell as described below in Table No. 10.1 below will also ensure the following in line with their policy:

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

- Ensuring that all mining operations are strictly conducted keeping with regulatory standards & maintaining safe working environment in the area.
- Providing periodical training on safety, Health, & Environment to all employers.
- Any infringement / violation of any rule or unsafe mining operations should be reported mines manager, who will take immediate corrective measures for avoiding major disasters. The report will ultimately reach the owner through upwardly hierarchical communicative channels from the lowest level to superior levels in a quick time bound duration.
- Remedial measures for such violations and deviations should be taken care by the mines manager to avoid any hazards or disasters in the mine and nearby areas. The persons responsible for such violations will be punished through appropriate disciplinarily penal actions.
- The EC conditions and stipulations will be strictly observed by Mines manager of the mine.

Figure 10.1: Environment, Health and Safety Policy

Chettinad cement

Environment, Health and Safety Policy

Our Environment, Health and Safety responsibilities are focused by an objective to protect people we work with, Environment and society at large. It is integral to the way we do our business activities.

1. We will work to protect people and environment with a basic belief that all injuries, emission and discharge can be prevented.
2. We are committed to prevent work place accidents and pollution, promote employee health and well-being and reduce the environmental impact in our business activities.
3. We will continue to identify, evaluate and control our safety & Occupational health hazard/risk and environmental impact and report progress.
4. We are committed to improve and skill among Employees and Partners through training to demonstrate their involvement and accountability to achieve robust safety, Occupational health and Environmental practices across our areas of operation.
5. We are committed to regularly set and review objectives and targets for continual improvement in the work environment and health & safety performance and go beyond compliance.

We are responsible and accountable for deployment of this policy and believe that Environment, Occupational Health & Safety is a core value of our company and integral part of all our business activities.

COO

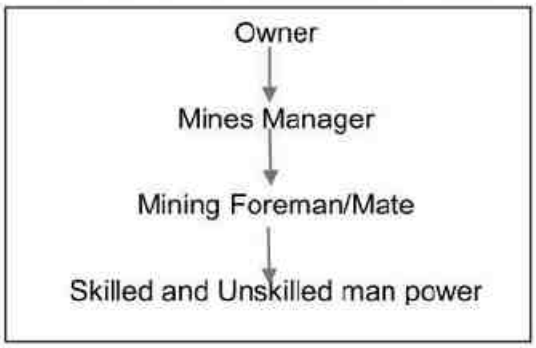
Cement Business

Date: 01.12.20

10.2.2 ENVIRONMENTAL MANAGEMENT CELL:

The Mines Manager/Mine Incharge will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. The organizational chart for the same has been provided below:

Figure 10.2: Organization Chart



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

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

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

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

10.2.3 ENVIRONMENTAL MANAGEMENT PLAN:

10.2.1.1 General:

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

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

10.2.2.2 Air Quality:

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

- Regular water sprinkling in the transport roads using mobile tankers for dust suppression.
- Provision of dust filters / mask to workers working at highly dust prone and affected areas.
- Proper maintenance of haul roads, HEMM and dumpers.
- Covering of loaded tippers with tarpaulins during transportation
- Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
- Besides, there will be good green belt cover will be developed around mine periphery and in safety zone.
- Setting up of tyre washing facility in the transport road.
- Fencing with Green netting will be carried out on all sides of the lease area.

10.2.2.3 Water Environment:

There will be no process effluent generated from this project. The domestic sewage to be generated will be collected in septic tank with soak pit arrangements. Besides, there will be no waste dumps or stockpiles within the lease area as the entire material will be directly dispatched to the consumers. Since, the maximum depth of working is limited only up to 2.55 m, there will not be much impact on water environment.

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

There is a Vari flowing across the lease area in the east west direction. A safety distance of 50m has been left based on precise area conditions. Earthen bund formation on both sides within the lease will be done. Besides there are also other vari courses in S.F.No.240/10 on the western side and another vari in S.F.228/10. Safety distance of 50m has been left for this also. Good plantation will also be carried out in the safety zone. Besides, There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.

10.2.2.4 Noise Environment:

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

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

10.2.2.6 Biological Environment:

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

In the lease area, safety barrier 7.5m & 50m is left around the periphery. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. This will boost the biological, visual and aesthetic outlook of the area. Elaborate details regarding the same is provided under section 4.6.4, Chapter-IV.

10.2.2.7 Socio-Economic Environment:

The proposed project operation will provide positive impacts in the region on the employment area as well as on physical and social infrastructural status. Many other tangible benefits will be gained by the local people in the surrounding areas due to ancillary units, trading operations, contractual needs, casual labor, green belt development, etc. Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1 Lakh under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner.

10.3 ENVIRONMENTAL POLLUTION CONTROL COST:

In this proposed quarry Implementation of environmental control measures as stated above involves capital as well as recurring expenses. The probable capital and recurring environmental control cost are calculated and given below **Table No – 10.1**

Table 10.1: Environmental Control Cost

Sl. No	Mitigation Measure	Capital cost	Recurring Cost /Annum
	Air Environment		
1	Compaction, gradation and drainage on both sides for Haulage Road		0.44
2	Water Sprinkling Arrangements		0.50
3	Air Quality will be regularly monitored as per norms within ML area & Ambient Area		0.50
6	No overloading of trucks/tippers/tractors-Manual Monitoring through Security guard		0.05
7	Stone carrying trucks will be covered by tarpaulin		0.10
8	Enforcing speed limits of 20 km/hr within ML area by installation of speed governer	0.10	0.00
9	Regular monitoring of exhaust fumes as per RTO norms		0.05
10	Regular sweeping and maintenance of approach roads near ML Area		0.87
11	Installing wheel wash system near gate of quarry	0.50	0.20
	Sub-Total (A)	**0.60**	**2.71**

Noise Environment			
12	Source of noise will be during operation of transportation vehicles, HEMM- For this proper maintenance will be done at regular intervals.	Will be part of Operating Cost	Will be part of Operating Cost
13	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done		
14	Adequate silencers will be provided in all the diesel engines of vehicles.		
15	It will be ensured that all transportation vehicles carry a fitness certificate.		
Sub-Total (B)			
Water Environment			
21	Surface Runoff Management Structures	0.32	0.05
Sub-Total (C)		**0.32**	**0.05**
Implementation of EC, Mining Plan & DGMS Condition			
22	Waste management (Spent Oil, Grease etc.,) - Provision for waste collection and disposal through authorized agency	0.25	0.20
23	Installation of dust bins	0.05	0.02
24	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions - Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	0.10	0.01
25	Workers will be provided with Personal Protective Equipment's	0.56	0.14
26	Health check up for workers will be provisioned		0.14
27	First aid facility will be provided		0.17
28	Mine will have safety precaution signages, boards.	0.10	0.02
29	Barbed Wire Fencing to quarry area will be provisioned.	4.50	0.10
30	No parking will be provided on the transport routes. Separate provision will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management		0.10
31	Installation of CCTV cameras in the mines and mine entrance with DVR, Monitor with internet facility	0.30	0.05
32	Implementation as per Mining Plan and ensure safe quarry working - Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961		7.80
Sub-Total (D)		**5.86**	**8.75**
Green Belt Development			
34	Green belt development (1200 Inside Lease Area)	2.40	0.36
35	Plantation (1000 Outside Lease Area)	3.00	0.30
Sub-Total (E)		**5.40**	**0.66**
Grand Total		**12.18**	**12.18**

Towards EMP measures, Rs.12.18 lakhs is allocated under capital cost. Besides, Rs.12.18 lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue.

10.4 CONCLUSION:

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

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CHAPTER-XI

SUMMARY AND CONCLUSION

CHAPTER 11

SUMMARY & CONCLUSION

11.1 INTRODUCTION:

Chettinad Cement Corporation Pvt. Ltd. proposed to operate Lime Kankar Quarry Lease over an area of 4.370 Ha in Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu and has initiated action towards obtaining environmental clearance.

This project involves the production of 97,196 Tonnes of Lime Kankar upto a depth of 2.55m bgl for the period of 5 years. It will meet the part requirement of the Kilapaluvur Cement Plant of the proponent.

Although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius cluster along with this subject project works out to >5 Ha. Hence, this proposal is considered under Category – B1 and as per MoEF & CC notification necessitates preparation of EIA/EMP report and public hearing. The details of the quarries located within the 500m radius of the project is given vide **Annexure-3.** A cumulative impact study has been carried out and furnished in **Para 7.3, Chapter-VII.**

This EIA/EMP report is prepared based on standard and additional Terms of Reference issued by SEIAA, Tamil Nadu vide letter no. SEIAA-TN/F.No.7193/SEAC/ToR-760/2020 dated 24.09.2020 and Extension ToR vide letter no .SEIAA-TN/F.No.7193/SEAC/TOR-760/Extn, dated : 08.08.2023 and is in conformance of the generic structure prescribed by MOEF&CC in their notification of September 2006 and the approved mining plan.

11.1.1 STATUTORY APPROVALS:

S.No	Statutory Approval	Authority	Letter Number and Date	Reference
1.	**Precise Area Communication Letter**	Industries (MMC2) Department	Lr.No.9020/MMC.2/2018-1 dated 12.10.2018	**Annexure-1**
2.	**Mining Plan Approval**	Department of Geology & Mining,	1507/MM10/2018/LK/Ary, dated 09.01.2019	**Annexure-2**
3.	**Details of other quarries within 500m radius**	Department of Geology & Mining,	Rc.No.77/G&M/2016 dated 27.08.2018	**Annexure-3**

11.1.2 ENVIRONMENTAL CLEARANCE APPLICATION:

Particulars	Details
Terms of Reference	Received from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.7193/SEAC/ToR-760/2020. Dated:24.09.2020. and Extension ToR dated 08.08.2023.
Baseline Data Collection	Carried out by Creative Engineers & Consultants , Chennai for Summer Season (March – May 2022)

11.2 SALIENT FEATURES OF THE PROJECT:

Table 11.1: Site Details

Location	Kallankurichi Village, Ariyalur Taluk and District, Tamil Nadu
Survey No.	226/2B, 226/2C, 226/2D, 241/1A, 241/1B, 241/2, 241/3A, 241/3B, 241/3C, 241/4, 241/5, 241/6A, 241/6B, 241/7, 241/8, 242/1, 242/2, 242/3, 242/4, 242/5, 242/6, 242/9, 242/10A, 242/10B1(P) and 242/10B2
Coordinates	**Latitude:** 11°09'46.692" - 11°09'58.092" N **Longitude:** 79°05'41.346 - 79°05'48.888" E
Nearest Highway	NH-136 (Ariyalur – Perambur) – 1.9Km (SW) SH-139 (Ariyalur – Reddipalayam) – 4.3Km (S) NH-81 (Chidambaram – Trichy) – 8.9Km (SE)
Nearest Village	Aminabad – 0.8Km (NW)
Nearest Town	Ariyalur – 2.5Km (SW)
Nearest Railway Station	Ariyalur Railway Station – 3.3Km (SW)
Nearest Airport	Trichy Airport – 60 Km (SW)
Topography	Plain terrain, dry lands with scarce vegetation.
Accessibility	The lease area can be approached from Kollapuram – Illuppaiyur Road that is connected to NH-136 (Ariyalur – Perambur) on the southern side of the lease area.
Drainage	Kallar River – 3.4Km (E) There is a Vari flowing across the lease area in west to east direction. Another Vari is flowing adjacent the QL area in western side

Table 11.2: Environment Setting of The Study Area

S.No	Particulars	Name	Distance	Direction
1	Nearest highway	NH-136 (Perambalur – Keezhapalur)	1.90Km	SW
		SH-139 (Ariyalur – Reddipalayam)	4.3Km	S
		NH-81 (Chidambaram – Trichy)	8.9Km	SE

2	Nearest Railway Station	Ariyalur Railway Station	3.3Km	SW
3	Nearest Airport	Trichy Airport	60Km	SW
4	Nearest villages	Pallakaveri	0.8Km	SE
		Venkataramapuram	0.9Km	NE
		Kollapuram	1.0km	SW
		Aminabad	0.8Km	NW
5	Nearest Town	Ariyalur	2.5Km	SW
6	Nearest Major Water Bodies	Kallar River	3.4Km	E
		Vanchyiam odai	3.7Km	SW
		Chempan Odai	7.5Km	NW
		Mettal odai	6.3Km	SW
		Marudaiyar River	8.4km	SW
		Kundiyar River	9.5km	SW
7	Reserved / Protected Forests	Nil	--	--
8	Notified Archaeologically important places, Monuments	Nil	--	--
9	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972*	Nil	--	--
10	Defence Installations	Nil	--	--
11	Seismic Zone	Zone-II (Least Active)	--	--
12	Other Industries in the study area	Mining leases of other companies, cement plant are present.		

