DRAFT OF ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

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

"B1" CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 7.98.50hectares

At

Kondalankuppam Village, Vanur Taluk,

Villuppuram District, Tamil Nadu State

TOR File No.10560 and TOR Identification No. TO23B0108TN5920417N, Dated.02/04/2024.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.	Production in m^3
Mr.S.Vasantharaj S/o Selvaraj No.477, M.G.Road, Ramakrishna Nagar, Muthialpet, Puducherry – 605 003.	**1.93.50 Ha & 71/2 & 88/1**	**Ordinary earth - 22810**

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

NABET ACC. NO: NABET/EIA/23-26/RA 0319
Valid till: 31.12.2026

ENVIRONMENTAL LAB

EKDANT ENVIRO SERVICES (P) LIMITED

NABL Accredited and Recognised Laboratory

No.R7/1,avk Tower, North Main Road, Anna Nagar, West Exten.

Chennai – 600 101

NABL Certificate Number: TC- 11742,

Valid Until: 31/05/2025

Baseline Study Period – December 2022 - February, 2023

TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.10560

ToR Identification No. TO23B0108TN5920417N, Dated.02/04/2024

Mr.S.Vasantharaj, Ordinary Earth Quarry.

Specific Terms of Reference for (Mining of Minerals)

1. Seiaa Specific Conditions:

S.No	Terms of Reference		
1.1	1	The PP shall change the Name of the mineral as "Ordinary Earth" instead of "Red Earth" in the 500m cluster letter issued by Deputy Director mines vide dated 11.10.2023 and also in the approved mine plan wherever it occurs.	The Name of the mineral as "Ordinary Earth" instead of "Red Earth" in the 500m cluster letter and in the approved mining plan is attached in the Annexure II.
	2	The PP shall furnish NOC obtained from the Director, Agriculture Department that the removal of ordinary earth will not affect the agriculture nearby area.	NOC obtained from the Director, Agriculture Department will be submitted during the final EIA report.

2. Mining Conditions – Site Specific

S.No	Terms of Reference	
2.1	1. The PP shall change the Name of the mineral as "Ordinary Earth" instead of "Red Earth" in the 500m cluster letter issued by Deputy Director mines vide dated 11.10.2023 and also in the approved mine plan wherever it occurs.	The Name of the mineral as "Ordinary Earth" instead of "Red Earth" in the 500m cluster letter and in the approved mining plan is attached in the Annexure II.

3. Seiaa Standard Conditions:

Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	A cluster management committee including all the proponents of the ordinary earth quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of green belt development plan, water sprinkling, blasting, etc.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development Water sprinkling, tree plantation, blasting etc.,	The members of the cluster management committee will be instructed to carry out EMP in coordination.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	All the information has been discussed in Section 2.7 under Chapter II in the EIA report page 16.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially	It will be informed to the committee.

	during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental po`licy devised will be given in detail.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall furnish the Emergency Management plan within the cluster.	The committee will submit the emergency management plan to the respective authority in the stipulated time period.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	The information on the health of the workers and the local people will be updated periodically.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	The committee will submit the fire safety and evacuation plan as discussed in Section 7.2 under Chapter VII in the EIA report page 102-105.

Impact study of mining			
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following.		
	a)	Soil health & soil biological, physical land chemical features.	Soil health and biodiversity have been discussed in Sections 3.3.2 and 3.3.6 respectively under Chapter III in the EIA report page 26-29 & 54-69.
	b)	Climate change leading to Droughts, Floods etc.	Climatic condition of the proposed project area has been discussed in Section 3.3.4 under Chapter III in the EIA report page 40-41.
	c)	Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local People.	The information about CO_2 emission has been added to Section 4.2.6 under Chapter IV in the EIA report page 88-90.
	d)	Possibi1ities of water contamination and impact on aquatic ecosystem health.	Possibilities of both surface and ground water contamination have been discussed in Section 4.2.3 under Chapter IV in the EIA report page 81. The impact on aquatic species has been discussed in Section 4.2.6 under Chapter IV in the EIA report page 92.
	e)	Agriculture, Forestry, & Traditional practices.	Sorgum, millet, groundnut, and coconut are the primary crops that are cultivated in the study area.
	f)	Hydrothermal/Geothermal effect due to destruction in the Environment.	The average geothermal gradient of earth is 25^0C/km. As the proposed depth of mining is 2m below the local ground level, the temperature will increase by 0.5^0C at the depth of mining.
	g)	Bio-geochemical processes and its foot prints including environmental stress.	Data is not included.

	h)	Sediment geochemistry in the surface streams.	The details of sediment geochemistry is discussed in the Table 3.4 under Chapter III in the EIA report page 29.

	Agriculture & Agro-Biodiversity	
13	Impact on surrounding agricultural fields around the proposed mining area.	There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.2.6 under Chapter IV in the EIA report page 88-93.
14	Impact on soil flora & vegetation around the project site.	The details on flora have been provided in Section 3.3.6 under Chapter III in the EIA report page 54-69. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area shall be given and if so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details of vegetation in the lease area have been provided in Section 3.3.6 under Chapter III in the EIA report page 54-69. Details about transplantation of plants have been provided in Section 4.2.6 under Chapter IV, in the EIA report page 88-93.
16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.3.6 under Chapter III in the EIA report page 54-69. and measures have been provided in Section 4.2.6 under Chapter IV, in the EIA report page 88-93.

17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 79-96.
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 79-80.
	Forests	
19	The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.	The project proponent shall do barbed wire fencing work and develop a green belt around the lease area to prevent wildlife from entering the site.
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.2.6 under Chapter IV in the EIA report page 88-93.
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.2.6 under Chapter IV in the EIA report page 88-93.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	The protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.42 under Chapter III in the EIA report page 77.
	Water Environment	

23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	Detailed hydrogeological study will be submitted in the final EIA report.
24	Erosion control measures.	Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.2.3 under Chapter IV in the EIA report page 81-82
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, waterbodies/rivers & any ecological fragile areas.	The matter has been discussed under Chapter IV in the EIA report page 79-96.
26	The project proponent shall study impact on fish habitats and the food WEB/food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem has been discussed in Section 3.3.6 under Chapter 3 in the EIA report page 64.
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV in the EIA report page 79-96.

28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sits possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.2.6 under Chapter IV in the EIA report page 92.
29.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components.	The impact of mining on soil environment has been discussed in Section 4.2.2 under Chapter IV in the EIA report page 80-81.
30	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.2.6 under Chapter IV in the EIA report page 88-93.
Energy		
31	The measures taken to control Noise, Air, water, Dust control and steps adopted to efficiently utilise the Energy shall be furnished.	The measures taken to control noise, air, water, and dust have been given under Chapter IV in the EIA report page 79-96.
Climate Change		
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.2.6 under Chapter IV in the EIA report page 88-90.

33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The matter has been discussed in Chapter IV in the EIA report page 79-96.
	Mine Closure Plan	
34	Detailed Mine closure plan covering the entire mine lease period as per precise area communication order issued.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan is discussed in Table 2.8 under Chapter II in the EIA report page 17.
	EMP	
35	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management plan has been given under Chapter X in the EIA report page 115-121.
36	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	A detailed Environment Management plan has been given in Tables 10.1 & 10.2 under Chapter X in the EIA report page 117-121.
	Risk Assessment	
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII in the EIA report page 102-105.
	Disaster Management Plan	
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability	The disaster management plan for this project has been provided in Section 7.2 under Chapter VII in the report page 104-105.

	to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	
	Others	
39.	The project proponent shall furnish VAO certificate with reference to 300 m radius regard to approved habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, river, lake pond, tank etc.	The VAO certificate of 300 m radius is submitted in the Annexure IV.
40	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management plan.	The concerns raised during the public consultation is submitted in final EIA
41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The matter on plastic waste management has been given in Section 7.3 under Chapter VII in the EIA report page 109-110.

Specific Terms of Reference for (Mining of Minerals)

1.

S.No	Terms of Reference	
1.1	An EIA-EMP Report shall be prepared for peak capacity (...MTPA) operation in an ML/project area of. ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Yes, it is based on the generic structure specified in Appendix III of the EIA Notification, 2006. i.e., the peak capacity of the proposed quarry is 22810 MTPA and operation in an ML/project area of 1.93.5 ha.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modelling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection can be for any season (three months) except monsoon.	The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering December 2022 – February 2023 with CPCB guidelines. The detailed baseline environmental monitoring studies were carried out and the results are discussed in the Chapter III and the approved mining plan is attached in the Annexure III.
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided	The KML file with proper pin drop and coordinate of the mine will be uploaded during the online submission.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical	The details of environmentally sensitive ecological features in the study area are given in the Table 3.42 under Chapter III in the EIA report page 77.

	features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also	
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	The map showing the lease area with cluster details is shown in the Figure 1.1, Chapter I, In the EIA report page 2. The details are given in the Table 3.42 under Chapter III in the EIA report page 77.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major	The contour map will be submitted in the final EIA report.

	rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted.	The catchment area map will be submitted in the final EIA report.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	The reserve details are discussed in the Section 2.5.1 under Chapter II in the EIA report page 14.

1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	The details of mining method, technology, equipment, etc is discussed in the Section 2.7 under Chapter II in the EIA report page 16.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channelling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	There is no any drainage within or around the lease area. The drainage map is shown in Figure 3.3A under Chapter III in the EIA report page 25.
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.	Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.7 under Chapter II in the EIA report page 16-17. There is no any drainage within or around the lease area. The drainage map is shown in Figure 3.3A under Chapter III in the EIA report page 25. The traffic survey conducted based on the transportation route of material, the ordinary earth is proposed to be transported mainly through Village Road and Mayilam–Pondicherry (SH-136) as shown in Table 3.38 and in Figure 3.28 under Chapter III in the EIA report page 75-76.
1.12	Original land use (agricultural land/forestland/grazing land / wasteland / water bodies) of the area should be provided as per the tables given below. Impacts of project, if any	

<table>
<tr><td></td><td colspan="5">on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights.

<table>
<tr><td>S.No</td><td>ML/Project Land use</td><td>Area under Surface Area Rights(ha)</td><td>Area Under Mining Rights(ha)</td><td>Area under Both (ha)</td><td></td></tr>
<tr><td>1</td><td>Agricultural land</td><td>---</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>Forest Land</td><td>---</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>Grazing Land</td><td>---</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Settlements</td><td>---</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>Others (specify)</td><td>1.93.50</td><td>1.93.50</td><td></td><td></td></tr>
<tr><td>S.No</td><td colspan="2">Details</td><td>Area (ha)</td><td colspan="2" rowspan="5"></td></tr>
<tr><td>1</td><td colspan="2">Buildings</td><td>0</td></tr>
<tr><td>2</td><td colspan="2">Infrastructure</td><td>0</td></tr>
<tr><td>3</td><td colspan="2">Roads</td><td>0</td></tr>
<tr><td>4</td><td colspan="2">Others (area under quarry)</td><td>1.93.50</td></tr>
<tr><td colspan="3">Total</td><td>1.93.50</td><td colspan="2"></td></tr>
</table></td></tr>
<tr><td>1.13</td><td>Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-</td><td colspan="4">The details on flora and fauna have been provided in Section 3.3.6 under Chapter III in the EIA report 54.</td></tr>
</table>

	I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.	
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering December 2022 - February 2023 with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified *Ekdant Enviro Services(P) Limited* for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats,	The detailed study is discussed in the Chapter III in the EIA page 19-78.

	other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.	
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of	10km baseline study can be conducted only when total cluster area extent of the projects is above 25ha. Here, the proposed cluster area of the projects is less than 25ha, (i.e,7.98.50ha) and so baseline monitoring study is done for 5 km only. The baseline study of the air quality is discussed in the Section 3.3.4 under Chapter III in the EIA report page 40-50.

	CAAQMS and its comparison with the monitoring data to be provided.	
1.17	A detailed traffic study along with presence of habitation in 100m distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	There is no need of road widening, the details of traffic study are discussed in the Section 3.3.8 under Chapter III in the EIA report 74-76. Carbon released from quarrying machineries and tippers during quarrying would be 396 kg per day, 106979 kg per year and 213958 kg over five years.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.	The socio-economic study is discussed in the Section 3.3.7 under Chapter III in the EIA report page 69-74.

1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	There is no forest within 10km. The Ecology and biodiversity study is discussed in the Section 3.3.6 under Chapter III in the EIA report page 54-69. To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 46394 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.	The occupational health and safety of the personnel and manpower for the mine is submitted in the Section 4.5 under Chapter IV in the EIA report page 95-96.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.	The hydrological study of the proposed project lease area will be submitted in the final EIA report.
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater	Not Applicable. The rock formation of low resistivity values indicates occurrence of water at the depth of about 70 m below ground level. The maximum depth proposed for the proposed project is 2 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

<table>
<tr><td></td><td>availability and/or if the area falls within dark/grey zone.</td><td></td></tr>
<tr><td>1.23</td><td>Study on land subsidence including modelling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.</td><td>Not applicable.
The proposed project is new lease area.</td></tr>
<tr><td>1.24</td><td>Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.</td><td><table>
<tr><th>Purpose</th><th>Quantity</th><th>Source</th></tr>
<tr><td>Dust Suppression</td><td>0.5 KLD</td><td rowspan="4">The water requirement is purchased from the authorized water vendor.</td></tr>
<tr><td>Green Belt development</td><td>0.5 KLD</td></tr>
<tr><td>Drinking & Domestic</td><td>1.0 KLD</td></tr>
<tr><td>Total</td><td>2.0 KLD</td></tr>
</table></td></tr>
<tr><td>1.25</td><td>PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs</td><td>Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.</td></tr>
<tr><td>1.26</td><td>PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored</td><td>The PP is adviced to use LNG/CNG trucks in mining operation because these trucks can control air pollution and noise pollution.</td></tr>
</table>

1.27	PP to evaluate the greenhouse emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	There is no greenhouse emission in the project lease area.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	The details are discussed in the Section 7.2 under Chapter VII in the EIA report page 102-105.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	The impact on the air quality is discussed in the Section 4.2.4 under Chapter IV in the EIA report page 82-86.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.	The details regarding is discussed in the Section 4.2.4 under Chapter IV in the EIA report page 86.

1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	The details are given in the Section 2.8.2 under Chapter II in the EIA report page 16-17.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.	Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.	The present mining is proposed to an average depth of 2m BGL. After completion of ordinary earth quarry area will be utilized agricultural purpose. The details of mine closure budget is discussed in the Section 2.8 under Chapter II in the EIA report page 17.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be	The details are given in the Section 4.2.6 under Chapter IV in the EIA report page 88-93.

1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.		The detailed EMP is given under Chapter X in the EIA report page 115-121.
1.36	Details of R&R. Detailed project specific R&R plan with data on the existing socio-economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with schedule of the implementation of the R&R plan should be given.		Not Applicable. The proposed lease area belongs to the lessee and there is no any habitation in the lease area.
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.		The CSR plan is discussed in the Section 8.6 under the Chapter VIII in the EIA report page 112.
1.38	Corporate Environment Responsibility:		
1.39	a)	The Company must have a well laid down Environment Policy approved by the Board of Directors.	The CER plan is discussed in the Section 8.7 under Chapter VIII in the EIA report page 112-113.
1.40	b)	The Environment Policy must prescribe for standard operating process/procedures to bring into focus any	

		infringements/deviation/violation of the environmental or forest norms/conditions.	
1.41	c)	The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.	
1.42	d)	To have proper checks and balances, the company should have a well laid down 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.	
1.43	e)	Environment Management Cell and its responsibilities to be clearly spleel out in EIA/ EMP report	
1.44	f)	In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.	
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.		No litigation is pending in any court against this project.
1.46	PP shall submit clarification from DFO that mine does not fall under corridors of		The DFO letter will be submitted in final EIA report.

<table>
<tr><td></td><td>any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.</td><td></td></tr>
<tr><td>1.47</td><td>Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.</td><td>The clearance copy of approved mining plan letter is attached in the Annexure III.</td></tr>
<tr><td>1.48</td><td colspan="2">Details on the Forest Clearance should be given as per the format given:
<table>
<tr><th>Total ML Project Area</th><th>Total Forest land (ha) If more than one provides details of each FC</th><th>Date of FC</th><th>Extent of Forest Land</th><th>Balance area for which FC is yet to be obtained</th><th>Status of appl for diversion of forest land</th></tr>
<tr><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr>
</table></td></tr>
<tr><td>1.49</td><td>In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report</td><td>Approved Mining plan of the expansion proposal is attached in the Annexure III and the mine closure plan is discussed in the Table 2.8 under Chapter II in the EIA report page 17.</td></tr>
<tr><td>1.50</td><td>Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English</td><td>The public hearing comments will be submitted during final EIA report.</td></tr>
</table>

	Translation of the same should be provided.	
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes	The drone video survey will be submitted in the final EIA report.
1.52	Detailed Chronology of the project starting from the first lease deed alloted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.	It is not applicable for this project because it is a fresh quarry lease area.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	The first page of the EIA report mentions the peak capacity production, area, project proponent details, Consultant and NABET details0 and authorized Laboratory (NABL / MoEF & CC certification) details.
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter's section.	ToR Compliance is cited with respective chapter section and page no in tabular form.

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CHAPTER I
INTRODUCTION

1.1 PURPOSE OF THE REPORT

Preamble

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14th August 2018, all the mining projects are broadly classified into two categories, i.e., category A and category B, based on the spatial extent of the projects. The category B projects are further divided in to B1 and B2 on the basis of the guidelines issued of the Ministry of Environment and Forests. All mining projects included in category B1 require an EIA report for obtaining environmental clearance from the State Environment Impact Assessment Authority (SEIAA). As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 50 ha in the case of non-coal mine lease, the proposed project falls under the category B1 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance as per the order dated 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

In compliance with TOR obtained vide TOR File No.10560 and TOR Identification No. TO23B0108TN5920417N, Dated.02/04/2024, This EIA report has been prepared for the project proponent Mr.S.Vasantharaj applied for ordinary earth quarry lease in the patta land falling in S.F.No's.71/2 and 88/1, over an extent of 1.93.5ha in Kondalankuppam Village, Vanur Taluk, Villuppuram District, Tamil Nadu. This EIA report takes into account the ordinary ordinary earth quarry within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains three proposed projects, known as P1, P2, P3 and one Existing Project known as E1. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) dated 1st July 2016. The total extent of all the quarries is 7.98.50ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

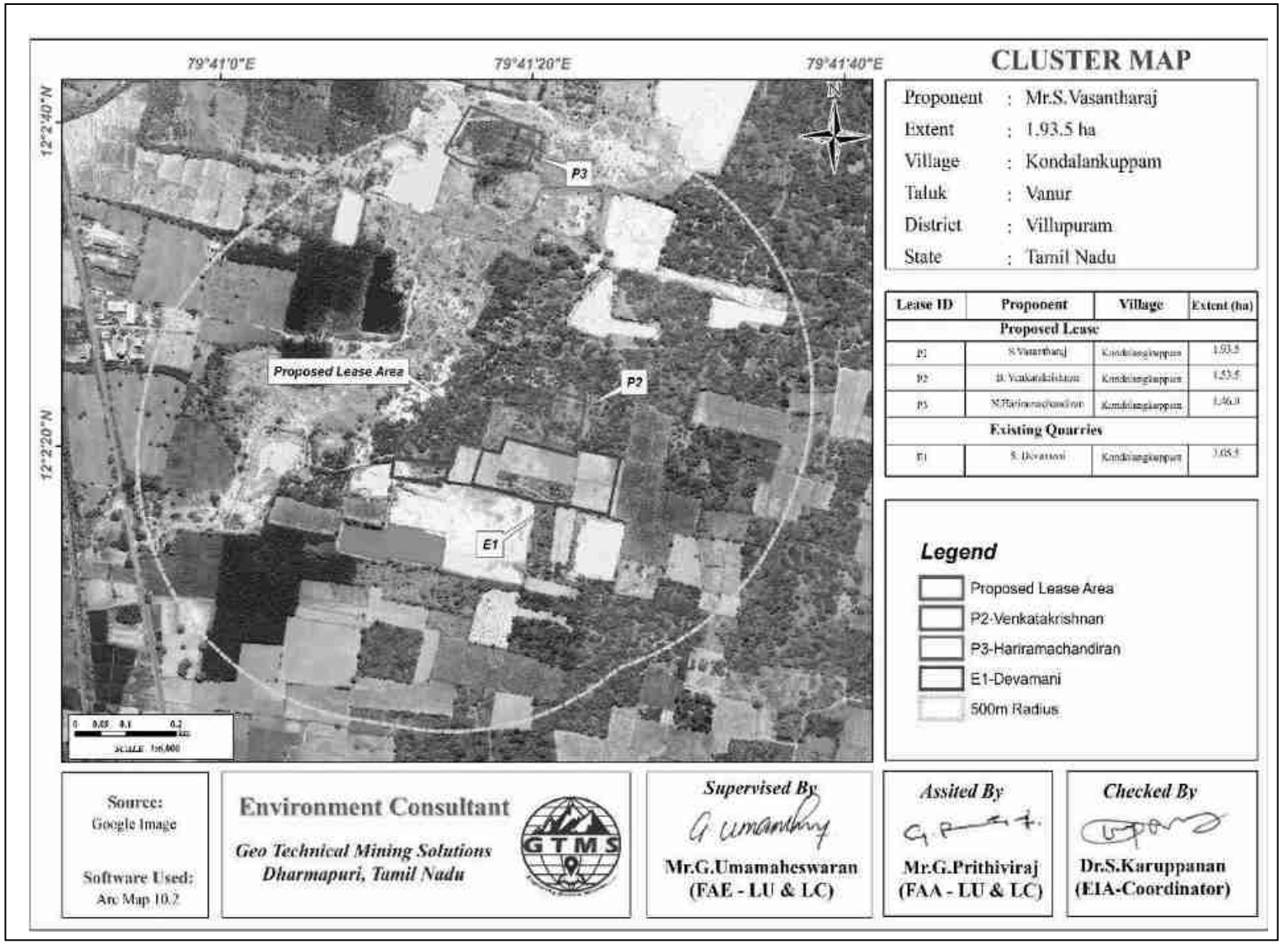


Figure 1.1 Location of the proposed and existing Ordinary Earth quarries in the cluster of 500m radius

Table 1.1 Details of Quarries within the cluster area of 500 m radius

ProposedQuarries				
Code	**Name of the owner**	**S. F. No. and Village**	**Extent (ha)**	**Status**
P1	S.Vasantharaj	71/2, 88/1 Kondalankuppam	1.93.5	Proposed Area
P2	B. Venkatakrishnan	70/2, 70/3 70/4, 70/5A, 71/3 Kondalankuppam	1.53.5	Applied Area
P3	N.Hariramachandiran	60/3 Kondalankuppam	1.46.0	Applied Area
Existing Quarries				
E1	S.Devamani	69/2, 70/5B,70/6, 70/7B, 70/8, 88/2 Kondalankuppam	3.05.5	06.10.2022 to 05.10.2025
Total Cluster Extent			**7.98.50**	

Source:

DD Letter - Rc.No. A/G&M/93/2023, Dated:11.10.2023.

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

1.2 IDENTIFICATION OF THE PROJECT AND PROPONENT

- ***Identification of the Project***

The ordinary earth quarry lease in S.F.No.71/2 and 88/1 over on extent of 1.93.50Hect, Patta land of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu.

- ***Identification of the* Proponent**

The applicant Mr.S.Vasantharaj S/o Selvaraj No.477, M.G.Road, Ramakrishna Nagar, Muthialpet, Puducherry – 605 003.

1.3 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of ordinary earth quarry which is primarily used in construction projects. The method adopted for ordinary earth excavation is Open Cast manual mining method. Some of the important features of the proposed project have been provided in Table 1.2.

Table 1.2 Brief Description of the Proposed Project

Name of the Quarry	Mr.S.Vasatharaj
Type of Land	Patta land
Extent	1.93.5 ha

S.F. No.	71/2 & 88/1		
Village	Kondalankuppam		
Taluk & District	Vanur & Villuppuram		
State & Country	Tamilnadu & India		
Toposheet No.	57 P/12		
Maximum Elevation	80 m AMSL		
Latitude	12°2'18.66"N to 12°2'23.97"N		
Longitude	79°41'11.19"E to 79°41'21.41"E		
Ultimate Depth of Mining	2.0m BGL		
Geological Resources	Ordinary earth (m^3) - 38714		
Mineable Reserves	Ordinary earth (m^3) - 22810		
Proposed production for 2 years	Ordinary earth (m^3) - 22810		
Ultimate Pit Dimensions	Length (m)	Width (m)	Depth (m)
	108	99	2
Method of Mining	The mining operation is open-cast semi-mechanized methods are adopted and on single shift basis only. It is being loose in nature. No drilling or blasting is proposed for this type of ordinary earth quarry lease.		
Topography	Flat Topography		
Machinery Proposed	Excavator	1	
	Tipper	4	
Proposed Manpower Deployment	8 persons		
Project Cost	Rs.15,33,000/-		

1.4 SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact of the quarries in the cluster on the study area and formulate the effective mitigation measures for each individual lease. A detailed account of the emission sources, emissions control equipment, background air quality levels, meteorological measurements, dispersion model and all other aspects of pollution like effluent discharge, and dust generation has been provided in this report. The baseline monitoring study has been carried out during the period of **December 2022-February 2023** for various environmental components such as land, soil, air, water, noise, ecology, etc. to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of sample analysis, etc., are given in Table 3.1 in chapter III.

1.4.1 Terms of Reference (ToR)

The SEAC framed a comprehensive Terms of Reference (TOR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued TOR to the proponent vide TOR File No.10560 and TOR Identification No. TO23B0108TN5920417N, Dated.02/04/2024.

1.4.2 Environmental Clearance

The Environmental Clearance process for the project will comprise of four stages. These stages are given below:

- Screening
- Scoping
- Public consultation &
- Appraisal

Screening

Screening is the first stage of the EIA process. In this stage, the State level Expert Appraisal Committee (SEAC) examined the application of EC made by the proponent in Form 1 through online (Proposal No. SIA/TN/ MIN/ 451203/2023, dated 25.11.2023) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on 25.11.2023.

Scoping

The proposal was placed in the 441th meeting of SEAC on 31.01.2024. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) and the recommendation for ToR is subjected to the outcome of the Honourable NGT, Principal Bench, New Delhi (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).

Public Consultation

In this stage, an application along with the draft of EIA and EMP report will be made to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing ensuring public participation at the project site or in its close proximity in the district. During public hearing, an opportunity will be given to the people living nearby the project site to express their opinions about the impact of the proposed project on the environment. The outcome of the public hearing meeting will be submitted in the final EIA report.

Appraisal

In this stage, an application along with final EIA report including the outcome of the public consultations will be made to the SEIAA. The application thus made will be scrutinized by the SEAC. Then, the SEAC will make recommendations to grant EC or reject the application to the SEIAA.

1.4.3 Post Environment Clearance Monitoring

For category B projects, irrespective of its clearance by MoEF/SEIAA, the project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of MoEF website where it is displayed.

After obtaining EC, the project proponent will submit a half-yearly compliance report of stipulated environmental clearance terms and conditions to MoEF & CC Regional Office & SEIAA on 1st June and 1st December of every year.