Table 11.3: Technical Description

PARTICULARS	DETAILS
Geological reserve	2,21,231 T
Mineable reserve	97,196 T
Method of Mining	Opencast method without drilling and blasting will be carried out.

Production

Year	Block	Lime Kankar ROM (Tonnes)	Top Soil (Tonnes)	Ore: OB Ratio
I	Block I & II	74,999.08	8,888.76	1 : 0.1185
II	Block II	9,999.42	1,185.1	1 : 0.1185
III	Block II	4,999.18	592.48	1 : 0.1185
IV	Block II	4,999.18	592.48	1 : 0.1185
V	Block II	2,199.24	260.64	1 : 0.1185
Total		**97,196.10**	**11,519.46**	**1 : 0.1185**

PARTICULARS	DETAILS
Waste Generation and Management	There is no generation of mineral rejects in the applied area. The topsoil that would be generated during the present plan period is proposed to be utilized for afforestation.
Ultimate Depth	2.55m
Man power	14 People directly and more than 50 people indirectly
Mode of transport	By Road
Water requirement	5 KLD
Source of water	The required water will be procured from outside agencies.
Power requirement	All the equipment will be diesel operated. No electricity is needed for mining operation. The minimum power requirement for office, etc will be met from state grid.
Life of the mine	5 Years
Project cost	Rs. 50,00,000 /-

11.3 EXISTING ENVIRONMENTAL SCENARIO:

11.3.1 GENERAL:

The studies and data collection have been carried out systematically and meticulously as per relevant IS codes, CPCB and MoEF&CC guidelines and as per approved ToR during **Summer Season (March 2022 to May 2022**) For the purpose of this study, the area has been divided into two zones, namely, core and buffer zones. Core zone is considered as the total lease area, while buffer zone encompasses an area of 10 km radius distance from the periphery of core zone.

11.3.2 SOCIO-ECONOMIC STATUS:

The proposed Roughstone and gravel quarry is located in in Kallankurichi Village, Ariyalur Taluk, & District. Based on 2011 census data, in the 10km radius there are 32 Rural villages from Ariyalur Taluk, & District.

Table 11.4: Social, Economic And Demographic Profile of the Study Area

Details	Population	Percentage
A. Gender-wise distribution		
Male Population	51773	49.75
Female Population	52303	50.25

Details	Population	Percentage
Total	**104076**	**100**
B. Caste-wise population distribution		
Scheduled Caste	25922	24.91
Scheduled Tribes	527	0.51
Other	77627	74.59
Total	**104076**	**100**
C. Literate and Illiterate population		
Literate Males	36556	35.12
Literate Females	27334	26.26
Total Literate Population	**63890**	**61.39**
Illiterate Males	15217	14.62
Illiterate Females	24969	23.99
Others Population	**40186**	**38.61**
Total	**104076**	**100**
D. Occupational structure		
Main workers	43838	42.12
Marginal workers	9923	9.53
Total Workers	**53761**	**51.66**
Total Non-workers	50315	48.34
Total	**104076**	**100**

11.3.2.1 SAMPLE SURVEY:

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

11.3.3 EXISTING ENVIRONMENTAL QUALITY:

Baseline monitoring was carried out during Summer Season (March 2022 to May 2022). The details of the same are provided below:

Table 11.5: Baseline Data

A) METEOROLOGICAL DATA	**Monitoring Location** - Near Mine Lease Area	
PARAMETERS	**MINIMUM**	**MAXIMUM**
Temperature in °C	20.0	41.3
Humidity in %	26.0%	92.7%
Wind speed Km/Hr	<1.8	14.0

Predominant wind direction (From)	NE		
B) AMBIENT AIR QUALITY	**Monitoring Location –** 5 locations		
PARAMETER	**RESULT (µg/m3)**		***LIMIT (µg/m3)**
Location	**Core Zone**	**Buffer Zone**	
Particulate Matter (Size <10 µm)	40.4 – 56.5	42.5 – 73.2	100
Particulate Matter (Size <2.5 µm)	18.6 – 26.0	19.6 – 34.4	60
Sulphur Dioxide (as SO_2)	3.9 – 8.5	4.7 – 10.4	80
Nitrogen Dioxide (as NO_2)	7.9 – 10.9	8.2 – 15.8	80
Conclusion: The existing Ambient Air Quality levels for PM10, PM2.5, SO2 and NO2, are within the NAAQ standards prescribed CPCB limits of 100 µg/m3, 60 µg/m3, 80 µg/m3 & 80 µg/m3. The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m3)			

C) WATER QUALITY	**Monitoring Location –** 4 locations	
PARAMETER	**Result**	***LIMIT (µg/m3)**
pH at 25 °C	6.87 – 7.52	**6.5-8.5**
Total Dissolved Solids, mg/L	440 – 760	**2000**
Chloride as Cl-, mg/L	99.8 – 196	**1000**
Total Hardness (as CaCO3), mg/L	296 – 384	**600**
Total Alkalinity (as CaCO3), mg/L	242– 340	**600**
Sulphates as SO42-, mg/L	71 – 215	**400**
Iron as Fe, mg/L	BDL(D.L - 0.01) – 0.07	**0.3**
Nitrate as NO3, mg/L	1.80 – 3.97	**45**
Fluoride as F, mg/L	0.26 – 0.42	**1.5**
Conclusion: The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.		

D) NOISE LEVELS	**Monitoring Location –** 5 locations		
PARAMETER	**RESULT dB(A)**		***LIMIT (µg/m3)**
	Day Equivalent	**Night Equivalent**	
Core Zone	44.2	39.0	**90**
Buffer Zone	46.5 – 49.6	38.2 – 39.1	**Day Equivalent - 55dB(A), Night Equivalent - 45dB(A)**
*Permissible noise for industrial workers as laid down by CPCB (at 8 hrs Exposure Time). While comparing with the MoEF&CC Norms, the monitored ambient noise levels are generally within the limit values.			

E) SOIL QUALITY	Monitoring Location – 2 locations
PARAMETER	**Range of values**
pH	7.05 – 7.24
Electrical Conductivity (µmho/cm)	58.92 - 95.46
Organic matter (%)	0.54 – 0.65
Total Nitrogen (mg/kg)	186 – 212
Phosphorus (mg/kg)	0.65 – 0.92
Sodium (mg/kg)	940 – 1456
Potassium (mg/kg)	710 – 1072
Soil is of Loam Type	

F) LAND EVIRONMENT:

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

Table 11.6: Land Use in 10Km Buffer Zone

S.No	Landuse Feature	Area (Sq.Km)	Percentage
1	Agriculture/ Plantation	45.16	13.96
2	Fallow Land	175.75	54.32
3	Land With Scrub	37.64	11.63
4	Land Without Scrub	37.12	11.47
5	Water bodies	4.93	1.52
6	Mining	13.16	4.07
9	Settlement	9.79	3.02
	Total	**323.54**	**100**

From the above table it is seen that 13.96 % of the buffer area is classified under the Agriculture/ Plantation followed by 54.32 % of fallow land, 11.63 % constitutes land with scrub, 11.47 % constitutes land without scrub and the balance falls under other land use categories. Details are given in Table 3.21, Chapter – III.

G) BIOLOGICAL ENVIRONMENT:

Flora: The lease area is a non forest, private land. The lease area is dominated with Prosopis juliflora. There are 3 trees species from 2 families followed by 3 shurbs from 3 families and 2 herbs from 2 family were recorded in the core zone. The detailed list of plants found in the core zone are given in Table no – 3.23 . The Dominated species in the buffer zone are Albizia lebbeck,

Acacia auriculiformis, Sygygium cumuni, Borassus flabellifer, Azadirachta indica, Prosopis juliflora, etc.

Fauna: There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals like Cows, Buffalos, Dogs, Cats etc., are commonly found. The lease and 10 Km buffer zone does not fall in the Western Ghats ESA boundary. No wild mammalian species was directly sighted during the field survey. There is no Schedule I species in the core & buffer zone. The list of fauna within the study area is given in Table No – 3.25.

H) HYDROLOGICAL STUDY:

The area applied for quarry lease exhibits almost plain topography covered by top soil and lime kankar formation. There are no Perennial Rivers in the vicinity. A Vari is flowing across the QL area in west to east direction. Another Vari is flowing aside the QL area in western side. As directed, Safety distance of about 50 m has been provided to both the Vari's and their flows will be maintained as such till the conceptual stage. Further elaborate details of the same has been provided under section 4.3.3C, Chapter-IV. The drainage map prepared from the survey of India topographic maps shows the presence of few streams running in a dendritic pattern

The Groundwater levels from the 27 number of observation wells of TWAD in Ariyalur have been analyzed for Post-Monsoon and Pre-Monsoon. The occurrence of groundwater mainly in the porous soil are weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer, after that there is no existence of groundwater. The ultimate mining depth is also 2.55m only. Hence, no adverse impact on groundwater table is envisaged.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:

11.4.1 GENERAL:

This is a proposed project and Semi – Mechanized Open Cast mining will be carried out to quarry out Lime Kankar. Negligible environmental impact is envisaged from this project owing to the following reasons:

- Low quantum of production – Only 97,196T of Limekankar will be mined out during the period of 5 years. Out of this, 74,999T i.e; almost 77% of the total production quantity will be mined out in the first year itself.
- No Drilling and Blasting

- ❖ Less number of equipments of optimum capacity - Only 1 excavator and 2 tippers are proposed to be used in this project.
- ❖ Ultimate depth of mining is only 2.55m

Due to the above-mentioned reasons, there is no adverse impact envisaged on the environment. The identified impacts due to this mine during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc.

11.4.2 AIR ENVIRONMENT:

The principal sources of air pollution in the area due to mining and allied activities are dust generation in the mine due to various activities such as excavation of material, movement of HEMM, loading, unloading and transportation operations.. Besides, Gas emission also occur as a result of emission of SO2, NOx, CO etc., from diesel driven mining equipment, compressors, generator sets, etc. The following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

Table 11.7: Mitigation Measures – Air Environment

S.No	Activity	Mitigation Measures
1	Excavation and Loading	Proper maintenance of HEMM
		Enclosures for operator cabin.
		Imparting sufficient training to operators on safety and environmental parameters.
		Proper maintenance of hauling equipments.
		Avoiding overloading of dumpers.
2	Transportation	Regular wetting of transport road using mobile water tanker.
		Proper maintenance of haul road and other roads
		Setting up of tyre wash facility in the transport road.
		Avoiding overloading of tippers
		Covering of loaded tippers with tarpaulins during transportation
		Vehicular emissions will be controlled through regular and proper preventive maintenance schedules and emissions tests are done with diesel smoke meter equipment to ensure emission values.
3	Others	Development of greenbelt / barriers around mine in the safety zone and carrying out plantation within the lease area.
		Green netting will be carried out around the lease periphery on all sides.

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

The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion. Ground Level Concentration (GLC) have been computed using hourly meteorological data for particulate matter PM10 and PM2.5.

The resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM_{10} are in the range of 57.5 μg/m3 to 74.2 μg/m3 μg/m3 and with respect to PM2.5 are in the range of 27.0 μg/m3 to 35.4 μg/m3 which are within the statutory limits in each case.

For preservation of environment in this mine strict enforcement of management schemes will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

11.4.3 WATER ENVIRONMENT:

Water Requirement: The total water requirement for this project will be 5.0 KLD comprising 1.0 KLD for drinking water and domestic use, 3.0 KLD for dust suppression and 1.0 KLD for greenbelt. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose.

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

Table 11.8: Mitigation Measures – Water Pollution

S.No	Source	Consequence	Mitigation Measures
A	Domestic use	Generation of waste water	The domestic sewage to be generated from the project will be collected in septic tank with soak pits.
B	Rainfall	Runoff from waste dump and stack	Towards surface runoff management, a garland drain of length 990m will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users.

		Rainwater Harvesting	The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc.
C	Drainage Course	Disturbance to drainage course	There is a Vari flowing across the lease area in the east west direction. A safety distance of 50m has been left based on precise area conditions. Earthen bund formation on both sides within the lease will be done. Besides there are also other vari courses in S.F.No.240/10 on the western side and another vari in S.F.228/10. Safety distance of 50m has been left for this also. Good plantation will also be carried out in the safety zone. Besides, There is no proposal to discharge any effluent into this water body. No major impact is envisaged on the nearby water bodies due to project operations.

- **Stage of Groundwater Development:** The groundwater resource data of Ariyalur district was obtained from the data provided in the technical report of the National Water Mission, Ministry of Jal Shakti, Department of Water Resources, RD&GR – Notes on Ariyalur District. Based on the report it is seen that this area can be categorized as 'Safe' from ground water development point of view.
- **Generation of mine pit water:** Mining operations are proposed to be quarried upto a depth of 2.55m only. The groundwater table in this area is much below this level. There is no groundwater intersection envisaged

11.4.4 NOISE ENVIRONMENT:

In this project, there is no drilling and blasting involved. There will be hardly operation of 1 loader and 2 tippers in the lease area. Hence the effects of noise from the mining operation will be insignificant. Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor. However, practically there will be attenuation due to vegetation etc., and as such there will not be any adverse noise propagation outside the lease boundary. Since the habitations are also away the effect of noise due to mining operations will not be felt at all in the surrounding village. Hence, by implementing the following mitigative measures for noise control, the impact on noise levels will continue to be insignificant:

- Planting rows of native trees along roads, around mine area and other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipments like shovel, tippers, etc.
- Proper and regular maintenance of equipments may lead to less noise generation.

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

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

11.4.6 IMPACT ON LAND ENVIRONMENT:

The lease area of 4.370 Ha is a patta land in the name of the applicant Chettinad Cement Corporation Pvt Ltd. vide Patta No. 2412. There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized. Hence, there is no external overburden dump involved. Ultimately the entire mined out area of 1.910 Ha will be used for storing rainwater. 0.03 Ha will be the mine roads & infrastructure, 2.430 Ha will be covered with vegetation. Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals.

11.4.7 BIOLOGICAL ENVIRONMENT:

Necessary mitigative measures like dust suppression, proper maintenance of equipment's, greenbelt and plantation etc., will be carried out to prevent dust generation & any further impact on the vegetation. In the lease area, safety barrier 7.5m around the periphery, 50m safety distance for vari and road. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area. About 2200 trees will be planted in and around the lease area.

11.4.8 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is a private patta land. Hence, there are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here. The vari in proximity

to the lease area not be disturbed by the proponent and sufficient safety barrier has also been left. Towards the same, it is proposed to construct a bund on the eastern side along with fencing.

The mining operations in the proposed quarry will employ about 14 people. Besides through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service related activities connected with the project operations.

Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.1.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner.In consultation with the locals based on the need & priority it will be implemented.

11.4.9 OCCUPATIONAL HEALTH AND SAFETY ASPECTS:

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

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

11.4.10 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:

From this proposed quarry the entire output will be transported to the cement plant of the proponent. There will be about 2 trips per hour during the first year. Subsequently as the production will reduce in the forthcoming years, the number of trips will also reduce to 1 Trip per hour. The transport route can easily absorb this negligible traffic due to this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:

- ❖ Water sprinkling on Rough stone in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Proper maintenance of transport roads

- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.

11.4.11 WASTE MANAGEMENT:

Since the entire mined out material will be used there will not be any solid waste generation from this project. There is no process effluent generation from this mine. Hence no liquid waste is generated.

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

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

11.5 ENVIRONMENTAL MONITORING PROGRAMME:

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

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

Towards EMP measures, Rs.12.18 Lakhs is allocated under capital cost. Besides, Rs.12.18 Lakhs per annum will be spent under recurring cost. All the recurring cost of maintenance of pollution control measures, environmental monitoring etc., will be met from revenue. Further details of the capital and recurring cost of environmental management has been provided in in Table No. 10.2, Chapter-X.

11.6 ADDITIONAL STUDIES:

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

1. Public consultation of the project as per MoEF&CC mandates.
2. Risk Assessment
3. R&R Plan
4. Mine closure plan

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

Elaborate description in respect of Risk Assessment and Mine closure plan are given in **Chapter - VII**.

Although the individual lease area of this project is less than 5 Ha, the other existing and proposed quarries within the 500m radius along with this subject project works out to >5 Ha. As such cluster situation applicable and this EMP is prepared. There are no working quarries in the area. The baseline monitoring carried out for this project reflects the cumulative impact of the existing scenario.

11.7 CONCLUSION:

By systematic and scientific mining adhering to all the statutory norms and enforcing and strictly implementing the above said mitigation measures mentioned in this report, no adverse impact is envisaged. The proposed mining activity will be carried out without drilling and blasting, with low quantum of production, less number of equipments and also a meagre depth of only 2.55m. Hence, no adverse impact on the environment due to mining operations is envisaged. Besides, this project will also provide employment, social welfare facilities by way of CER activities and also meet the raw material requirement of their plant.

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CHAPTER - XII

DISCLOSURE OF CONSULTANTS ENGAGED

CHAPTER 12

DISCLOSURE OF CONSULTANTS ENGAGED

Creative Engineers & Consultants, Chennai is an **NABL** accredited testing laboratory and **NABET** accredited EIA consultancy. Established over 25 years ago, this company has steadily made good strides in the environmental impact assessment fields, and is also one of the first companies to get accredited by NABET as an Accredited Consultant Organization as early as 2011. Creative Engineers & Consultants has to its credit, successful completion of numerous EIA/EMP reports, grant of environmental clearances and periodic environmental monitoring works. Presently, the company has been accredited by NABET as a 'Category-A' organization for the sectors of Mining of Minerals (opencast only), Thermal Power Plants, Mineral Beneficiation and Cement Plants with the accreditation valid upto 23.12.2023. The team of experienced professionals that are a part of this organization has been detailed below.

Table 12.1: List of People Involved

EXPERT NAME	QUALIFICATION	POSITION	EXPERIENCE
Mr. P. Giri	AMIE (Mining)	EIA Coordinator & Functional area Expert (AP,NV,HW),	Over 30 years of experience in EIA/EMP report, mine plan preparation, including modeling
Mr. K. Shankar	M.Sc (Geology). PGMEMG	Functional area Expert (GEO, HG, SHW, RH) & IBM approved RQP.	Over 25 years of experience in EIA/EMP report, Mine plan, hydrological report preparation
Dr. N. Radhakrishnan	M.Sc., M.Tech., Ph.D	Functional area Expert (Land use)	Over 25 years of experience in using the advanced spatial analysis techniques in GIS environment. Specialized in Spatial Information Technology and Applications (remote sensing, GIS)
Mr.S.S.Rajendran	M.Sc. (Pharmaceutical Chemistry)	Lab head	More than 15 years of

EXPERT NAME	QUALIFICATION	POSITION	EXPERIENCE
			experience in Environmental laboratory.
Mr. R. Babu raj	M.A (Sociology), B.Com(Y.L&Cost), ITI, Advance Diploma in Computer application	Functional Area Expert (Socio Economy)	Over 18 years of experience in dispersion modeling, computer applications. Specialized in CAD and computer software, applications. 7years experience in the field of socio economy and its allied report preparation.
Mr. B. Govindaraman	B.Sc.	Field technician	Over 20 years of field monitoring & data collection experience
Dr.B.Swamynathan	M.Sc (Ecology & Environmental Sciences), M.Phill (Botany), Ph.D (Ecology & Environmental Sciences)	EIA Coordinator and Functional Area Expert (EB,SC,LU and AP)	More than 10 years of experience in Environment and allied fields.
Ms. G. Sandhya	B. Tech Chemical Engineering M.Tech Environmental Engineering	Functional Area Expert (AQ, WP)	Over 5 years experience in preparation of EIA/EMP reports

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ANNEXURES

Industries (MMC.2) Department,
Secretariat, Chennai – 600 009

Letter No.9020/MMC.2/2018 -1, dated 12.10.2018

From

Thiru K.Gnanadesikan, I.A.S.,
Additional Chief Secretary to Government.

To

Tvl.Chettinad Cement Corporation Private Ltd,
Ariyalur Works,
Trichy Road,
Keelapalur – 621 707,
Ariyalur District.

Sir,

Sub: Industries - Mines and Minerals - Minor Mineral – Quarry lease application of Tvl.Chettinad Cement Corporation Ltd. for quarrying Limekankar over an extent of 4.37.0 hectares of patta lands in S.F.Nos. 226/2B (0.73.0), etc. of Kallankurichi Village, Ariyalur Taluk and District - Precise Area communicated – Approved Mining Plan and Environment Clearance Certificate – Requested.

Ref:
1. Quarry lease application of Tvl.Chettinad Cement Corporation Ltd., dated Nil and received by the District Collectorate, Ariyalur on 17.06.2016.
2. From the District Collector, Ariyalur District, Letter Rc.No.77/G&M/2016, dated 15.02.2018.
3. From the Director of Geology and Mining, File Rc.No.1507/MM10/2018, dated 29.06.2018 and 11.09.2018.

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I am directed to invite attention to the references second and third cited wherein the District Collector, Ariyalur District and the Director of Geology and Mining have recommended the quarry lease application of

vii. The applicant company should not mine the Limestone which occurs below the Limekankar deposit.

viii. The applicant company is allowed to quarry limekankar only. If any mineral other than limekankar is discovered while quarrying, the company 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 mineral(s) as per Rule 36(3) of the Tamil Nadu Minor Mineral Concession Rules, 1959.

ix. The applicant company should produce latest no mining dues certificate in respect of other lease areas both major / minor mineral leases granted in Dindigul, Karur and Ariyalur Districts before the execution of lease deed.

x. Consent from the Tamil Nadu Pollution Control Board should be obtained before the commencement of quarrying operation.

xi. If any violation is found during quarrying operation, the penal provisions of the Tamil Nadu Minor Mineral Concession Rules, 1959 and other Act and Rules in force will attract.

3. I am also directed to request the company to obtain and produce Environment Clearance Certificate from DEIAA, Ariyalur District before grant of quarry lease.

Yours faithfully,

S. P. Ramamasate
12/X/2016

for Additional Chief Secretary to Government

Copy to:-
The Director of Geology and Mining,
Guindy, Chennai-600 032.

The District Collector,
Ariyalur District.

DEPARTMENT OF GEOLOGY AND MINING

From
Thiru M.Kandan, M.Sc. M.Phil.,
Additional Director of Geology and Mining,
Department of Geology and Mining,
Guindy, Chennai - 600 032.

To
The Additional Chief Secretary to Government,
Industries Department,
Secretariat,
Chennai - 600 009.