1.4.4 Transferability of Environmental Clearance

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written "no objection" by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period (EIA Guidance Manual for Mining of Minerals, 20).

Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

- The Mines Act, 1952.
- The Mines and Mineral (Development and Regulation) Act, 1957.
- Mines Rules, 1955.
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988.
- State Minor Mineral Concession Rules, 1960.
- Granite Conservation and Development Rule, 1999.
- The Water (Prevention and Control of pollution) Act, 1974.
- The Air (Prevention and Control of pollution) Act,1981.
- The Environment (Protection) Act, 1986.
- The Forest (Conservation) Act, 1988.
- The Wildlife (Protection) Act, 1972.

CHAPTER II
PROJECT DESCRIPTION

2.0 GENERAL

The Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14-09-2006, as amended from time to time and the EIA Guideline Manual for Mining of Minerals (Feb, 2010) of MoEF, Govt. of India, for seeking environmental clearance for Ordinary earth mining.

2.1 DESCRIPTION OF THE PROJECT

The Proponent, **Mr.S.Vasantharaj** is involved in the undertaking of establishment, construction, development, and closure of opencast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of ordinary earth quarry. Therefore, the proponent had applied for quarry lease on 24.07.2023 to extract ordinary earth quarry. The precise area communication letter was issued by Department of Geology and Mining, Villuppuram vide Rc.No.A/G&M/93/2023 dated 09.10.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Villuppuram (Rc.No.A/G& M/93/2023 dated 11.10.2023). The overall view of the project site is shown in Figure 2.1.

Figure 2.1 Overall View of Proposed Project Site

2.2 TYPE OF THE PROJECT

The proposed project is excavation of Ordinary earth from patta land. The mining operation is opencast semi mechanized methods are adopted and on single shift basis only. It is a being loose in nature no drilling is blasting in proposed for this type of ordinary earth quarry lease it is an ecofriendly quarrying operation.

2.3 NEED FOR THE PROJECT

Ordinary earth is used in almost any type of construction activity. It is also the most important input in domestic activity. Further, the material can also be used for road fillings purposes. Thus, in current times, where the focus of the governments is on improvement of basic infrastructure like roads, railways, dams and other social infrastructure – both in rural and urban areas, there is a constant need for ensuring regular supply of these minor minerals.

2.4 LOCATION OF THE PROJECT

The proposed quarry project is located in Kondalankuppam Village, Vanur Taluk, Villuppuram District, as shown in Figure 2.2 & 2.3. The area lies between Latitudes from 12°2'18.66"N to 12°2'23.97"N and Longitudes from 79°41'11.19"E to 79°41'21.41"E. The maximum altitude of the project area is 80m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

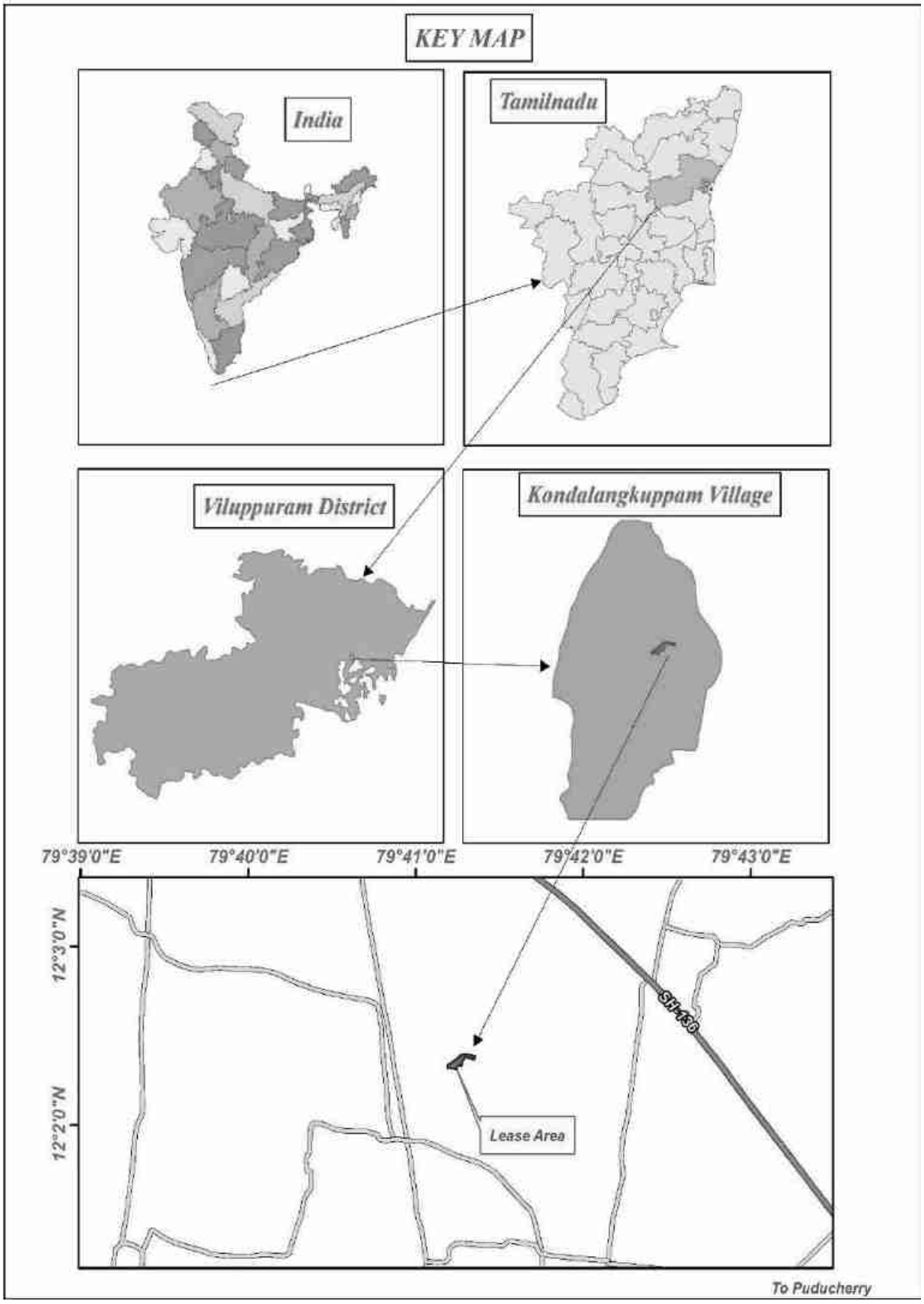


Figure 2.2 Key Map Showing Location of the Project Site

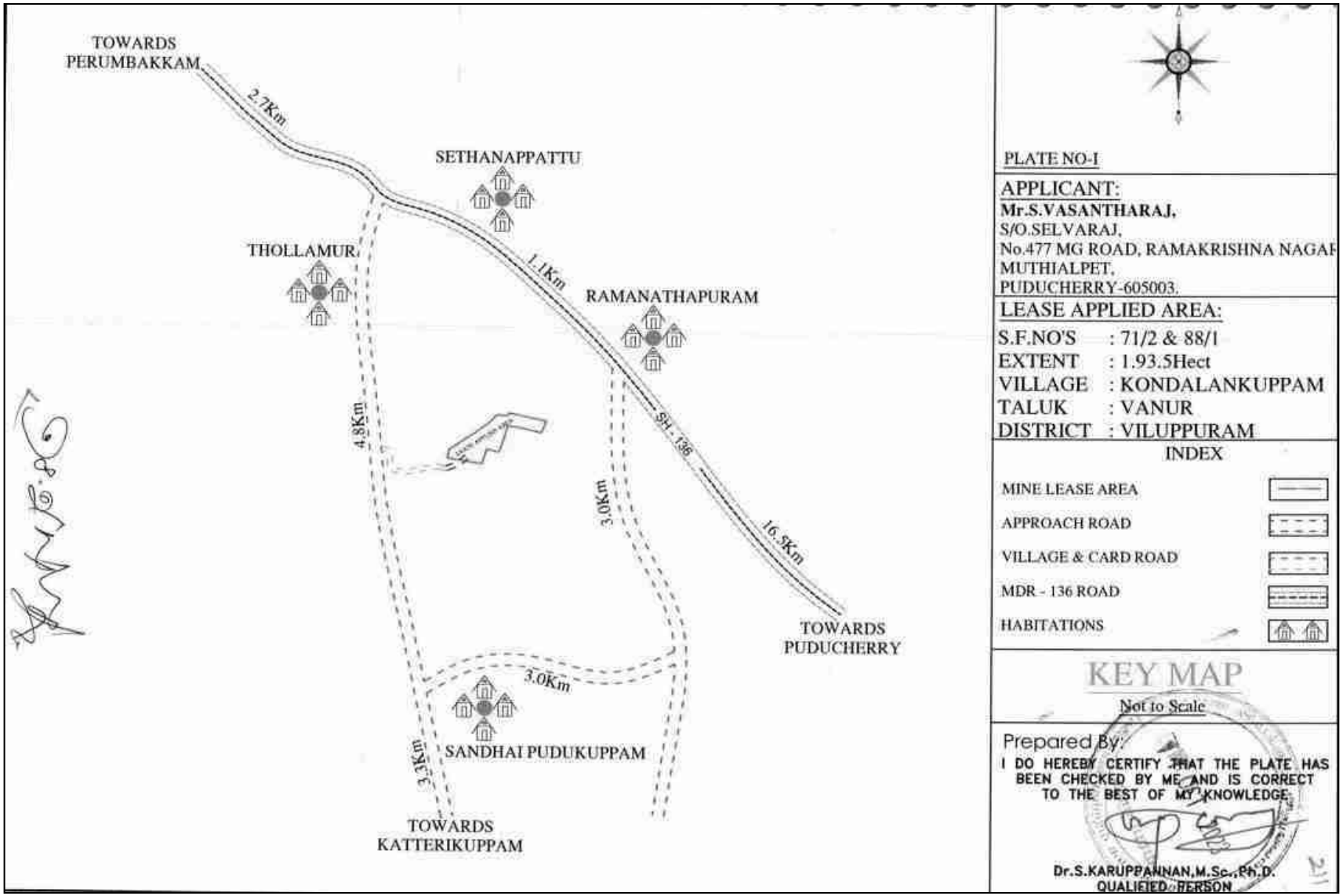


Figure 2.3 Route Map of the Project Site

Table 2.1 Site Connectivity to the Project Area

Type of Features	Name/Location	Distance (km)	Direction
Nearest Roadways	SH - 136	2.14km	N
	MDR- 808	3.26km	W
Nearest Town	Vanur	4.30 km	E
Nearest Railway Station	Chinna Babu Samudram	12.9 km	S
Nearest Airport	Puducherry	15.9km	SE
Nearest Seaport	Chennai	132.5km	N
Nearest Villages	Parankani	1.70km	N
	Ramanathapuram	1.73km	NE
	Kondalamkuppam	0.98km	SW
	Thollamur	1.16km	W

2.4.1 Leasehold Area

- The extent of the proposed project site is 1.93.50 ha.
- The proposed project is site specific.
- There is no mineral beneficiation or processing proposed inside the project area.
- There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

2.4.2 Corner Coordinates

The boundary corner geographic coordinates are given in Table 2.2 and the proposed project site with boundary coordinates has been shown in Figure 2.4.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude	Pillar ID	Latitude	Longitude
1	12°2'23.19"N	79°41'21.41"E	8	12°2'19.22"N	79°41'11.19"E
2	12°2'21.98"N	79°41'20.91"E	9	12°2'20.12"N	79°41'11.36"E
3	12°2'22.42"N	79°41'18.97"E	10	12°2'21.56"N	79°41'13.52"E
4	12°2'22.67"N	79°41'17.43"E	11	12°2'22.97"N	79°41'15.45"E
5	12°2'19.90"N	79°41'16.53"E	12	12°2'23.79"N	79°41'16.31"E
6	12°2'20.18"N	79°41'15.22"E	13	12°2'23.67"N	79°41'17.33"E
7	12°2'18.66"N	79°41'14.74"E	14	12°2'23.97"N	79°41'17.58"E

2.4.3 Geology

The lease area geologically occurs Sandstone. The Sandstone, commercially called as sand. Also, the lease area geomorphologically occurs pediment pediplain complex.

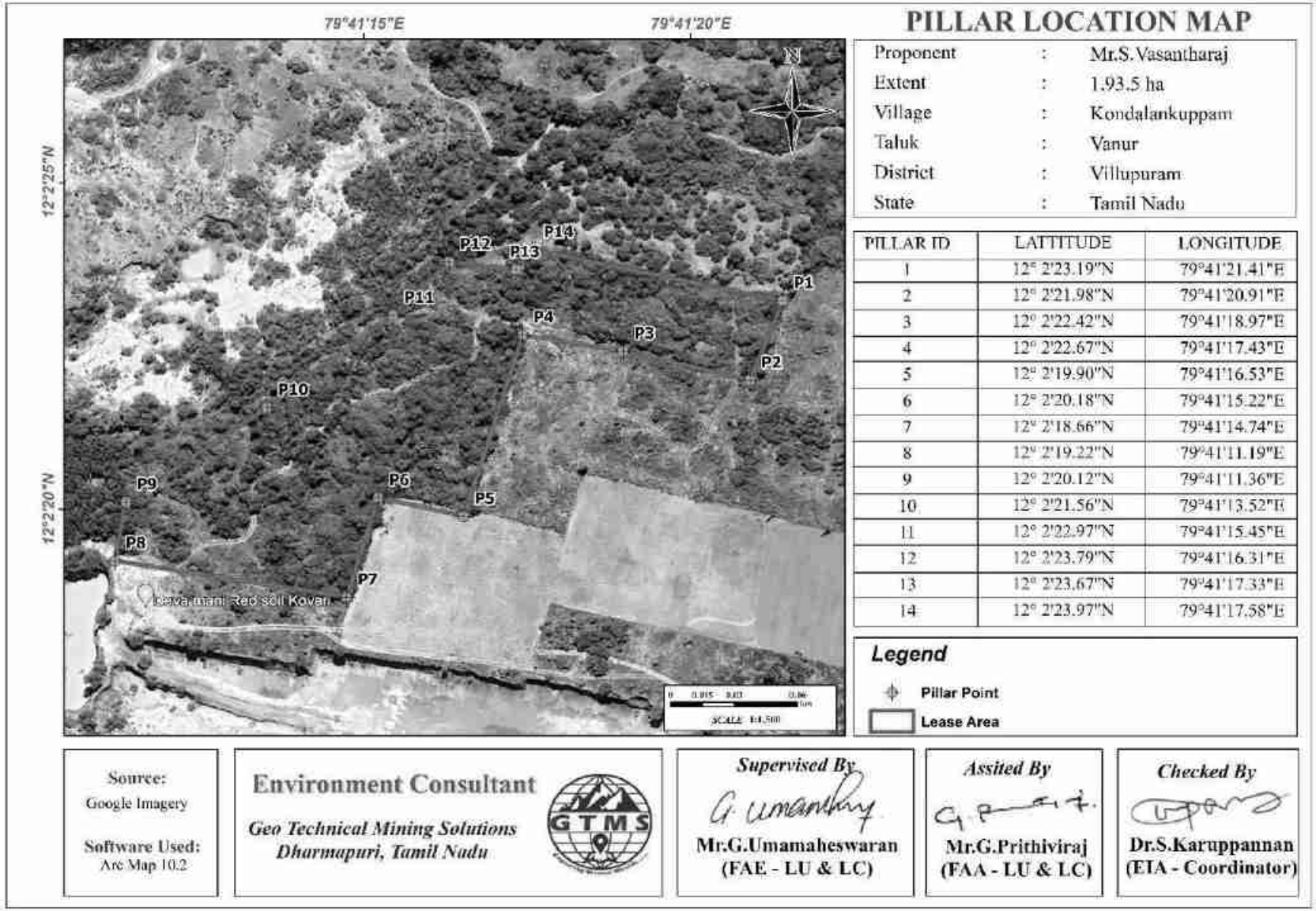


Figure 2.4 Google Earth Image Showing Lease Area with Pillars

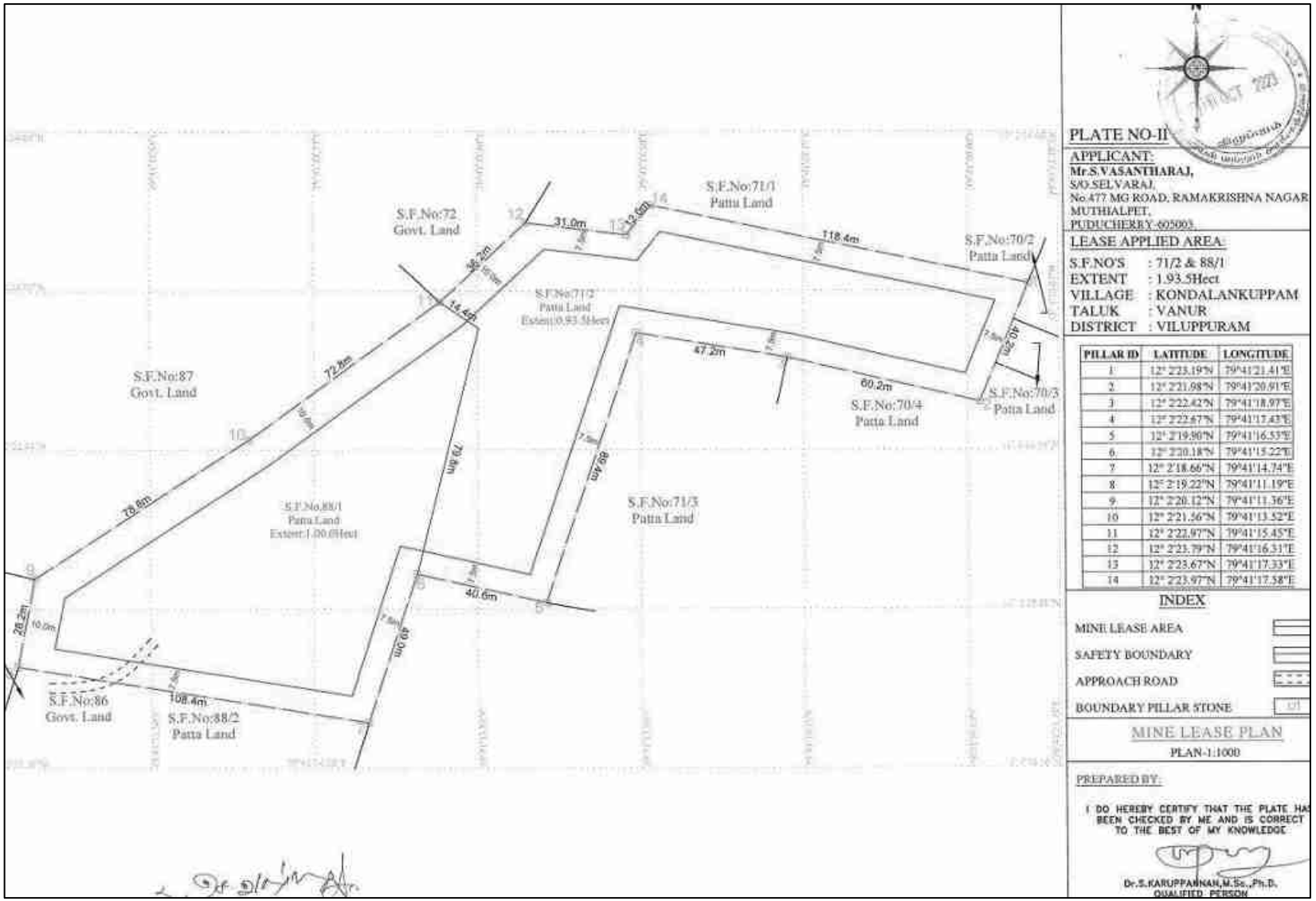


Figure 2.5 Mine Lease Plan

2.5 SIZE AND MAGNITUDE OF OPERATION

The salient features of the project showing the size and magnitude of the operation is provided at Table 2.3.

2.5.1 Quantity of Reserves

The resources and reserves of ordinary earth were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety margins, as shown in Figure 2.6 and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 2 m BGL considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource Type	Ordinary Earth in m^3
Geological Resource in m^3	38714
Mineable Reserves in m^3	22810
Proposed production for 2 years m^3	22810

Based on the year wise development and production plan and sections, as exemplified in Figures 2.6, the year wise production results have been provided in Table 2.4.

Table 2.4 Year-Wise Production Details

Year	Ordinary Earth (m^3)
I	15512
II	7298
Total	**22810**

Source: Approved Mining Plan & Tord

2.5.2 Magnitude of Operation

Based on the results of estimated production for the 2 years, details about the size of operation have been provided in Table 2.5.

Table 2.5 Operational Details for Proposed Project

	Ordinary Earth / 2 years
Proposed production	22810
Number of Working Days	270
Production /Day (m^3)	42
No. of Lorry Loads	7

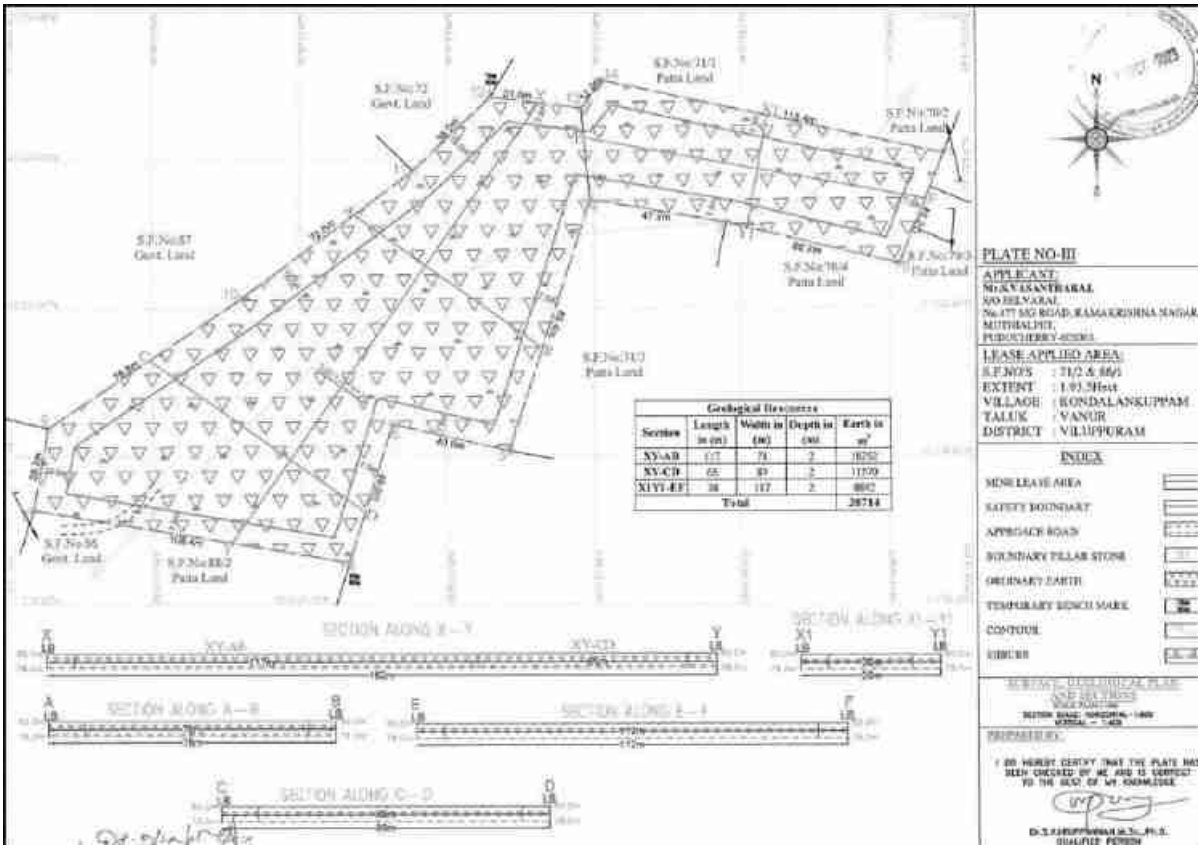


Figure 2.6 Surface Geological Plan and Sections

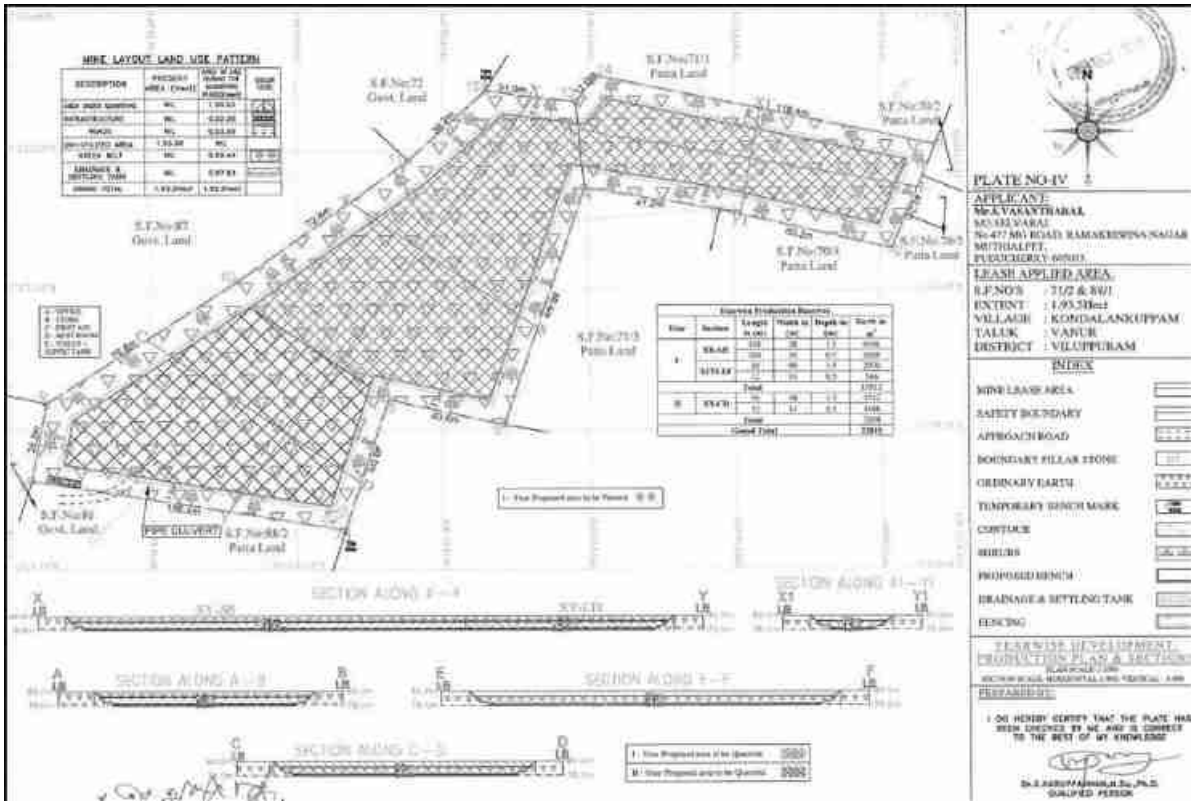


Figure 2.7 Yearwise Development Production Plan and Sections

2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

- The precise area communication letter was issued by Department of Geology and Mining, Villuppuram vide Rc.No.A/G&M/93/2023 dated 09.10.2023. Based on the precise area communication letter, mining plan was prepared.
- The mining plan thus prepared was approved by Deputy Director Department of Geology and Mining, Villuppuram (Rc.No.A/G& M/93/2023 dated 11.10.2023).
- In compliance with TOR obtained vide TOR File No.10560 and TOR Identification No. TO23B0108TN5920417N, Dated.02/04/2024.
- The PP has applied for environment clearance as per requirements of EIA notification SO 1533(E) dated 14.9.2006 and amendments made thereof and the proposed project will be implemented after the environment clearance is granted.