Lr. No. 1507/MM10/2018/LK/Ary, dated. 09.01.2019

Sir,

Sub: Mines and Minerals – 31 Minor Mineral - Limekankar – Ariyalur District – Ariyalur Taluk – S.F.Nos. 226/2B (0.73.0), 226/2C (0.80.0), 226/2D (0.70.5), 241/1A (0.11.0), 241/1B (0.03.5), 241/2 (0.12.0), 241/3A (0.03.0), 241/3B (0.04.5), 241/3C (0.02.5), 241/4 (0.06.0), 241/5 (0.17.0), 241/6A (0.04.0), 241/6B (0.12.0), 241/7 (0.09.5), 241/8 (0.06.0), 242/1 (0.04.5), 242/2 (0.03.5), 242/3 (P) (0.11.0), 242/4 (0.16.0), 242/5 (0.07.0), 242/6 (0.03.5), 242/9 (0.09.0), 242/10A (0.07.0), 242/10B1 (P) (0.41.0) & 242/10B2 (0.20.0) of Kallankurichi village over an extent of 4.37.0 hectares of patta lands – Quarry lease application preferred by Tvl. Chettinad Cement Corporation Ltd – Precise area communicated by the Government - Approved Mining Plan called for – Mining Plan submitted for approval – Recommended and forwarded by the Deputy Director (G&M), Ariyalur - Approval accorded – Reg.

Ref:
1) Quarry Lease application of Tvl. Chettinad Cement Corporation Ltd., Ariyalur Works, Trichy Road, Keelapalur Post, Ariyalur District – 621 707 dated. .06.2016 (received by the District Collector on 10.06.16).
2) The District Collector, Ariyalur letter Roc. Rc. 77/G&M/2018 dated 15.02.2018.
3) The Commissioner of Geology and Mining, Chennai Lr No. 1507/MM10/2018 Dated 11.09.2018.
4) Government letter No.9020/MMC.2 Industries (MMC.2) Department dated 12.10.2018.
5) Tvl. Chettinad Cement Corporation Ltd letter dated 13.11.2018.
6) The Deputy Director, Geology and Mining, Ariyalur letter Roc. No.77/G&M/2018 dated 29.11.2018.
7) G.O.Ms.No.09, Industries (MMC1) Department Dated 08.2.2018.
8) G.O. (D) No. 23, Industries (MMC1) Department Dated 15.02.2018.

Kind attention is invited to the references cited.

2) The Government in the reference 4th cited have communicated the precise area to the applicant Tvl. Chettinad Cement Corporation Ltd with a direction to produce an approved Mining Plan in respect of the area applied for grant of quarry lease for quarrying Limekankar over an extent of 4.37.0 hects of patta lands in S.F.Nos. 226/2B (0.73.0), 226/2C (0.80.0), 226/2D (0.70.5), 241/1A (0.11.0), 241/1B (0.03.5), 241/2 (0.12.0), 241/3A (0.03.0), 241/3B (0.04.5), 241/3C (0.02.5), 241/4 (0.06.0), 241/5 (0.17.0), 241/6A (0.04.0), 241/6B (0.12.0), 241/7 (0.09.5), 241/8 (0.06.0), 242/1 (0.04.5), 242/2 (0.03.5), 242/3 (P) (0.11.0), 242/4 (0.16.0), 242/5 (0.07.0), 242/6 (0.03.5), 242/9 (0.09.0), 242/10A (0.07.0), 242/10B1 (P) (0.41.0) & 242/10B2 (0.20.0) of Kallankurichi village, Ariyalur Taluk, Ariyalur District for a period of 5 years as per Rule 43 of Tamil Nadu Minor Mineral Concession Rules, 1959 by incorporating the conditions stipulated in the Government letter dated 12.10.2018.

3) In response to the precise area communication letter issued by the Government vide in reference 4th cited, the applicant has submitted 5 copies of draft mining plan duly prepared by the Qualified Person for approval vide in the reference 5th cited.

4) The Deputy Director of Geology and Mining, Ariyalur in the reference 6th cited has forwarded the draft mining plan recommending for approval and stating that, the mining plan has been verified with reference to field conditions and the details such as Geological reserves, Mineable reserves, year wise production and development program have been incorporated in the draft mining plan. Further, he has reported that, the special conditions imposed in the precise area communication letter have also been incorporated in the Mining Plan. He has furnished the total extent of existing / adjacent / proposed quarries located within a radius of 500mts as 320.16.0 hectares.

5) The draft mining plan submitted in respect of the precise area communication and the report of the Deputy Director of Geology and Mining, Ariyalur have been examined with reference to the provisions of Rule 43 of

Tamil Nadu Minor Mineral Concession Rules, 1959 and the followings are observed:-

i) All the following conditions stipulated in the Government letter No. 9020/MMC.2 Industries (MMC.2) Department dated 12.10.2018 have been incorporated in the mining plan.

a. The applicant should take all precautionary measures while quarrying in the applied area without disturbing the adjacent patta lands, agricultural lands and 7.5 meters safety distance should be left all along the boundary of the area to be granted on quarry lease as indicated in the combined FMB sketch have been demarcated in the mining plan.

b. A high tension power line passing NW–SE in SF No. 241/1B, 6A, 7 and 8 has to be shifted 50mts away from the periphery of the quarrying lease boundary at the applicant company's expenses before the execution of lease deed.

c. The applicant company should maintain a safety distance of 10 metres to the state on ground village road located in patta land S.F.No. 226/2A situated on the northern side of the applied area have been demarcated in the mining plan.

d. The applicant company should maintain a safety distance of 10 metres to the cart track in SF No.241/9 passing on the eastern side of the applied area have been demarcated in the mining plan.

e. The applicant company should maintain safety distance of 50 mts shall be provided and maintained to the vari in S.F.No. 240/10 situated on the western side of S.F.No. 241/3A and another vari in S.F.No. 228/10 situated on the north western side of the applied area in S.F.No. 241/1A have been demarcated in the mining plan.

f. The applicant company should maintain safety distance of 50mts has to be provided for the Vari marked in the FMB for SF No.226/1, 2B, 2C and 2D have been demarcated in the mining plan.

ii) The boundary coordinates (GPS readings) for the entire boundary pillars of the area have been incorporated and shown in the mining plan.

iii) The total geological reserve (ROM) in the applied area is 2,21,231 tonnes of Limekankar. The mineable reserve with 100% recovery with an assumed depth of 2.25mts is estimated as 97,196 tonnes of Limekankar.

iv) The total quantity of production for the first 5 years has been estimated as 97,196 tonnes of Limekankar for a depth of 2.25mts.

6) In the light 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.Ms.No.09, Industries (MMC1) Department Dated 08.2.2018 and G.O. (D) No. 23, Industries (MMC1) Department Dated 15.02.2018, the mining plan in respect of Limekankar mine of Tvl. Chettinad Cement Corporation Ltd is hereby approved subject to the following conditions:-

i) The mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.

ii) The approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

iii) The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.

iv) The applicant should take all precautionary measures while quarrying in the applied area without disturbing the adjacent patta lands, agricultural lands and 7.5 meters safety distance should be left all along the boundary of the area to be granted on quarry lease as indicated in the

combined FMB sketch and to be maintained the safety zone till expiry of lease.

v) A high tension power line passing NW–SE in SF No. 241/1B, 6A, 7 and 8 has to be shifted 50mts away from the periphery of the quarrying lease boundary at the applicant company's expenses before the execution of lease deed.

vi) The applicant company shall provide and maintain a safety distance of 10 metres to the state on ground village road located in patta land S.F.No. 226/2A situated on the northern side of the applied area.

vii) The applicant company shall provide and maintain a safety distance of 10 metres to the cart track in SF No.241/9 passing on the eastern side of the applied area.

viii) A safety distance of 50 mts shall be provided and maintained to the vari in S.F.No. 240/10 situated on the western side of S.F.No. 241/3A and another vari in S.F.No. 228/10 situated on the north western side of the applied area in S.F.No. 241/1A.

ix) In order to safe guard the free flow of rain water to the kanmoi, safety distance of 50mts has to be provided for the Vari marked in the FMB for SF No.226/1, 2B, 2C and 2D.

x) The applicant should not mine the Limestone deposit which occurs below the Limekankar deposit.

xi) The applicant is allowed to quarry Limekankar only. If any mineral other than Limekankar 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 Tamil Nadu Minor Mineral Concession Rules 1959.

xii) The applicant 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 shall incorporate the 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 CD form to the Deputy Director (G&M), Ariyalur.

xiii) The applicant should produce latest no mining dues certificate in respect of other major / minor mineral leases held by him before the execution of lease deed.

xiv) Consent from the Tamil Nadu Pollution Control Board should be obtained before the 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 lessee shall strictly adhere to the statutory and safety requirements.

xvii) The waste material if any should be dumped within the lease hold area only.

xviii) 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.

xix) Necessary environmental Clearance has to be obtained by the applicant before the grant of quarry lease as per the rules.

A copy of the Approved Mining Plan is sent herewith for further necessary action.

Encl: Approved mining plan.

Additional Director of Geology and Mining

Copy to

1) Tvl. Chettinad Cement Corporation Ltd.,
Ariyalur Works, Trichy Road,
Keelapalur Post,
Ariyalur District – 621 707 (with AMP).
2) The District Collector, Ariyalur (with AMP)
3) The Director General of Mines Safety, Chennai-40 (with AMP).
4) The Deputy Director, Geology and Mining, Ariyalur.

With a request to ensure that the quarrying operation is undertaken as per the approved mining plan / Hon'ble Supreme Court order dated 02.08.2017 in W.P.No.114/2014 and conduct field inspection once in a quarter and submit the report.

From
Thiru.P.Saravanan, M.Sc.,
Deputy Director,
Geology & Mining,
Ariyalur.

To
The Director,
Department of Geology & Mining,
Industrial Estate,
Guindy,
Chennai – 600 032.

Rc.No.77/G & M/2016, Date: 27.08.2018.

Sir,

Sub : Mines and Quarries - Quarrying Lease - Minor Mineral - Limekankar - Ariyalur District & Taluk - Kallankurichi Village - S.F.No.226/2B, 226/2C, 226/2D, 241/1A, etc., - over an extent of 4.37.0 Hectares of Patta lands – quarry lease application of Tvl. Chettinad Cement Corporation Private Ltd., Ariyalur for grant of quarry lease for quarrying Limekankar – Reg.

Ref: 1. Quarry Lease application of Tvl. Chettinad Cement Corporation Private Ltd., Ariyalur works, Trichy Road, Keelapalur, Ariyalur District dated. .06.2016 (received by this office 10.06.2016).
2. District Collector, Ariyalur Lr.No.77/G&M/2016, dated: 15.02.2018.

I invite your kind attention to the references cited.

2) In the reference 1st cited, Tvl. The Chettinad Cement Corporation Private Limited, Ariyalur have applied for grant of quarrying lease for quarrying Limekankar over an extent of 4.37.0 Hectares of patta lands in S.F.No. 226/2B, 226/2C, 226/2D, 241/1A, etc., in Kallankurichi Village, Ariyalur Taluk and District for a period of 10 years.

3) The above said quarry lease application has been forwarded to the Government through the Director of Geology & Mining, Chennai – 32 vide this office letter in the reference 2nd cited.

4) In this connection, I submit the details of existing quarrying lease situated within 500 mts radial distance from the applied area are furnished as follows:

1) Existing lease :

Sl. No.	Name of the lessee and address	Taluk & Village	S.F.Nos.	Hect.	Name of the mineral	Lease Period
1.	Chettinad Cement Corporation Private Ltd., Rani Seethai Hall Building, No.603, Anna Salai, Chennai – 600 006.	Ariyalur Taluk, Kallankurichi Village	245/1A,1B etc.,	4.92.5	Limestone	08.07.2013 to 07.07.2033
			Total	**4.92.5**		

2) Proposed Mines :

Sl. No.	Name of the lessee and address	Taluk & Village	S.F.Nos.	Hect.	Name of the mineral	Lease Period
1.	Tamil Nadu Cements Corporation Ltd., Chennai.	Ariyalur Taluk, Kallankurichi Village	8/1 (Part) & 13 (Part)	4.64.5	Lime kankar	-
2.	Tamil Nadu Cements Corporation Ltd., Chennai.	Ariyalur Taluk, Kallankurichi Village	11/4, 13 (Part)	3.96.5	Lime kankar	-
			Total	**8.61.0**		

3) Expired and abandoned Mines :

Sl. No.	Name of the lessee and address	Taluk & Village	S.F.Nos.	Hect.	Name of the mineral	Lease Period
NIL						

Deputy Director,
Geology and Mining,
Ariyalur.