2.7 TECHNOLOGY AND PROCESS DESCRIPTION

The mining proposed by opencast semi- mechanized method without drilling and blasting. The minor mineral i.e. ordinary earth is proposed to be excavated by backhoe type excavator/JCB and directly loading in to trucks dispatch to market.

2.8 PROJECT DESCRIPTION

2.8.1 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.6.

Table 2.6 Machinery Details

S. No.	Type	No. of Unit	Size / Capacity	Make	Motive Power
1	Excavator	1	--	-	Diesel
Haulage & Transport Equipment					
2	Tipper	4	15T	-	Diesel

2.8.2 Land Requirement

The progressive quarry closure plan of the proposed project shows past, present, and future land use statistics, green belt development statistics, fencing and garland drains establishment details. According to the land use results, as shown in Table 2.7, at present, about 1.93.50 ha of land is designated as unutilized area, whereas at the end of the mine life, about 1.30.23 ha of land would have been quarried; about 0.02.00 ha of land would have been used for establishing infrastructures; about 0.03.00 ha of land would have been used for road development; about 0.50.44 ha of land would have been used for green belt development; and about 0.07.83 ha of land would have been unutilized.

Table 2.7 Land use data at present, during scheme of mining, and at the end of mine life

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under Mining	Nil	1.30.23
Infrastructure	Nil	0.02.00
Roads	Nil	0.03.00

Green Belt	Nil	0.50.44
Unutilized area	1.93.50	Nil
Drainage & Settling tank	Nil	0.07.83
Total	**1.93.50**	**1.93.50**

2.8.3 Progressive Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, final mine closure plan is not proposed for now. Based on the environment management plan as discussed in Chapter X, the progressive mine closure cost is given in Table 2.8.

Table 2.8 Mine Closure Budget

Activity	Capital Cost
387 plants inside the lease area	77400
581 plants outside the lease area	174150
Wire Fencing	387000
Renovation of Garland Drain	19350
Total	**6,57,900**

Source: Environment Management Plan

2.8.4 Water Requirement

Detail of water requirement in 2.0 KLD is given in Table 2.9.

Table 2.9 Water Requirement for the Project

Purpose	Quantity	Source
Dust Suppression	0.5 KLD	Existing bore wells nearby the lease area
Green Belt development	0.5 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.0 KLD	Existing bore wells and approved water vendors
Total	**2.0 KLD**	

Source: Prefeasibility Report

2.8.5 Energy Requirement

As per the data shown in Table 2.10, High Speed Diesel (HSD) will be used for quarrying machineries. Around 79835 litres of HSD will be used for ordinary earth extraction during this 2 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.10 Fuel Requirement Details

Fuel Requirement for Excavator		
Details	**Ordinary Earth (22810 m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	10	---
Working Capacity (m^3/hr)	60	---
Time Required (hours)	380	---
Total Diesel Consumption for 2 years(litre)	3802	3802
Fuel Requirement for Tipper		

Average Rate of Fuel Consumption/Trip (litre)	20	--
Carrying Capacity in m^3	6	--
Number of Trips / days	7	--
Number of Trips / 2 years	3802	--
Total Diesel Consumption for 2 years (litre)	76033	76033
Total Diesel Consumption by Excavator and Tipper		**79835**

2.8.6 Capital Requirement

The project proponent will invest **Rs.15,33,000/-** to the project. The breakup summary of the investment has been given in Table 2.11.

Table 2.11 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset Cost	768000
2	Machinery cost	400000
3	EMP Cost	365000
Total Project Cost		**15,33,000/-**

Source: Approved Mining Plan

2.8.7 Manpower Requirement

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.12.

Table 2.12 Employment Potential for the proposed project

S. No.	Category	Role	Nos.
1	Skilled	Excavator Operator	1
2	Semi – Skilled	Driver	4
3	Unskilled	Cleaners	2
4	Management & Supervisory Staff		1
		Total	**8**

2.9 DESCRIPTION OF MITIGATION MEASURES INCORPORATED INTO THE PROJECT TO MEET ENVIRONMENTAL STANDARDS, ENVIRONMENTAL OPERATING CONDITIONS OR OTHER EIA REQUIREMENTS

The anticipated impacts and mitigation measures on soil, land, water, air, noise, biological, and socioeconomic environments discuss in chapter IV in the EIA report.

2.10 ASSESSEMENT OF NEW AND UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

No new and untested technologies would be followed. The mining operations as explained in the section 2.7 above would be followed in the mining operations.

CHAPTER III
DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions.

3.1 STUDY AREA, PERIOD, COMPONENTS & METHODOLOGY

3.1.1 Study Area & Period

The study area has been divided into two zones: core zone and buffer zone. Core zone is considered as lease area and buffer zone as 5 km radius from the periphery of the cluster, except for ecological study, which considers 10 km as buffer zone. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1. Field monitoring studies to evaluate the base line status of the project site were carried out covering **December 2022 through February 2023** with CPCB guidelines.

3.1.2 Components & Methodology

The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Environmental baseline data were collected by an NABL accredited and MoEF notified ***Ekdant Enviro Services (P) Limited*** for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy are briefly given in Table 3.1.

3.2 ESTABLISHMENT OF BASELINE FOR VALUED ENVIRONMENTAL COMPONENTS AS IDENTIFIED IN THE SCOPE

- Sensitive areas
- Location of water bodies
- Wind Rose Diagram, Upwind and Downwind direction, predominant wind direction
- Nearby buildings / Nearby village
- Location of Polluted Areas
- Location of Ecologically Protected Areas

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 5 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico-Chemical characteristics	Once during the study period	7 (1 in core & 6 in buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	8 (2 surface water & 6 ground water)	IS 10500& CPCB Standards
Meteorology	Wind speed Wind direction Temperature Cloud cover Dry bulb temperature Rainfall	1 hourly continuous mechanical/automatic weather station	1	Site specific primary data & secondary data from IMD Station
*Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X	24 hours, twice a week (February to April 2022)	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

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

3.3 BASE MAP OF ALL ENVIRONMENTAL COMPONENTS

3.3.1 LAND ENVIRONMENT

Geology and Geomorphology

Study area is mainly composed of Charnockite, Sandstone, black silty clay and sandstone as shown in Figure 3.1. Among the geomorphic units, Pediment and Pediplain Complex and Flood Plain dominate the study area, as shown in Figure 3.2.

Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius to provide a baseline status of the study area covering 5 km radius around the proposed mine site. Totally, 9 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 113.19ha accounting for 1.47%, of which lease area of 1.93.5 ha contributes only about 0.02 %. This small percentage of mining activities shall not have any significant impact on the land environment.

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky / stony waste	155.10	2.02
2	Crop land	2732.18	35.58
3	Dense Forest	1028.16	13.39
4	Fallow land	14.73	0.19
5	Land with or without scrub	380.53	4.95
6	Mining/Industrial Area	113.19	1.47
7	Plantations	2668.75	34.75
8	Settlement	232.98	3.03
9	Water bodies	354.62	4.62
Total		**7680.00**	**100.0**

Source: Sentinel II Satellite Imagery

Topography

The proposed lease area is located in a flat terrain with an altitude range of 161-162m AMSL.

Drainage Pattern

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. The proposed area shows dendritic drainage pattern indicating uniform lithology beneath the surface, as shown in Figure 3.3A.

Seismic Sensitivity

The proposed lease area is situated in a Seismic Zone II, as defined by National Centre for Seismology (Official Website of National Centre of Seismology). The Zone II is defined as the region where only minor damage is expected from seismic events. In this respect, the proposed lease area is located in a low earthquake hazard area.