POPULATION BREAKUP & LITERACY LEVEL IN THE BUFFER ZONE

Sl.No	No. of Villages	Name of village	Rural / urban	HOUSE HOLDS	POPULATION			POPULATION BELOW 6 AGE GROUP			SCHEDULE CASTE			SCHEDULE TRIBE			LITRERATES			ILLITRERATES		
					TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F. MALE	TOTAL	MALE	F.MALE	TOTAL	MALE	F.MALE
0-2km Ariyalur, Sub-district, District - Ariyalur																						
1	1	Kallankurichi	Rural	1380	5385	2663	2722	607	304	303	1383	699	684	1	1	0	3392	1957	1435	1993	706	1287
2	2	Ariyalur (North)	Rural	1017	4147	2104	2043	463	263	200	409	207	202	246	127	119	2905	1567	1338	1242	537	705
		total (A)		**2397**	**9532**	**4767**	**4765**	**1070**	**567**	**503**	**1792**	**906**	**886**	**247**	**128**	**119**	**6297**	**3524**	**2773**	**3235**	**1243**	**1992**
2-5km Ariyalur, Sub-district, District - Ariyalur																						
3	1	Ottakoil	Rural	1210	4703	2344	2359	535	275	260	1769	899	870	0	0	0	2748	1640	1108	1955	704	1251
4	2	Govindapuram	Rural	1242	4996	2502	2494	591	314	277	1347	674	673	0	0	0	3260	1871	1389	1736	631	1105
5	3	Ammenabath	Rural	170	654	315	339	95	42	53	122	59	63	0	0	0	349	218	131	305	97	208
6	4	Kayarlabath	Rural	1349	5215	2602	2613	492	256	236	881	451	430	5	3	2	3937	2128	1809	1278	474	804
7	5	Valajanagaram	Rural	1945	7355	3702	3653	780	413	367	1550	805	745	0	0	0	5078	2873	2205	2277	829	1448
2-5km Kunnam, Sub-district, District -Perambalur																						
8	6	Alagiripalayam	Rural	725	2687	1354	1333	302	163	139	544	261	283	0	0	0	1585	925	660	1102	429	673
		total (B)		**6641**	**25610**	**12819**	**12791**	**2795**	**1463**	**1332**	**6213**	**3149**	**3064**	**5**	**3**	**2**	**16957**	**9655**	**7302**	**8653**	**3164**	**5489**
5-10km Ariyalur, Sub-district, District - Ariyalur																						
9	1	Rayampuram	Rural	947	3718	1846	1872	379	191	188	1456	726	730	0	0	0	2095	1229	866	1623	617	1006
10	2	Sennivanam	Rural	474	1870	932	938	195	109	86	1179	586	593	0	0	0	1257	711	546	613	221	392
11	3	Kadugur	Rural	866	3217	1627	1590	363	199	164	493	253	240	1	1	0	1893	1172	721	1324	455	869
12	4	Thelur	Rural	1094	4215	2136	2079	480	270	210	794	400	394	4	3	1	2407	1423	984	1808	713	1095
13	5	Periyanagalur	Rural	1041	3538	1762	1776	330	191	139	692	347	345	0	0	0	1975	1175	800	1563	587	976
14	6	Varanavasi	Rural	1091	4087	1947	2140	439	217	222	1412	651	761	0	0	0	2521	1359	1162	1566	588	978
15	7	Siruvalur	Rural	594	2155	1043	1112	215	93	122	453	230	223	0	0	0	1261	743	518	894	300	594
16	8	Pudupalayam	Rural	922	3535	1750	1785	330	176	154	1072	536	536	3	2	1	2009	1187	822	1526	563	963
17	9	Reddipalayam	Rural	1125	4126	2095	2031	417	212	205	516	260	256	5	3	2	2457	1432	1025	1669	663	1006
18	10	Sathamangalam	Rural	734	2845	1445	1400	368	196	172	449	224	225	0	0	0	1685	976	709	1160	469	691
19	11	Arungal	Rural	974	3581	1767	1814	477	240	237	827	415	412	259	120	139	1891	1073	818	1690	694	996
20	12	Alanduraiyarkattalai	Rural	544	2106	1090	1016	265	141	124	427	220	207	0	0	0	1048	655	393	1058	435	623
5-10km Kunnam, Sub-district, District -Perambalur																						
21	13	Periyammapalayam	Rural	895	3099	1528	1571	306	160	146	437	217	220	0	0	0	1875	1111	764	1224	417	807
22	14	Periavenmani (East)	Rural	351	1469	737	732	186	97	89	557	285	272	0	0	0	783	476	307	686	261	425
23	15	Periavenmani (West)	Rural	731	2911	1444	1467	308	155	153	937	473	464	0	0	0	1662	1005	657	1249	439	810
24	16	Thondappadi	Rural	1075	3966	1885	2081	465	240	225	1121	517	604	0	0	0	2260	1275	985	1706	610	1096
25	17	Koothur	Rural	495	1797	841	956	169	92	77	458	220	238	0	0	0	1102	613	489	695	228	467
26	18	Adhanur (South)	Rural	427	1396	631	765	140	76	64	241	106	135	0	0	0	833	452	381	563	179	384
27	19	Nekkaselam	Rural	1073	3799	1935	1864	410	223	187	1714	865	849	3	3	0	2546	1410	1136	1253	525	728
28	20	Thenur	Rural	757	2747	1371	1376	271	138	133	562	281	281	0	0	0	1663	897	766	1084	474	610
29	21	Mavilingai	Rural	322	1106	548	558	102	55	47	282	138	144	0	0	0	686	384	302	420	164	256
30	22	Irur	Rural	1230	4442	2232	2210	458	235	223	1093	527	566	0	0	0	2864	1575	1289	1578	657	921
31	23	Zamin Athur	Rural	429	1562	782	780	152	89	63	264	133	131	0	0	0	919	512	407	643	270	373
32	24	Sillakudi (North)	Rural	438	1647	813	834	196	98	98	481	242	239	0	0	0	944	532	412	703	281	422
		total (C)		**18629**	**68934**	**34187**	**34747**	**7421**	**3893**	**3528**	**17917**	**8852**	**9065**	**275**	**132**	**143**	**40636**	**23377**	**17259**	**28298**	**10810**	**17488**
		Grand Total (A+B+C)		**27667**	**104076**	**51773**	**52303**	**11286**	**5923**	**5363**	**25922**	**12907**	**13015**	**527**	**263**	**264**	**63890**	**36556**	**27334**	**40186**	**15217**	**24969**

**Source: District Primary Census Abstract,Ariyalur & Perambalur District of Tamilnadu State-2011*

OCCUPATIONAL STRUCTURE IN THE BUFFER ZONE

Sl.No	No. of Villages	Name of village	Rural / urban	MAIN WORKERS		CULTIVATORS		AGRI LABOURS		HOUSE HOLD		OTHERS		MARGINAL WORKERS		NON WORKERS	
				MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE	MALE	F.MALE
0-2km Ariyalur, Sub-district, District - Ariyalur																	
1	1	Kallankurichi	**Rural**	1228	705	396	253	264	236	17	54	551	162	252	150	1183	1867
2	2	Ariyalur (North)	**Rural**	1010	225	271	19	118	63	83	13	538	130	78	104	1016	1714
		total (A)		**2238**	**930**	**667**	**272**	**382**	**299**	**100**	**67**	**1089**	**292**	**330**	**254**	**2199**	**3581**
2-5km Ariyalur, Sub-district, District - Ariyalur																	
3	1	Ottakoil	**Rural**	1120	590	393	311	355	186	18	22	354	71	276	557	948	1212
4	2	Govindapuram	**Rural**	1401	782	380	220	452	391	12	16	557	155	85	131	1016	1581
5	3	Ammenabath	**Rural**	45	6	31	1	0	0	0	0	14	5	122	70	148	263
6	4	Kayarlabath	**Rural**	1320	362	219	19	244	107	22	12	835	224	94	102	1188	2149
7	5	Valajanagaram	**Rural**	1470	666	334	194	237	238	22	22	877	212	547	350	1685	2637
2-5km Kunnam, Sub-district, District -Perambalur																	
8	6	Alagiripalayam	**Rural**	797	737	487	424	230	288	6	5	74	20	17	14	540	582
		total (B)		**6153**	**3143**	**1844**	**1169**	**1518**	**1210**	**80**	**77**	**2711**	**687**	**1141**	**1224**	**5525**	**8424**
5-10km Ariyalur, Sub-district, District - Ariyalur																	
9	1	Rayampuram	**Rural**	752	432	412	266	138	122	32	4	170	40	321	464	773	976
10	2	Sennivanam	**Rural**	389	316	177	48	93	243	6	3	113	22	201	238	342	384
11	3	Kadugur	**Rural**	832	712	557	305	201	369	18	15	56	23	186	247	609	631
12	4	Thelur	**Rural**	1118	632	461	275	297	289	37	11	323	57	160	167	858	1280
13	5	Periyanagalur	**Rural**	936	644	452	304	123	208	33	29	328	103	85	140	741	992
14	6	Varanavasi	**Rural**	1097	664	194	93	553	457	12	5	338	109	20	21	830	1455
15	7	Siruvalur	**Rural**	515	363	254	186	120	153	4	1	137	23	114	133	414	616
16	8	Pudupalayam	**Rural**	514	195	92	51	153	108	2	0	267	36	501	481	735	1109
17	9	Reddipalayam	**Rural**	994	547	267	95	219	350	23	10	485	92	216	189	885	1295
18	10	Sathamangalam	**Rural**	873	767	433	407	296	327	4	5	140	28	9	10	563	623
19	11	Arungal	**Rural**	1019	793	390	187	441	552	8	0	180	54	38	177	710	844
20	12	Alanduraiyarkattalai	**Rural**	645	599	94	78	481	492	4	1	66	28	10	15	435	402
5-10km Kunnam, Sub-district, District -Perambalur																	
21	13	Periyammapalayam	**Rural**	898	673	583	301	257	353	0	0	58	19	65	289	565	609
22	14	Periavenmani (East)	**Rural**	420	179	140	13	176	158	5	2	99	6	17	259	300	294
23	15	Periavenmani (West)	**Rural**	843	706	264	164	445	504	7	6	127	32	33	176	568	585
24	16	Thondappadi	**Rural**	849	855	527	592	133	203	9	12	180	48	293	350	743	876
25	17	Koothur	**Rural**	269	313	165	211	48	80	3	0	53	22	188	193	384	450
26	18	Adhanur (South)	**Rural**	358	469	207	245	139	216	0	0	12	8	12	12	261	284
27	19	Nekkaselam	**Rural**	1052	941	470	453	384	421	21	15	177	52	128	115	755	808
28	20	Thenur	**Rural**	655	584	222	150	228	355	13	16	192	63	181	181	535	611
29	21	Mavilingai	**Rural**	324	346	173	174	121	150	2	2	28	20	56	45	168	167
30	22	Irur	**Rural**	1377	1249	732	704	264	349	28	30	353	166	76	70	779	891
31	23	Zamin Athur	**Rural**	466	415	327	320	83	84	1	0	55	11	13	3	303	362
32	24	Silfakudi (North)	**Rural**	403	382	309	208	73	165	2	2	19	7	38	38	372	414
		total (C)		**17598**	**13776**	**7902**	**5830**	**5466**	**6708**	**274**	**169**	**3956**	**1069**	**2961**	**4013**	**13628**	**16958**
		Grand Total (A+B+C)		**25989**	**17849**	**10413**	**7271**	**7366**	**8217**	**454**	**313**	**7756**	**2048**	**4432**	**5491**	**21352**	**28963**

**Source: District Primary Census Abstract,Ariyalur & Perambalur District of Tamilnadu State-2011*

Annexure-6

EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl.No	No. of Villages	Name of village	Educational Facilities (A(1)/ NA(2))	Govt Pre - Primary School (Nursery/LKG/UKG) (Numbers)	Govt Primary School (Numbers)	Govt Middle School (Numbers)	Govt Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Govt Medicine College (Numbers)	Govt Management Institute (Numbers)	Govt Polytechnic (Numbers)	Govt Vocational Training School/ITI (Numbers)	Government Non Formal Training Centre (Numbers)	Government School For Disabled (Numbers)
0-2km Ariyalur, Sub-district, District - Ariyalur																
1	1	Kallankurichi	1	4	5	2	2	0	0	0	0	0	0	0	5	0
2	2	Ariyalur (North)	1	1	1	0	0	0	0	0	0	0	0	0	1	0
		total (A)		**5**	**6**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**
2-5km Ariyalur, Sub-district, District - Ariyalur																
3	1	Ottakoil	1	4	3	3	1	0	0	0	0	0	0	0	1	0
4	2	Govindapuram	1	5	5	3	1	0	0	0	0	0	0	0	6	0
5	3	Ammenabath	1	1	1	0	0	0	0	0	0	0	0	0	1	0
6	4	Kayarlabath	1	2	3	2	1	1	0	0	0	0	0	0	1	0
7	5	Valajanagaram	1	5	3	2	0	0	0	0	0	0	0	1	4	0
2-5km Kunnam, Sub-district, District -Perambalur																
8	6	Alagiripalayam	1	5	4	2	0	0	0	0	0	0	0	0	1	0
		total (B)		**22**	**19**	**12**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**14**	**0**
5-10km Ariyalur, Sub-district, District - Ariyalur																
9	1	Rayampuram	1	3	2	2	1	0	0	0	0	0	0	0	3	0
10	2	Sennivanam	1	1	2	1	0	0	0	0	0	0	0	0	2	0
11	3	Kadugur	1	2	2	0	0	0	0	0	0	0	0	0	3	0
12	4	Thelur	1	3	3	2	0	0	0	0	0	0	0	0	1	0
13	5	Periyanagalur	1	3	3	1	1	0	0	0	0	0	0	0	4	1
14	6	Varanavasi	1	2	3	1	0	0	0	0	0	0	0	0	2	0
15	7	Siruvalur	1	1	2	1	1	0	0	0	0	0	0	0	3	0
16	8	Pudupalayam	1	1	1	1	0	0	0	0	0	0	0	0	1	0
17	9	Reddipalayam	1	6	3	2	0	0	0	0	0	0	0	0	3	0
18	10	Sathamangalam	1	3	3	1	0	0	0	0	0	0	0	0	3	0
19	11	Arungal	1	1	1	1	1	0	0	0	0	0	0	0	3	0
20	12	Alanduraiyarkattalai	1	4	4	0	0	0	0	0	0	0	0	0	4	0
5-10km Kunnam, Sub-district, District -Perambalur																
21	13	Periyammapalayam	1	2	3	1	0	0	0	0	0	0	0	0	1	0
22	14	Periavenmani (East)	1	2	2	0	0	0	0	0	0	0	0	0	1	0
23	15	Periavenmani (West)	1	3	1	0	0	0	0	0	0	0	0	0	1	0
24	16	Thondappadi	1	4	3	2	0	0	0	0	0	0	0	0	1	0
25	17	Koothur	1	1	1	1	1	1	0	0	0	0	0	0	1	0
26	18	Adhanur (South)	1	1	1	1	0	0	0	0	0	0	0	0	1	0
27	19	Nekkaselam	1	2	1	1	1	0	0	0	0	0	0	0	1	0
28	20	Thenur	1	3	3	1	0	0	0	0	0	0	0	0	1	0
29	21	Mavilingai	1	0	1	0	0	0	0	0	0	0	0	0	0	0
30	22	Irur	1	3	2	1	1	0	0	0	0	0	0	0	1	0
31	23	Zamin Athur	1	1	1	1	0	0	0	0	0	0	0	0	1	0
32	24	Sillakudi (North)	1	1	2	1	0	0	0	0	0	0	0	0	1	0
		total (C)		**53**	**50**	**23**	**7**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**43**	**1**
		Grand Total (A+B+C)		**80**	**75**	**37**	**12**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**63**	**1**

Source: District Primary Census Abstract,Ariyalur & Perambalur District of Tamilnadu State-2011

MEDICAL FACILITIES WITHIN THE STUDY AREA

Sl.No	No. of Villages	Name of village	Medical Facilities (A(1)/NA(2))	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
0-2km Ariyalur, Sub-district, District - Ariyalur														
1	1	Kallankurichi	**1**	0	0	1	0	0	0	0	0	0	0	0
2	2	Ariyalur (North)	**1**	0	0	1	0	0	0	0	0	0	0	0
		total (A)		**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2-5km Ariyalur, Sub-district, District - Ariyalur														
3	1	Ottakoil	**1**	0	0	1	0	0	0	0	0	0	0	0
4	2	Govindapuram	**1**	0	1	1	1	1	0	0	1	0	0	1
5	3	Ammenabath	**2**	0	0	0	0	0	0	0	0	0	0	0
6	4	Kayarlabath	**1**	0	0	1	0	0	0	0	0	0	0	0
7	5	Valajanagaram	**1**	0	0	1	0	0	0	0	0	0	0	0
2-5km Kunnam, Sub-district, District -Perambalur														
8	6	Alagiripalayam	**1**	0	0	0	0	0	0	0	0	1	0	0
		total (B)	**1**	**0**	**1**	**4**	**1**	**1**	**0**	**0**	**1**	**1**	**0**	**1**
5-10km Ariyalur, Sub-district, District - Ariyalur														
9	1	Rayampuram	**1**	0	0	1	0	0	0	0	0	0	0	0
10	2	Sennivanam	**2**	0	0	0	0	0	0	0	0	0	0	0
11	3	Kadugur	**1**	1	1	1	1	1	0	0	1	0	0	1
12	4	Thelur	**1**	0	0	1	0	0	0	0	0	0	0	0
13	5	Periyanagalur	**1**	0	0	1	1	0	0	0	0	1	0	0
14	6	Varanavasi	**1**	0	0	1	0	0	0	0	0	0	0	0
15	7	Siruvalur	**2**	0	0	0	0	0	0	0	0	0	0	0
16	8	Pudupalayam	**1**	0	0	1	0	0	0	0	0	0	0	0
17	9	Reddipalayam	**1**	0	0	1	0	0	0	0	0	0	0	0
18	10	Sathamangalam	**2**	0	0	0	0	0	0	0	0	0	0	0
19	11	Arungal	**1**	0	0	1	0	0	0	0	0	0	0	0
20	12	Alanduraiyarkattalai	**2**	0	0	0	0	0	0	0	0	0	0	0
5-10km Kunnam, Sub-district, District -Perambalur														
21	13	Periyammapalayam	**1**	0	0	1	0	0	0	0	0	0	0	0
22	14	Periavenmani (East)	**2**	0	0	0	0	0	0	0	0	0	0	0
23	15	Periavenmani (West)	**1**	0	0	1	1	0	0	0	0	0	0	0
24	16	Thondappadi	**1**	0	0	1	0	0	0	0	0	0	0	0
25	17	Koothur	**1**	0	0	0	0	0	0	0	0	1	0	0
26	18	Adhanur (South)	**2**	0	0	0	0	0	0	0	0	0	0	0
27	19	Nekkaselam	**1**	0	0	1	1	0	0	0	0	1	0	0
28	20	Thenur	**2**	0	0	0	0	0	0	0	0	0	0	0
29	21	Mavilingai	**2**	0	0	0	0	0	0	0	0	0	0	0
30	22	Irur	**1**	0	0	1	1	0	0	0	0	0	0	0
31	23	Zamin Athur	**2**	0	0	0	0	0	0	0	0	0	0	0
32	24	Sillakudi (North)	**1**	0	0	1	1	0	0	0	0	0	0	0
		total (C)		**1**	**1**	**14**	**6**	**1**	**0**	**0**	**1**	**3**	**0**	**1**
		Grand Total (A+B+C)		**1**	**2**	**20**	**7**	**2**	**0**	**0**	**2**	**4**	**0**	**2**

**Source: District Primary Census Abstract,Ariyalur & Perambalur District of Tamilnadu State-2011*

Note : A: Available, NA- Not Available

Annexure-8

INFRASTRUCTURAL FACILITIES IN THE STUDY AREA

Sl.No	No. of Villages	Name of village	Tap Water-Treated (Status A(1)/NA(2))	Covered Well (Status A(1)/NA(2))	Hand Pump (Status A(1)/NA(2))	Tube Wells/Borehole (Status A(1)/NA(2))	Spring (Status A(1)/NA(2))	River/Canal (Status A(1)/NA(2))	Tank/Pond/Lake (Status A(1)/NA(2))	Post Office (Status A(1)/NA(2))	Sub Post Office (Status A(1)/NA(2))	Post And Telegraph Office (Status A(1)/NA(2))	Telephone (landlines) (Status A(1)/NA(2))	Mobile Phone Coverage (Status A(1)/NA(2))	Public Bus Service (Status A(1)/NA(2))	Railway Station (Status A(1)/NA(2))	Commercial Bank (Status A(1)/NA(2))	Cooperative Bank (Status A(1)/NA(2))	Agricultural Credit Societies (Status A(1)/NA(2))
0-2km Ariyalur, Sub-district, District - Ariyalur																			
1	1	Kallankurichi	2	2	1	1	1	2	2	1	1	1	1	1	1	2	2	2	2
2	2	Ariyalur (North)	1	1	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
2-5km Ariyalur, Sub-district, District - Ariyalur																			
3	1	Ottakoil	1	1	1	1	2	2	2	2	1	2	1	1	1	1	2	2	2
4	2	Govindapuram	1	1	2	1	1	2	2	2	1	2	1	1	1	2	2	2	1
5	3	Ammenabath	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
6	4	Kayarlabath	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
7	5	Valajanagaram	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
2-5km Kunnam, Sub-district, District -Perambalur																			
8	6	Alagiripalayam	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	1	2
5-10km Ariyalur, Sub-district, District - Ariyalur																			
9	1	Rayampuram	1	2	1	1	2	2	1	1	1	1	1	1	1	2	2	2	1
10	2	Sennivanam	1	2	2	2	2	2	1	2	1	2	1	1	1	2	2	2	2
11	3	Kadugur	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
12	4	Thelur	1	2	1	1	1	1	2	2	1	2	1	1	1	2	2	2	2
13	5	Periyanagalur	1	1	1	1	2	2	1	2	1	2	1	1	1	2	2	2	1
14	6	Varanavasi	1	2	1	1	2	2	2	2	1	2	1	1	2	2	2	1	2
15	7	Siruvalur	1	2	1	1	1	2	2	2	1	2	1	1	1	2	2	2	2
16	8	Pudupalayam	1	1	1	1	2	2	1	2	2	2	1	1	1	2	2	1	1
17	9	Reddipalayam	1	1	1	1	2	2	2	2	1	2	1	1	1	2	1	1	2
18	10	Sathamangalam	1	1	2	2	2	1	1	2	2	2	1	1	1	2	2	2	2
19	11	Arungal	1	1	1	1	2	2	2	2	1	2	1	1	1	2	2	2	2
20	12	Alanduraiyarkattalai	1	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2
5-10km Kunnam, Sub-district, District -Perambalur																			
21	13	Periyammapalayam	2	2	2	2	2	2	1	2	1	2	1	1	1	2	2	2	2
22	14	Periavenmani (East)	1	1	2	1	2	2	2	2	2	2	2	1	1	2	2	2	2
23	15	Periavenmani (West)	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
24	16	Thondappadi	1	1	1	1	2	2	2	2	1	2	2	1	1	2	2	2	2
25	17	Koothur	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	1	1
26	18	Adhanur (South)	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	2
27	19	Nekkaselam	1	1	1	1	1	2	2	2	1	2	1	1	1	2	1	2	1
28	20	Thenur	1	2	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
29	21	Mavilingai	1	1	2	1	2	2	2	2	1	2	1	1	1	2	2	2	2
30	22	Irur	1	1	1	1	1	2	1	2	2	2	2	1	1	2	1	1	2
31	23	Zamin Athur	1	2	1	1	2	2	1	2	1	2	2	1	1	2	2	2	2
32	24	Sillakudi (North)	2	2	1	1	2	2	2	2	1	2	1	1	1	1	2	1	2