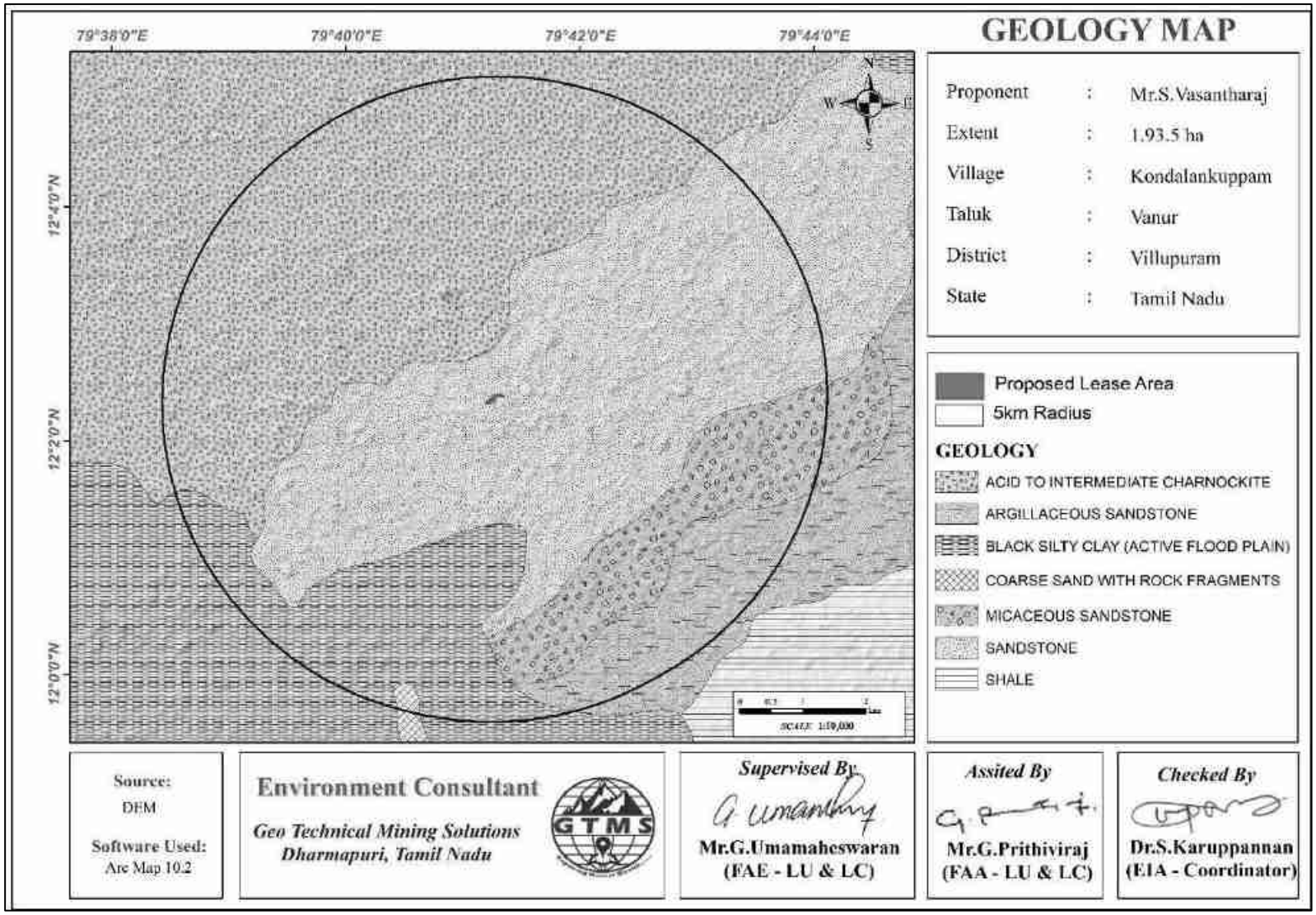


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

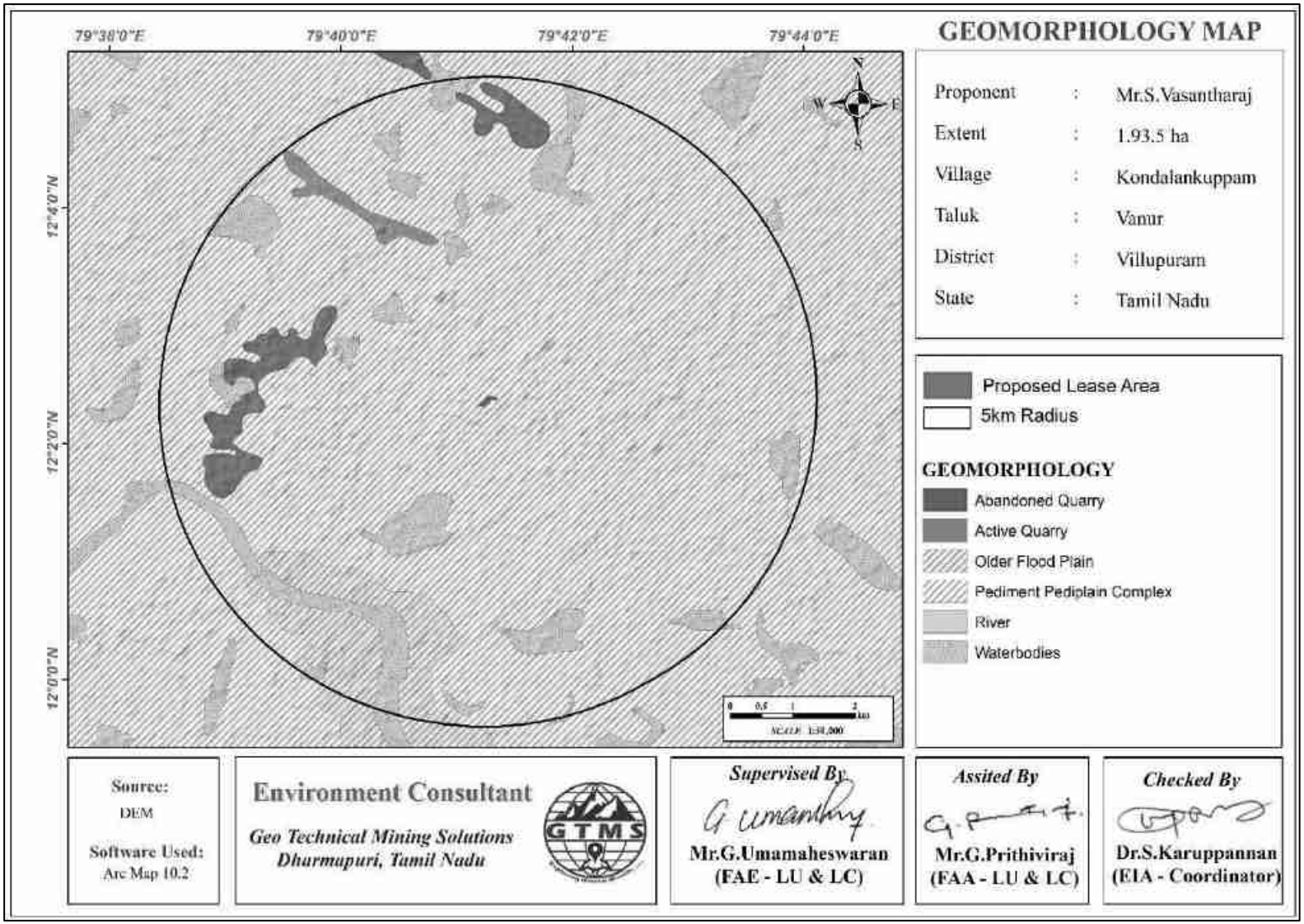


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

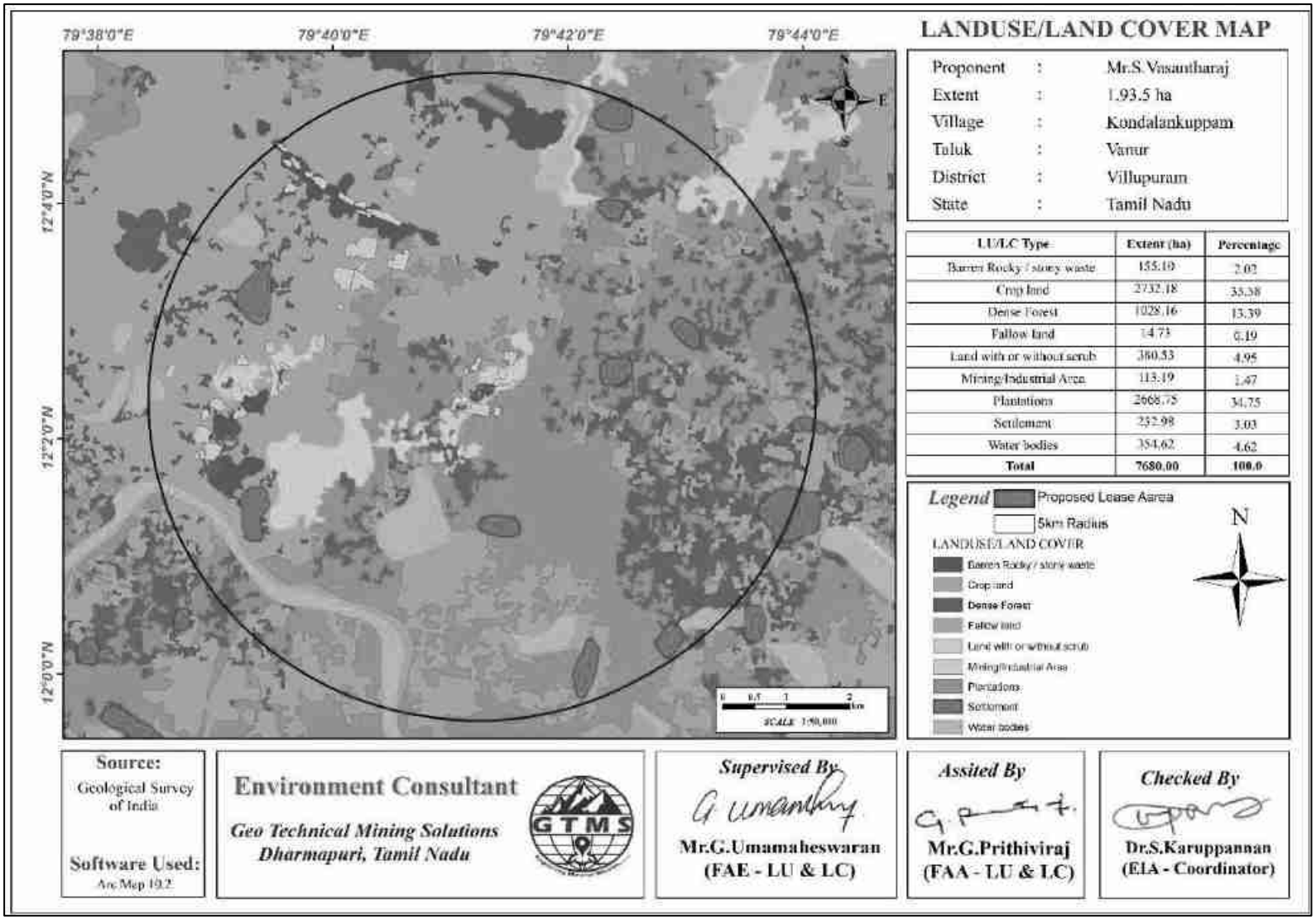


Figure 3.3 LULC Map of 5 km Radius from Proposed Project Site

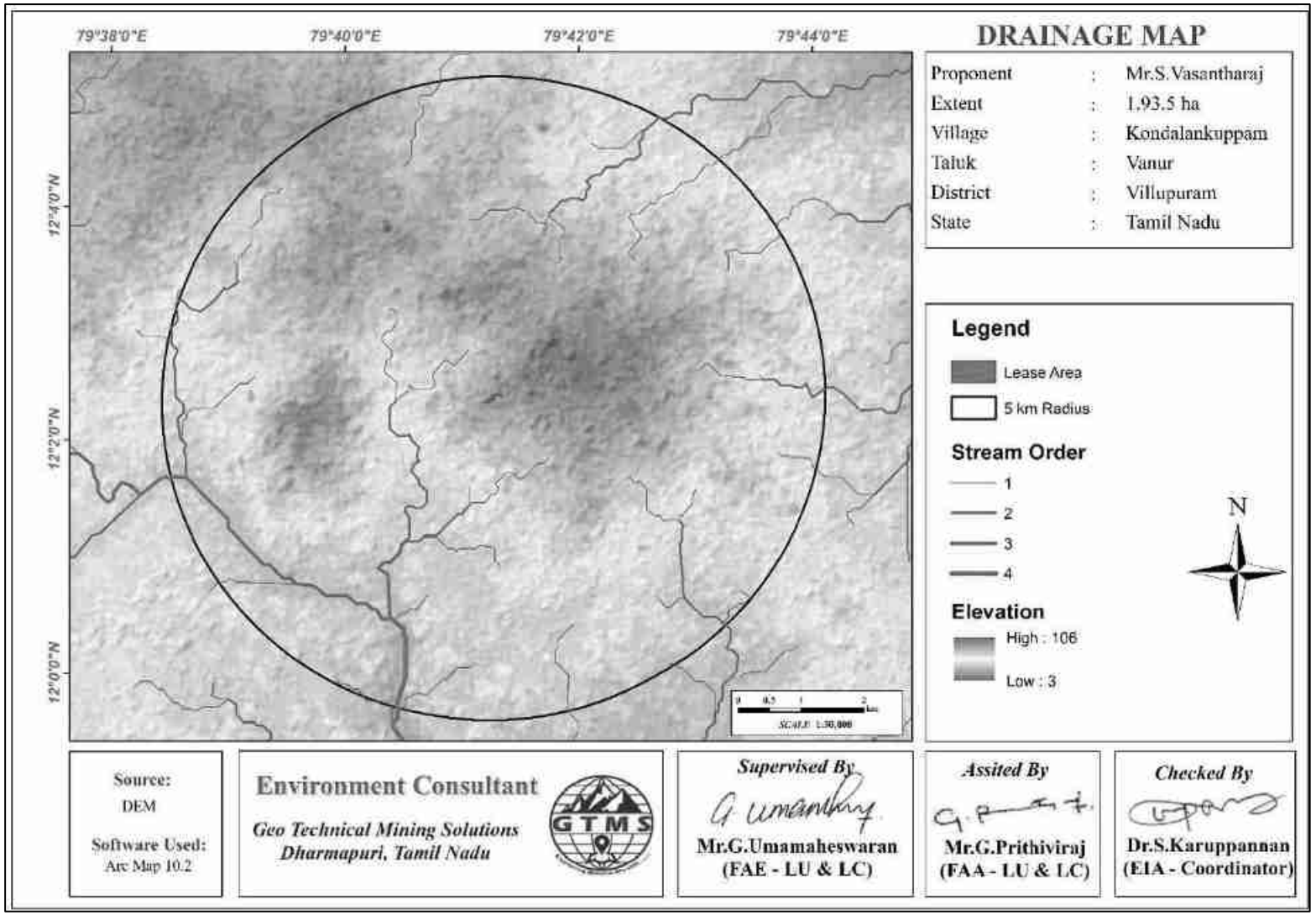


Figure 3.3A Drainage Map of 5 km Radius from Proposed Project Site

3.3.2 Soil Environment

Soil is one of the important components of the land environment. Composite soil samples were collected from the study area and analysed for different parameters to determine the baseline soil characteristics of the study area.

Methodology

Eight locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.4. The samples thus collected were analysed for physical and chemical characteristics as per the standard methods prescribed in "Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India". The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	S01	Venkatakrishnan lease	0.30	SE	12° 2'21.09"N 79°41'20.22"E
2	S02	Thiruvakkarai	3.1	W	12° 2'7.49"N 79°39'25.64"E
3	S03	Vanur	4.54	E	12° 2'13.78"N79°43'51.18"E
4	S04	Eraiyur	3.81	WNW	12° 3'40.88"N 79°39'37.78"E
5	S05	Ilvampattu	3.92	N	12° 4'29.97"N 79°41'39.05"E
6	S06	V. Pudupakkam	3.25	SSE	12° 1'3.68"N 79°42'30.37"E
7	S07	Katterikuppam	4.37	SSW	12° 0'1.40"N 79°40'36.71"E
8	S08	Core zone	---	---	12° 2'20.65"N 79°41'13.81"E

*Source: On-site monitoring/sampling **Ekdant Enviro Services (P) Limited,** in association with GTMS.*

Results and Discussion

Physical Characteristics & Chemical Characteristics

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 7.10 to 7.50 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 217 to 523 µs/cm. Bulk density ranges between 1.01 and 1.53 g/cm3. Calcium ranges between 78 and 156 mg/kg. Magnesium ranges between 18.76 and 29.21 mg/kg. Potassium ranges between 17.34 and 34.90 mg/kg. Iron content ranges between 78.65-172.4 mg/kg. Organic matter content ranges between 0.95 and 1.41 %.

Soil Erosion

Soil erosion map shows that:

- Soil erosion is very low in the proposed lease area
- Low to moderate soil erosion is in south side of the lease area. Soil erosion map showing in Figure 3.5