**Source: District Primary Census Abstract,Ariyalur & Perambalur District of Tamilnadu State-2011*

Note : A: Available, NA- Not Available

Status: A(1)/NA(2)

Creating Possibilities

CREATIVE ENGINEERS & CONSULTANTS

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

AMBIENT AIR QUALITY

Project	:	Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd
Name of the Location	:	Near lease area (Srinivasapuram Village)
Station Code	:	A1

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	07.03.2022	50.9	23.4	6.9	9.6
2	08.03.2022	55.1	25.3	8.1	10.2
3	18.03.2022	41.8	19.2	4.3	8.2
4	19.03.2022	44.6	20.5	5.1	8.6
5	21.03.2022	56.5	26.0	8.5	10.9
6	22.03.2022	51.6	23.7	7.1	9.7
7	01.04.2022	42.5	19.6	4.5	8.3
8	02.04.2022	48.1	22.1	6.1	9.2
9	04.04.2022	40.4	18.6	3.9	7.9
10	05.04.2022	46.7	21.5	5.7	8.9
11	15.04.2022	55.8	25.7	8.3	10.5
12	16.04.2022	50.2	23.1	6.7	9.5
13	18.04.2022	53.1	24.4	7.5	9.9
14	19.04.2022	45.3	20.8	5.3	8.7
15	29.04.2022	41.1	18.9	4.1	8.1
16	30.04.2022	47.4	21.8	5.9	9.1
17	02.05.2022	54.4	25.0	7.9	10.1
18	03.05.2022	49.5	22.8	6.5	9.4
19	13.05.2022	43.2	19.9	4.7	8.4
20	14.05.2022	48.8	22.4	6.3	9.3
21	16.05.2022	43.9	20.2	4.9	8.5
22	17.05.2022	52.3	24.1	7.3	9.8
23	27.05.2022	53.7	24.7	7.7	10
24	28.05.2022	45.9	21.1	5.5	8.8
	MIN	**40.4**	**18.6**	**3.9**	**7.9**
	AVE	**48.5**	**22.3**	**6.2**	**9.2**
	MAX	**56.5**	**26.0**	**8.5**	**10.9**

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

Prepared by

CREATIVE ENGINEERS & CONSULTANTS CHENNAI 600 059

9B/4, Bharathwajar Street, East Tambaram, Chennai 600 059.

Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

AMBIENT AIR QUALITY

Project	:	Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd
Name of the Location	:	Venketramanapuram Village
Station Code	:	A2

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	07.03.2022	49.7	22.9	6.1	10.6
2	08.03.2022	53.9	24.8	6.7	11.9
3	18.03.2022	44.3	20.4	5.1	8.7
4	19.03.2022	46.7	21.5	5.5	9.6
5	21.03.2022	50.3	23.1	6.2	10.8
6	22.03.2022	55.1	25.3	6.9	12.2
7	01.04.2022	47.3	21.8	5.6	9.8
8	02.04.2022	42.5	19.6	4.7	8.2
9	04.04.2022	48.5	22.3	5.8	10.2
10	05.04.2022	57.8	26.6	7.9	12.8
11	15.04.2022	52.7	24.2	6.5	11.4
12	16.04.2022	47.9	22.0	5.7	10.1
13	18.04.2022	43.1	19.8	4.8	8.4
14	19.04.2022	49.1	22.6	5.9	10.5
15	29.04.2022	55.7	25.6	7.2	12.4
16	30.04.2022	51.5	23.7	6.3	11.1
17	02.05.2022	44.9	20.7	5.2	9.1
18	03.05.2022	46.1	21.2	5.4	9.4
19	13.05.2022	45.5	20.9	5.3	9.2
20	14.05.2022	54.5	25.1	6.8	12.1
21	16.05.2022	43.7	20.1	4.9	8.6
22	17.05.2022	53.3	24.5	6.6	11.6
23	27.05.2022	56.3	25.9	7.5	12.5
24	28.05.2022	52.1	24.0	6.4	11.2
	MIN	**42.5**	**19.6**	**4.7**	**8.2**
	AVE	**49.7**	**22.9**	**6.0**	**10.5**
	MAX	**57.8**	**26.6**	**7.9**	**12.8**

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

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9B/4, Bharathwajar Street, East Tambaram, Chennai 600 059.

Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

AMBIENT AIR QUALITY

Project	:	Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd
Name of the Location	:	Kollapuram Village
Station Code	:	A3

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	09.03.2022	59.4	27.9	7.7	11.6
2	10.03.2022	63.0	29.6	8.3	12.4
3	16.03.2022	51.3	24.1	6.7	9.8
4	17.03.2022	54.9	25.8	7.2	10.6
5	23.03.2022	53.1	25.0	6.9	10.2
6	24.03.2022	56.7	26.6	7.4	11.1
7	30.03.2022	50.4	23.7	6.6	9.6
8	31.03.2022	58.5	27.5	7.6	11.4
9	06.04.2022	52.2	24.5	6.8	10.1
10	07.04.2022	54.1	25.4	7.1	10.4
11	13.04.2022	69.3	32.6	8.9	13.8
12	14.04.2022	65.7	30.9	8.6	13.2
13	20.04.2022	73.2	34.4	10.1	15.8
14	21.04.2022	66.6	31.3	8.7	13.4
15	27.04.2022	60.3	28.3	7.8	11.9
16	28.04.2022	55.8	26.2	7.3	10.8
17	04.05.2022	71.1	33.4	9.5	15.5
18	05.05.2022	63.9	30.0	8.4	12.6
19	11.05.2022	57.6	27.1	7.5	11.2
20	12.05.2022	61.2	28.8	7.9	12.1
21	18.05.2022	67.5	31.7	8.8	13.6
22	19.05.2022	62.1	29.2	8.2	12.3
23	25.05.2022	70.2	33.0	9.2	14.2
24	26.05.2022	64.8	30.5	8.5	12.8
	MIN	**50.4**	**23.7**	**6.6**	**9.6**
	AVE	**61.0**	**28.6**	**8.0**	**12.1**
	MAX	**73.2**	**34.4**	**10.1**	**15.8**

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

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CREATIVE ENGINEERS & CONSULTANTS CHENNAI 600 059

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Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

AMBIENT AIR QUALITY

Project	:	Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd
Name of the Location	:	Palla kaveri Village
Station Code	:	A4

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	09.03.2022	62.2	30.2	8.3	12.7
2	10.03.2022	56.6	26.3	7.5	11.1
3	16.03.2022	58.7	27.3	7.7	11.5
4	17.03.2022	50.9	24.2	6.6	9.5
5	23.03.2022	48.2	22.9	6.2	8.7
6	24.03.2022	53.1	25.2	6.9	10.1
7	30.03.2022	62.9	30.6	8.4	12.9
8	31.03.2022	55.2	25.7	7.3	10.7
9	06.04.2022	63.6	30.9	8.5	13.1
10	07.04.2022	59.4	27.6	7.8	11.7
11	13.04.2022	48.9	23.3	6.3	8.9
12	14.04.2022	53.8	25.6	7.1	10.3
13	20.04.2022	49.6	23.6	6.4	9.1
14	21.04.2022	52.4	24.9	6.8	9.9
15	27.04.2022	66.2	32.2	9.3	14.5
16	28.04.2022	61.5	29.9	8.2	12.5
17	04.05.2022	55.9	26.2	7.4	10.9
18	05.05.2022	60.1	27.9	7.9	11.9
19	11.05.2022	64.3	31.2	8.7	13.4
20	12.05.2022	60.8	29.5	8.1	12.3
21	18.05.2022	57.3	26.6	7.6	11.5
22	19.05.2022	51.7	24.6	6.7	9.7
23	25.05.2022	50.3	23.9	6.5	9.3
24	26.05.2022	54.5	25.3	7.2	10.5
	MIN	**48.2**	**22.9**	**6.2**	**8.7**
	AVE	**56.6**	**26.9**	**7.5**	**11.1**
	MAX	**66.2**	**32.2**	**9.3**	**14.5**

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CREATIVE ENGINEERS & CONSULTANTS CHENNAI 600 059

9B/4, Bharathwajar Street, East Tambaram, Chennai 600 059.

Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

AMBIENT AIR QUALITY

Project	:	Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd
Name of the Location	:	Aminabad Village
Station Code	:	A5

SL.NO	DATE	PM10	PM2.5	SO2	NO2
1	11.03.2022	59.1	28.4	8.2	13.1
2	12.03.2022	54.5	26.2	7.1	11.5
3	14.03.2022	57.3	27.5	7.6	12.6
4	15.03.2022	51.9	24.9	6.5	10.7
5	25.03.2022	59.7	28.7	8.5	13.3
6	26.03.2022	54.9	26.4	7.2	11.7
7	28.03.2022	56.1	26.9	7.4	12.1
8	29.03.2022	48.9	23.5	5.9	9.7
9	08.04.2022	47.1	22.6	5.6	9.1
10	09.04.2022	51.3	24.6	6.4	10.5
11	11.04.2022	57.9	27.8	7.7	12.7
12	12.04.2022	50.7	24.3	6.3	10.3
13	22.04.2022	47.7	22.9	5.7	9.3
14	23.04.2022	53.1	25.5	6.7	11.1
15	25.04.2022	60.7	30.1	8.7	13.5
16	26.04.2022	55.5	26.6	7.3	11.9
17	06.05.2022	46.5	22.3	5.5	8.8
18	07.05.2022	50.1	24.1	6.2	10.1
19	09.05.2022	56.7	27.2	7.5	12.3
20	10.05.2022	49.5	23.8	6.1	9.9
21	20.05.2022	48.3	23.2	5.8	9.5
22	21.05.2022	52.5	25.2	6.6	11.1
23	23.05.2022	58.5	29.5	7.8	12.9
24	24.05.2022	53.7	25.8	6.9	11.3
	MIN	**46.5**	**22.3**	**5.5**	**8.8**
	AVE	**53.4**	**25.7**	**6.9**	**11.2**
	MAX	**60.7**	**30.1**	**8.7**	**13.5**

Note: BDL – Below Detectable Limit, DL: Detectable Limit.