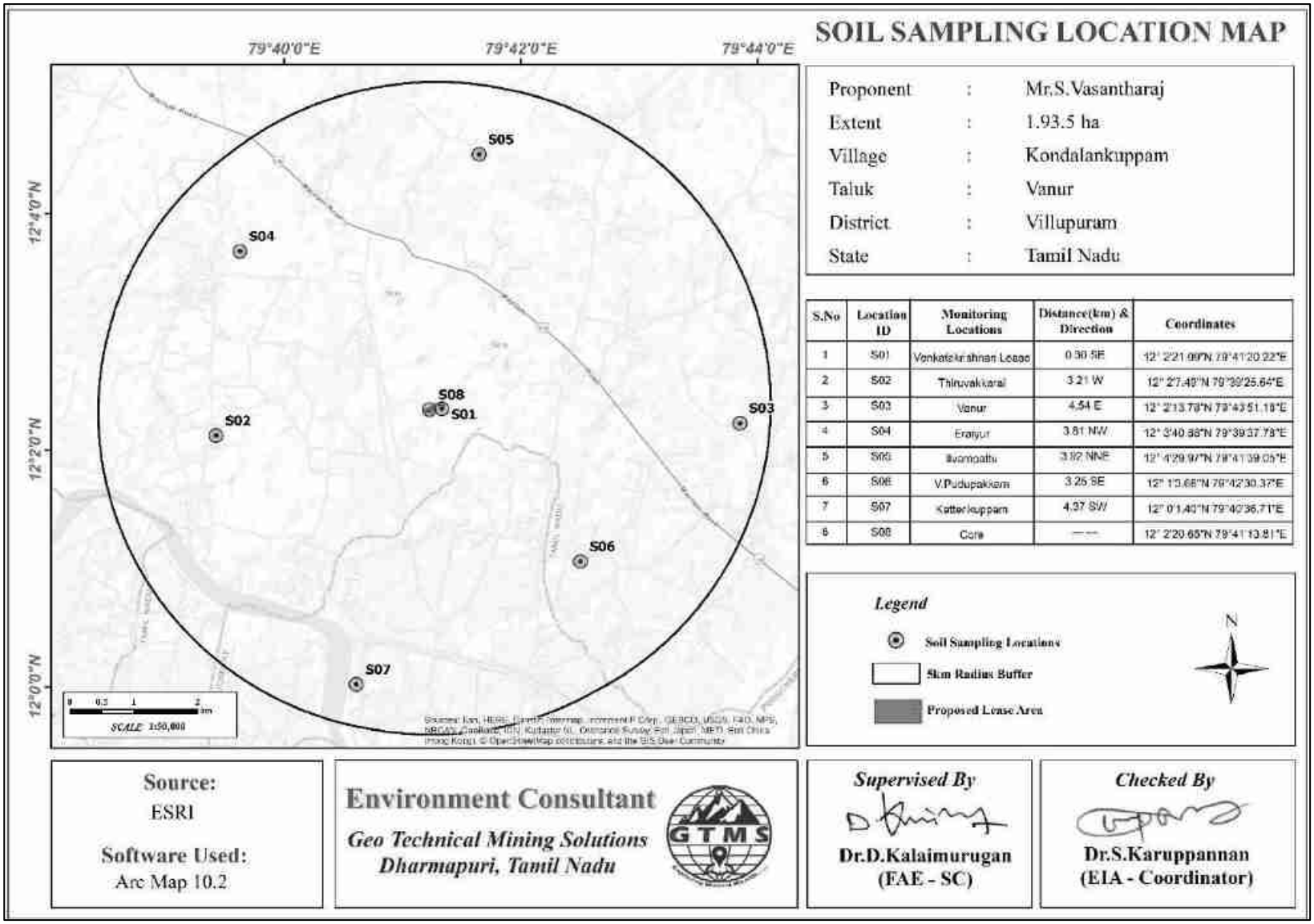


Figure 3.4 Toposheet Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

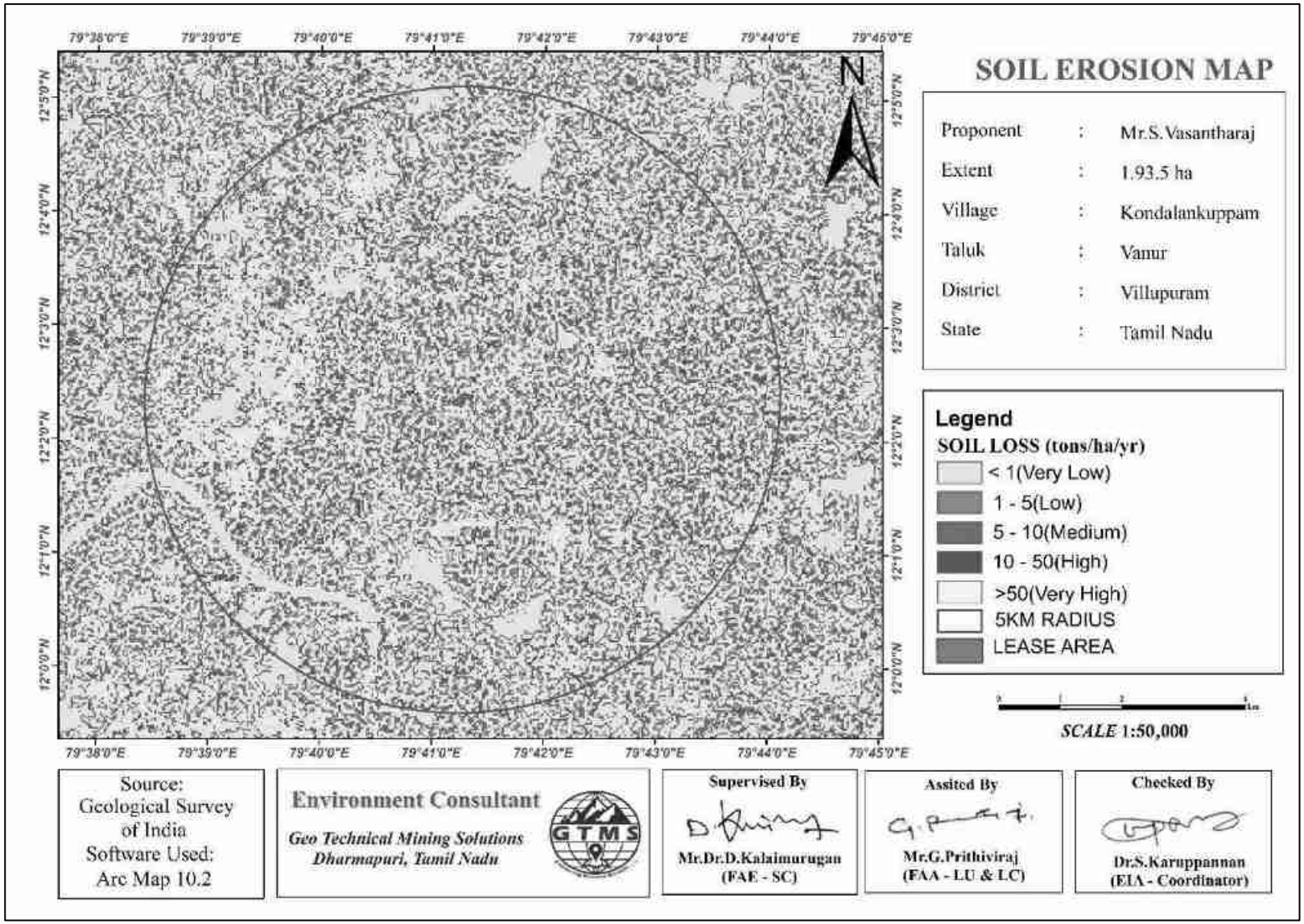


Figure 3.5 Soil Erosion map within 5 km Radius around the Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S. No	Parameters	Unit	Core zone	Minimum	Maximum	Average
1	pH Value	-	7.2	7.10	7.50	7.30
2	EC@25ºC (10% Solution)	µ/cm	285	217.00	523	292.43
3	Texture	--	Sandy Loam	Sandy Loam, Clay Loam, Silt Loam and Sandy Clay Loam		
4	Sand	%	55	38	65	51.375
5	Silt	%	30	5	54	32.625
6	Clay	%	15	8	30	16
7	Bulk Density	g/cc	1.25	1.01	1.53	1.23
8	Water Content	%	4.75	2.54	5.34	4.10
9	Organic Matter	%	1.05	0.95	1.41	1.16
10	Alkalinity	mg/kg	94.96	56.23	96.45	78.57
11	Water Holding Capacity	%	45.69	32.40	49.60	39.74
12	Calcium (Ca)	mg/kg	126	78.00	156.00	126.43
13	Magensium Mg	mg/kg	27.05	18.76	29.21	23.56
14	Sodium Na	mg/kg	127	115.00	178.00	137.00
15	Iron	mg/kg	139.25	78.65	172.42	118.62
16	Copper	mg/kg	>0.05	>0.05	>0.05	>0.05
17	Chlorides	mg/kg	135	112.00	147.00	131.43
18	Potassium	mg/kg	31.96	17.34	34.90	25.59

*Source: Sampling Results by **Ekdant Enviro Services (P) Limited** in association with GTMS.*

Table 3.4a Assigning Scores to Soil Quality Indicators

Soil Quality Score						
S. No.	OM	BD	pH	EC	**Total Score**	**Recommendation**
1	33	7	20	11	71	The Soil Requires Major and Immediate Treatment
2	33	7	13	11	64	
3	33	13	20	11	78	
4	33	7	20	11	71	
5	33	13	13	11	71	
6	33	13	13	11	71	
7	33	13	13	11	71	
8	33	13	13	11	71	

3.3.3 Water Environment

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the baseline quality of surface and ground water.

Table 3.5 Water Sampling Locations

S. No	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	SW01	Sangarabarani River, Thiruvakkarai	4.47	WSW	12°1'29.68"N 79°38'52.28"E
2	SW02	Sangarabarani River, Kaikilampattu	3.60	SSW	12° 0'29.62"N 79°40'29.41"E
3	OW01	V. Parangani	3.40	NNE	12° 4'9.99"N 79°41'49.81"E
4	OW02	Thollamur	1.77	NW	12° 3'1.28"N 79°40'30.31"E
5	BW01	Katterikuppam	4.41	SSE	12° 0'2.54"N 79°42'0.92"E
6	BW02	Ranganathapuram	2.28	ENE	12° 2'40.76"N 79°42'34.78"E
7	BW03	Kadagampattu	1.27	SSW	12° 1'42.67"N 79°40'51.54"E
8	BW04	Vanur	4.78	ESE	12° 1'16.87"N 79°43'44.29"E

*Source: On-site monitoring/sampling by **Ekdant Enviro Services (P) Limited,** in association with GTMS.*

Surface Water Resources and Quality

Sangarabarani River is the prominent surface water resources present in the study area. This river was ephemeral in nature, which convey water only after rainfall events. The proposed project area is located in 4.47 (Thiruvakkarai) km WSW of Sangarabarani River and 3.60 (Kaikilampattu) km SW of Sangarabarani River, as shown in Table 3.5 and Figure 3.6. Two surface water sample, known as SW01 and SW02 were collected from the Sangarabarani River in Thiruvakkarai (4.47 km) and Sangarabarani River in Kaikilampattu (3.60 km), to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the collected sample. Result for surface water sample in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Ground Water Resources and Quality

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose.

Six groundwater samples, known as OW01, OW02, BW01, BW02, BW03 and BW04 collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water.

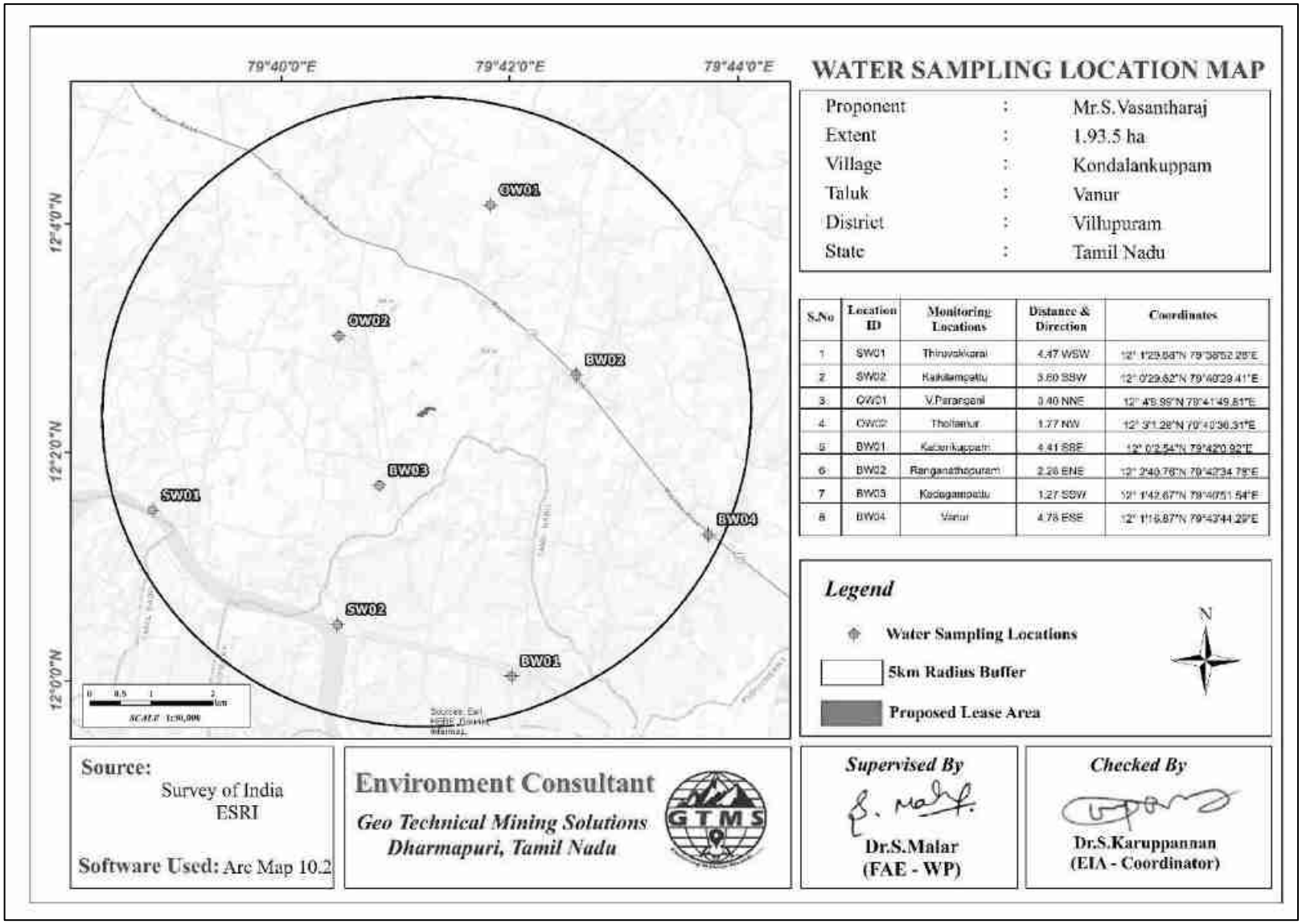


Figure 3.6 Map Showing Water Sampling Locations within 5 km Radius around Proposed Project Site

Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.6. Table 3.6 summarizes ground water quality data of the nine samples.