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CREATIVE ENGINEERS & CONSULTANTS CHENNAI 600 059

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e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

CREATIVE ENGINEERS & CONSULTANTS

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

Creating Possibilities

WATER QUALITY DATA

Project Name	:	**Lime Kankar Mine of M/S.Chettinad Cement Corporation Pvt. Ltd**
Location Name	:	

Location Code	Location Name
W1	Srinivasapuram Village
W2	Venketramanapuram Village
W3	Palla kaveri Village
W4	Amnebda Village

S. No.	Parameter	Unit	W1	W 2	W 3	W 4	*Permissible Limits
1	pH	-	6.94	7.52	6.87	6.97	6.5-8.5
2	Electrical Conductivity	µmhos/cm	1021	1267	1084	726.5	-
3	Odor	-	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE	AGREEABLE
4	Turbidity	NTU	<1	<1	<1	<1	5.0
5	Total Hardness as $CaCO_3$	mg/L	318	384	329	296	600
6	Calcium Hardness $CaCO_3$	mg/L	255	337	239	198	-
7	Magnesium Hardness $CaCO_3$	mg/L	62.7	47.0	90	98	-
8	Calcium Ca	mg/L	102	135	95.6	79.2	200
9	Magnesium Mg	mg/L	15.1	11.3	21.6	23.5	100
10	Alkalinity $CaCO_3$	mg/L	315	330	340	242	600
11	Chloride Cl^-	mg/L	147	196	122	99.8	1000
12	Sulphate SO_4^{2-}	mg/L	158	202.0	215	71.0	400
13	Iron Fe	mg/L	0.07	BDL(D.L - 0.01)	0.03	0.07	0.3

9B/4, Bharathwajar Street, East Tambaram, Chennai 600 059.

Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

S. No.	Parameter	Unit	W1	W 2	W 3	W 4	*Permissible Limits
14	Nitrate NO_3	mg/L	2.08	1.80	3.10	3.97	45
15	Fluoride F	mg/L	0.26	0.37	0.42	0.39	1.5
16	Total Dissolved Solids	mg/L	615	760	655	440	2000
17	Free Residual Chlorine Cl^-	mg/L	BDL(D.L-0.2)	BDL(D.L-0.2)	BDL(D.L-0.2)	BDL(D.L-0.2)	1.0
18	Manganese Mn	mg/L	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	BDL(D.L-0.05)	0.3

Note: * **The water quality of the collected ground water samples were found to be within the prescribed permissible limits of IS: 10500:2012 Norms for Drinking in the absence of an alternative source.**

Prepared by

CREATIVE ENGINEERS & CONSULTANTS CHENNAI 600 059

9B/4, Bharathwajar Street, East Tambaram, Chennai 600 059.

Ph : 22395170, 9444133619,Fax : 91-44-22396643.

e-mail : cecgiri@yahoo.com, web : www.creativeengineers.co.in

LAND USE PATTERN OF THE STUDY AREA WITHIN 10 KM RADIUS AROUND THE PROPOSED PROJECT AREA

Sl.No	No. of Villages	Name of village	Total Geographical Area (in Hectares)	Forest Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Un-cultivable Land Area (in Hectares)	Permanent Pastures and Other Grazing Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Area (in Hectares)	Culturable Waste Land Area (in Hectares)	Fallows Land other than Current Fallows Area (in Hectares)	Current Fallows Area (in Hectares)	Total Unirrigated Land Area (in Hectares)	Area Irrigated by Source (in Hectares)
0-2km Ariyalur, Sub-district, District - Ariyalur													
1	1	Kallankurichi	1323.55	0	197.97	122.77	9.98	172.35	5.6	88.52	290.88	334.22	101.26
2	2	Ariyalur (North)	446.94	0	28.71	0	0	1.79	1.78	101.14	186.02	109.4	18.1
		total (A)	**1770.49**	**0**	**226.68**	**122.77**	**9.98**	**174.14**	**7.38**	**189.66**	**476.9**	**443.62**	**119.36**
2-5km Ariyalur, Sub-district, District - Ariyalur													
3	1	Ottakoil	1795.12	0	505.18	122.82	0	100	4.1	0	10	979.36	73.66
4	2	Govindapuram	1374.92	0	90.45	0	0	10.27	1.28	570.91	159.67	486.43	55.91
5	3	Ammenabath	559.45	0	93.54	174.5	0	9.92	62.97	56.56	0.45	136.27	25.24
6	4	Kayarlabath	1081.1	0	577.13	0	2.06	10.06	152.79	0	15.09	190.1	133.87
7	5	Valajanagaram	1212.8	0	461.11	0	10.66	10.2	184.91	0	15.19	405.62	125.11
2-5km Kunnam, Sub-district, District -Perambalur													
8	6	Alagiripalayam	608.93	0	131.03	0.37	0	24.88	1.8	23.02	2.95	419.34	5.54
		total (B)	**6632.32**	**0**	**1858.44**	**297.69**	**12.72**	**165.33**	**407.85**	**650.49**	**203.35**	**2617.12**	**419.33**
5-10km Ariyalur, Sub-district, District - Ariyalur													
9	1	Rayampuram	1160.97	0	148.87	11.05	0.48	96.95	39.03	5.24	105.15	582.97	171.23
10	2	Sennivanam	557.38	0	112.39	0	24.8	14.95	1.05	0	0.24	365.46	38.49
11	3	Kadugur	877.98	0	49.1	21.9	44	45.4	75.6	30.6	85.19	415.59	110.6
12	4	Thelur	1219.57	0	370.13	0	0	35.39	234.97	3.23	144.87	244.65	186.33
13	5	Periyanagalur	1194.7	0	291.08	149.36	0.35	22.2	194.18	277.56	16.8	117.03	126.14
14	6	Varanavasi	976.09	0	14.34	277.97	13.39	0	0	216.08	127.93	267	59.38
15	7	Siruvalur	704.41	0	140.06	165.2	0	0	0	15.2	2.56	345.79	35.6
16	8	Pudupalayam	976.39	0	140.68	387.45	9.2	32.25	0	0	72.62	294.67	39.52
17	9	Reddipalayam	1218.34	0	250.91	154	0	51.45	401.25	18.2	80.04	220.47	42.02
18	10	Sathamangalam	947.17	0	129.83	11.81	1.31	0	1.48	0	54.43	732.16	16.15
19	11	Arungal	2059.2	0	269.56	316	39.95	95.25	15.25	25.56	332.57	875.38	89.68
20	12	Alanduraiyarkattalai	673.36	0	104.1	110.35	0	15.86	0	26.2	29.99	369.38	17.48
5-10km Kunnam, Sub-district, District -Perambalur													
21	13	Periyammapalayam	1181.52	0	260.99	0	0	12.42	0	95.98	33.46	763.13	15.54
22	14	Periavenmani (East)	829.88	0	86.88	0	0	0	0	50.86	70.31	464.73	157.1
23	15	Periavenmani (West)	1029.17	0	130.99	0	0	10.4	28.67	130.29	8.65	653.34	66.83
24	16	Thondappadi	952.73	0	170.05	0.86	0	200.83	14.65	20.18	62.77	460.33	23.06
25	17	Koothur	898.23	10	75.72	5.21	2	1.92	91.19	4.39	250.26	443.96	13.58
26	18	Adhanur (South)	644.1	0	132.2	8.26	0	3.53	68	0	9.75	398.18	24.18
27	19	Nekkaselam	965.52	29	154.59	1.13	0.15	1.74	49.85	103.1	173.07	151.5	301.39
28	20	Thenur	1259.42	400.06	263.9	0.38	0	28.83	21.16	22	63.33	137.38	322.38
29	21	Mavilingai	547.07	0	77.47	36.12	13.42	0	13.25	53.7	20.09	140.12	192.9
30	22	Irur	2001.2	241.63	220.35	0.3	0	0.42	51.5	30.5	560.72	471.43	424.35
31	23	Zamin Athur	692.72	0	136.73	99.74	0.61	5.5	2.52	10.26	29.21	343.8	64.35
32	24	Sillakudi (North)	723.95	0	127.94	121.79	0	18.88	0	9.52	83.63	235.99	126.2
		total (C)	**24291.07**	**680.69**	**3858.86**	**1878.88**	**149.66**	**694.17**	**1303.6**	**1148.65**	**2417.64**	**9494.44**	**2664.48**
		Grand Total (A+B+C)	**32693.88**	**680.69**	**5943.98**	**2299.34**	**172.36**	**1033.64**	**1718.83**	**1988.8**	**3097.89**	**12555.18**	**3203.17**

**Source: District Primary Census Abstract Ariyalur & Perambalur District of Tamilnadu State-2011*

VAO LETTER

ANNEXURE- 12

அரியலூர் வருவாய் வட்டாட்சியர் அவர்கள் முன்பாக கல்லங்குறிச்சி கிராம நிர்வாக அலுவலர் அளித்த வாக்குமூலம்.

அரியலூர் வட்டம், கல்லங்குறிச்சி கிராமத்தில் திருவாளர்கள் செட்டிநாடு சிமெண்ட் நிறுவனத்தினர் தனிப்பட்டா எண். 2412ல் புல எண்கள்.226/2B, 241/1A 242/1 மற்றும் பல புல எண்களில் கூடுதல் விஸ்தீரணம் 4.37.0 ஹெக்டேர்ஸ் நிலத்தில் லைம் கங்கர் வெட்டி எடுக்க அனுமதி கோரிய விண்ணப்பத்தின் மீது 19.11.2016 அன்று புலத்தணிக்கை செய்தபோது நானும் உடன் இருந்தேன்.

அரியலூர் வட்டம், கல்லங்குறிச்சி கிராமத்தில் திருவாளர்கள் செட்டிநாடு சிமெண்ட் நிறுவனத்தினரால் கிரயம் பெறப்பட்டு பட்டா எண். 2412ல் மேற்கண்ட புல எண்கள் பதிவாகி உள்ளது. பட்டா நிலங்களில், அரசுக்கோ, அரசு சார்ந்த நிறுவனங்களுக்கோ நிலம் கையகம் செய்ய அரசு ஆணை எதுவும் நிலுவையில் இல்லை. கல்லங்குறிச்சி கிராமத்தில் திருவாளர்கள் செட்டிநாடு சிமெண்ட் நிறுவனத்தினரால் லைம் கங்கர் வெட்டி எடுக்க அனுமதி கோரியுள்ள நிலத்தில் இருந்து 500 மீட்டருக்குள் குடியிருப்புகளோ அங்கீகரிக்கப்பட்ட நத்தம் குடியிருப்புகளும் ஏதும் இல்லை. லைம் கங்கர் வெட்டி எடுக்க அனுமதி கோரியுள்ள நிலங்களின் வடக்கே புல எண். 226/2A கிராம கணக்குகளில் பட்டா நிலம் எனவும், பூஸ்தியில் தற்போது தார்சாலையாகவும் உள்ளது. மேற்கில் புல எண். 226/1ல் தென்புறத்தில் வாரி ஒன்று செல்கிறது. கிழக்கில் நடுபகுதியில் புல எண். 241/2ல் வண்டிப்பாதை என "அ" பதிவேட்டில் பதிவாகி உள்ளது. மேலும், குத்தகை அனுமதி கோரும் நிலத்தில் இருந்து மேற்படி நிலங்களில் மத உணர்வை தூண்டும் வகையில் கோயில், மசூதி, சர்ச் மற்றும் புராதான சின்னங்கள் போன்ற நிலையான அமைப்புகள் ஏதும் இல்லை. குத்தகை உரிமம் அனுமதி கோரும் நிலங்களின் வழியாக உயர் அழுத்த மின் கம்பி ஒன்று புல எண். 246/1B, 6Aல் வடகிழக்கிலிருந்து தென்மேற்காக செல்கிறது.

மேற்கண்ட பட்டா நிலங்களில் லைம் கங்கர் வெட்டி எடுக்க அரசு அனுமதி அளிக்கும்பட்சத்தில் மேற்படி நிறுவனத்தினரால் பொதுமக்களுக்கு எவ்வித சுகாதாரக்கேடும் இல்லை. எனவே, செட்டிநாடு சிமெண்ட் நிறுவனத்தினருக்கு லைம் கங்கர் வெட்டி எடுக்க குத்தகை உரிமம் வழங்கலாம் என தெரிவித்துக் கொள்கிறேன்.

/படித்துப் பார்த்தேன் சரி/

12-11-16

கிராம நிர்வாக அலுவலர்
மற்றும்
பிறப்பு இறப்பு பதிவாளர்
12-கல்லங்குறிச்சி.
அரியலூர் வட்டம்