Results for ground water samples in the Table 3.6 indicate that the physical, chemical and biological parameters, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

Table 3.6 Ground Water Quality Result

S. No.	Parameters	Units	Result of Ground Water			Standards as Per IS 10500:2012	
			Minimum	Maximum	Average	Acceptable Limit	Permissible Limit
1	pH@ 25°C	--	7.1	7.6	7.3	6.5-8.5	No relaxation
2	Turbidity	NTU	BLQ (LOQ=0.1)				
3	Electrical Conductivity @ 25°C	µs/cm	512	2112	939.2	Not specified	Not specified
4	TSS	mg /l	BLQ (LOQ=0.1)				
5	TDS	mg /l	343	1225	573.7	500	2000
6	Total Hardness	mg /l	219	289	241.8	200	600
7	Chloride (Cl)	mg /l	89	142	144.3	250	1000
8	Sulphate (SO4)	mg /l	24	223	122.8	200	400
9	Iron (Fe)	mg /l	BLQ (LOQ=0.1)			0.3	No relaxation
10	Silica (SiO_2)	mg /l	-			Not specified	Not specified
11	Total Coliform	MPN/ 100ml	Absent			Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water
12	E-Coli	MPN/ 100ml	Absent			Shall not be detectable in any 100 ml water	Shall not be detectable in any 100 ml water

*Source: Sampling Results by **Ekdant Enviro Services (P) Limited,** in association with GTMS*

3.3.3.1 Hydrogeological Studies

The area within 2 km radius consists of numerous open wells and deep wells. Groundwater level data were collected both from open wells and bore wells for two monsoon seasons as discussed in the following section.

Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2022 (Pre-Monsoon Season) and from December 2022 through February, 2023 (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.7 and 3.8. According to the data, average depths to the static water table in open wells range from 11.3 to 15.9 m BGL in pre monsoon and 6.5 to 10.5 m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static potentiometric surface in bore wells for the period of December 2022 through February, 2023 (Post Monsoon Season) vary from 55.10 to 60.0 m and from 60.2 to 70.0 m for the period of March through May, 2022 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

From the maps of open well groundwater flow direction shown in Figures 3.7-3.8, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 1 located in western direction of the proposed project site. The groundwater flow maps in Figure 3.9 - 3.10 show that most of the bore well groundwater for the post- and pre-monsoon seasons flows towards the bore well number 3. It is located in South Southwest direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

Table 3.7 Pre-Monsoon Water Level of Open Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2022	Apr-2022	May- 2022	Average		
DW01	11.4	12.9	15.2	13.17	12° 2'27.80"N	79°40'58.03"E
DW02	11.6	13.2	14.2	13.00	12° 2'29.75"N	79°40'26.08"E
DW03	11.5	12.5	14.9	12.97	12° 1'54.64"N	79°40'49.41"E
DW04	11.3	12.1	13.9	12.43	12° 1'24.92"N	79°41'6.83"E
DW05	11.4	13.4	15.4	13.40	12° 1'46.10"N	79°41'57.40"E
DW06	11.5	12.9	15.9	13.43	12° 2'21.40"N	79°42'6.23"E
DW07	11.4	13	15.7	13.37	12° 3'4.90"N	79°41'40.68"E
DW08	11.4	13.2	15.9	13.50	12° 3'27.72"N	79°41'20.87"E
DW09	11.9	12.8	14.7	13.13	12° 3'25.37"N	79°40'50.15"E

Table 3.8 Post-Monsoon Water Level of Open Wells within 2 km Radius

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Dec-22	Jan-23	Feb-23	Average		
DW01	6.8	8.1	10	8.30	12° 2'27.80"N	79°40'58.03"E
DW02	6.9	8.2	9.8	8.30	12° 2'29.75"N	79°40'26.08"E
DW03	6.8	7.9	9.7	8.13	12° 1'54.64"N	79°40'49.41"E
DW04	7	7.8	9.5	8.10	12° 1'24.92"N	79°41'6.83"E
DW05	6.9	8.5	10	8.47	12° 1'46.10"N	79°41'57.40"E
DW06	6.5	8.2	9.7	8.13	12° 2'21.40"N	79°42'6.23"E
DW07	6.9	8	9.9	8.27	12° 3'4.90"N	79°41'40.68"E
DW08	7.2	8.5	10.5	8.73	12° 3'27.72"N	79°41'20.87"E
DW09	7.1	8.6	9.5	8.40	12° 3'25.37"N	79°40'50.15"E

Table 3.9 Pre-Monsoon Water Level of Bore Wells within 2 km Radius

Statin ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2022	Apr-2022	May- 2022	Average		
BW01	60.5	61.9	63.2	61.87	12° 2'10.94"N	79°40'55.66"E
BW02	60.7	63.4	66.5	63.53	12° 1'52.48"N	79°40'23.01"E
BW03	60.2	61.1	62.6	61.30	12° 1'42.67"N	79°40'51.54"E
BW04	62.3	65.3	69.2	65.60	12° 1'20.30"N	79°41'0.68"E
BW05	62.8	66.2	70	66.33	12° 1'34.38"N	79°41'44.27"E
BW06	63.9	66.8	69.3	66.67	12° 1'56.65"N	79°42'14.14"E
BW07	64.5	67.6	69.4	67.17	12° 2'17.81"N	79°41'54.61"E
BW08	64.2	67.2	69.8	67.07	12° 2'57.25"N	79°41'43.41"E
BW09	63.9	66.1	67.2	65.73	12° 2'47.48"N	79°40'47.98"E

Table 3.10 Post-Monsoon Water Level of Bore Wells within 2 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Dec-22	Jan-23	Feb-23	Average		
BW01	55.10	55.8	56.4	55.77	12° 2'10.94"N	79°40'55.66"E
BW02	55.30	55.9	57.9	56.37	12° 1'52.48"N	79°40'23.01"E
BW03	56.00	56.6	58.5	57.03	12° 1'42.67"N	79°40'51.54"E
BW04	55.10	56.2	56.3	55.87	12° 1'20.30"N	79°41'0.68"E
BW05	55.80	56.6	59.6	57.33	12° 1'34.38"N	79°41'44.27"E
BW06	55.90	57.2	59.8	57.63	12° 1'56.65"N	79°42'14.14"E
BW07	56.10	57.6	59.9	57.87	12° 2'17.81"N	79°41'54.61"E
BW08	56.40	57.9	60	58.10	12° 2'57.25"N	79°41'43.41"E
BW09	57.00	58.2	59.4	58.20	12° 2'47.48"N	79°40'47.98"E

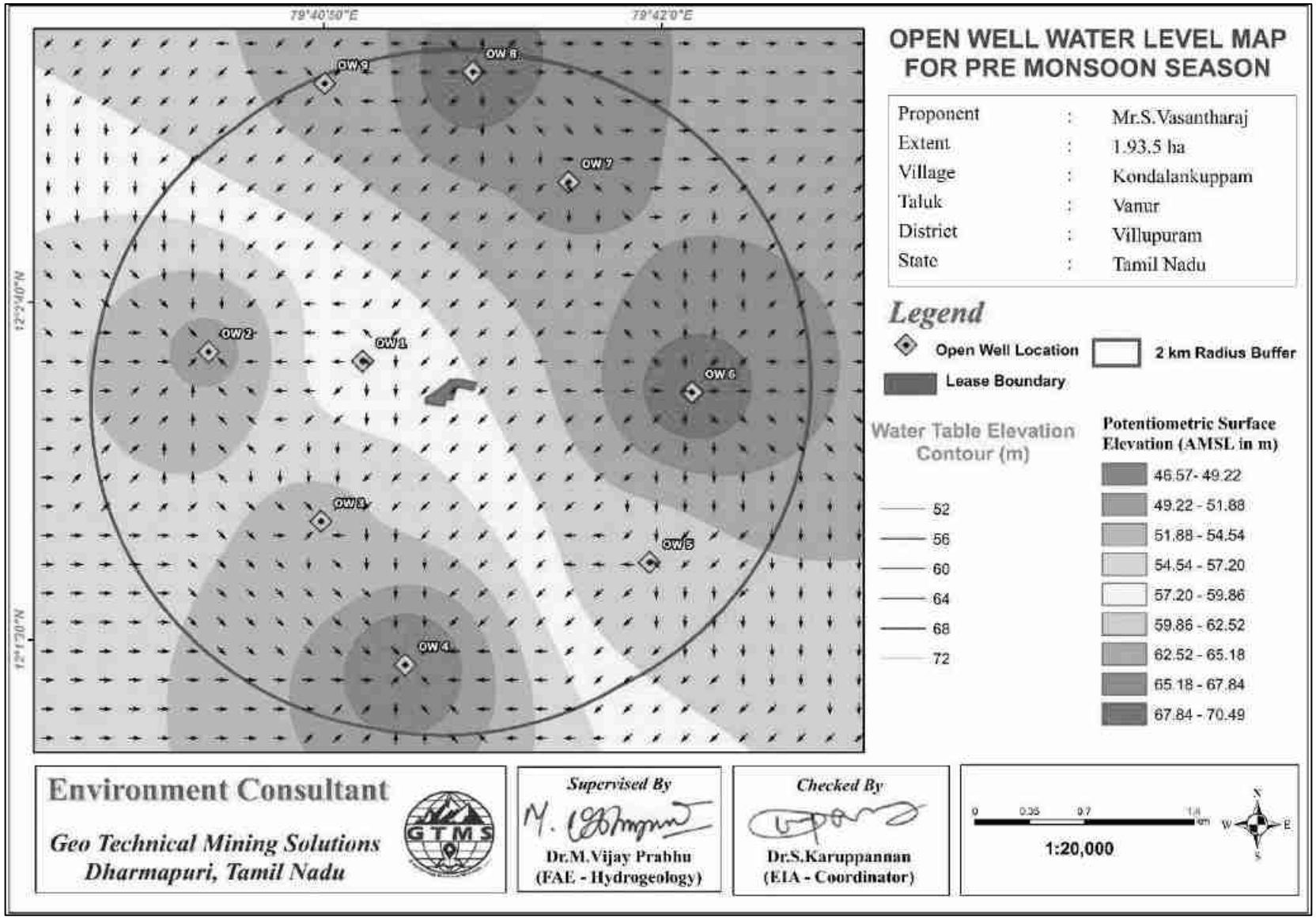


Figure 3.7 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

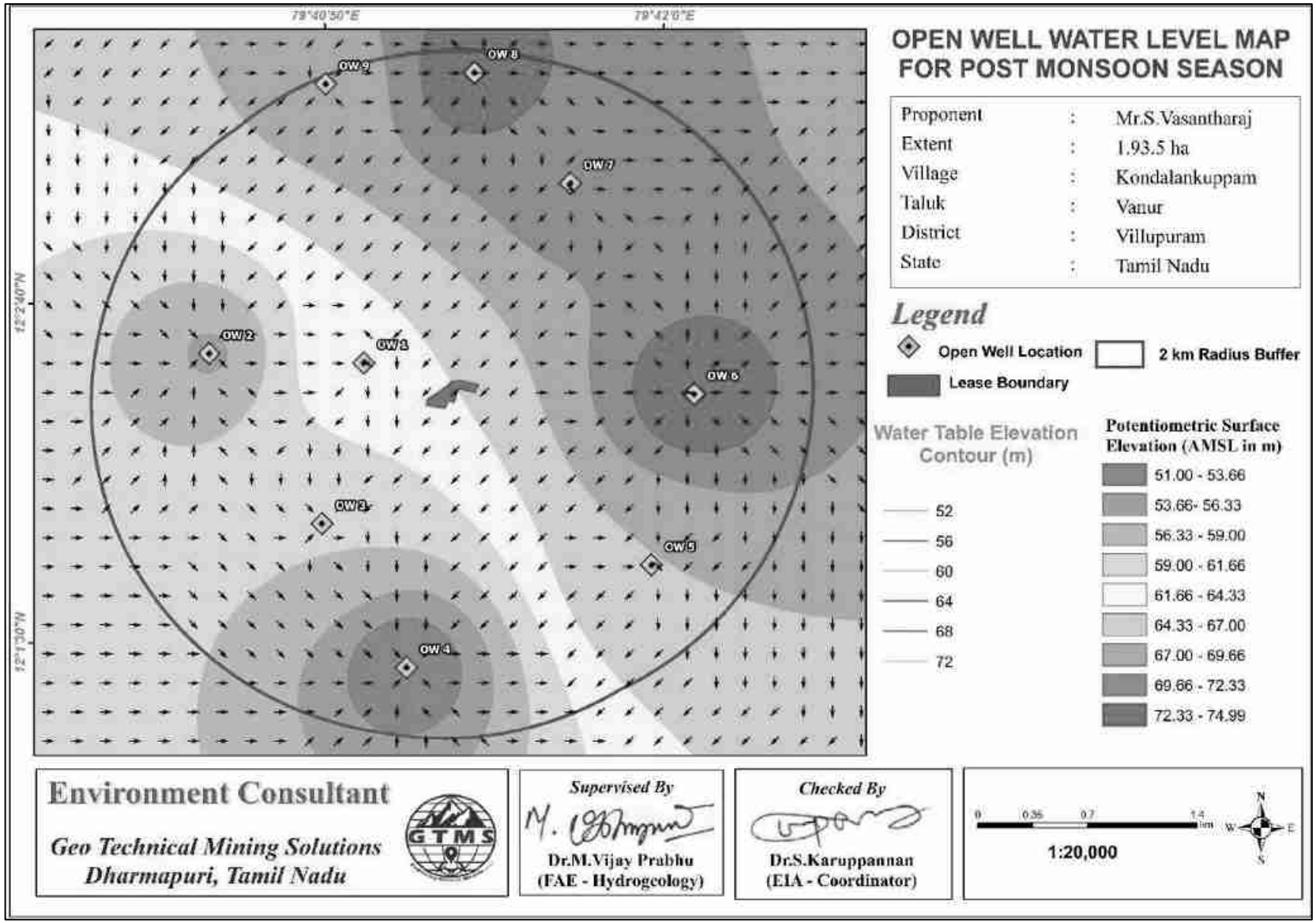


Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

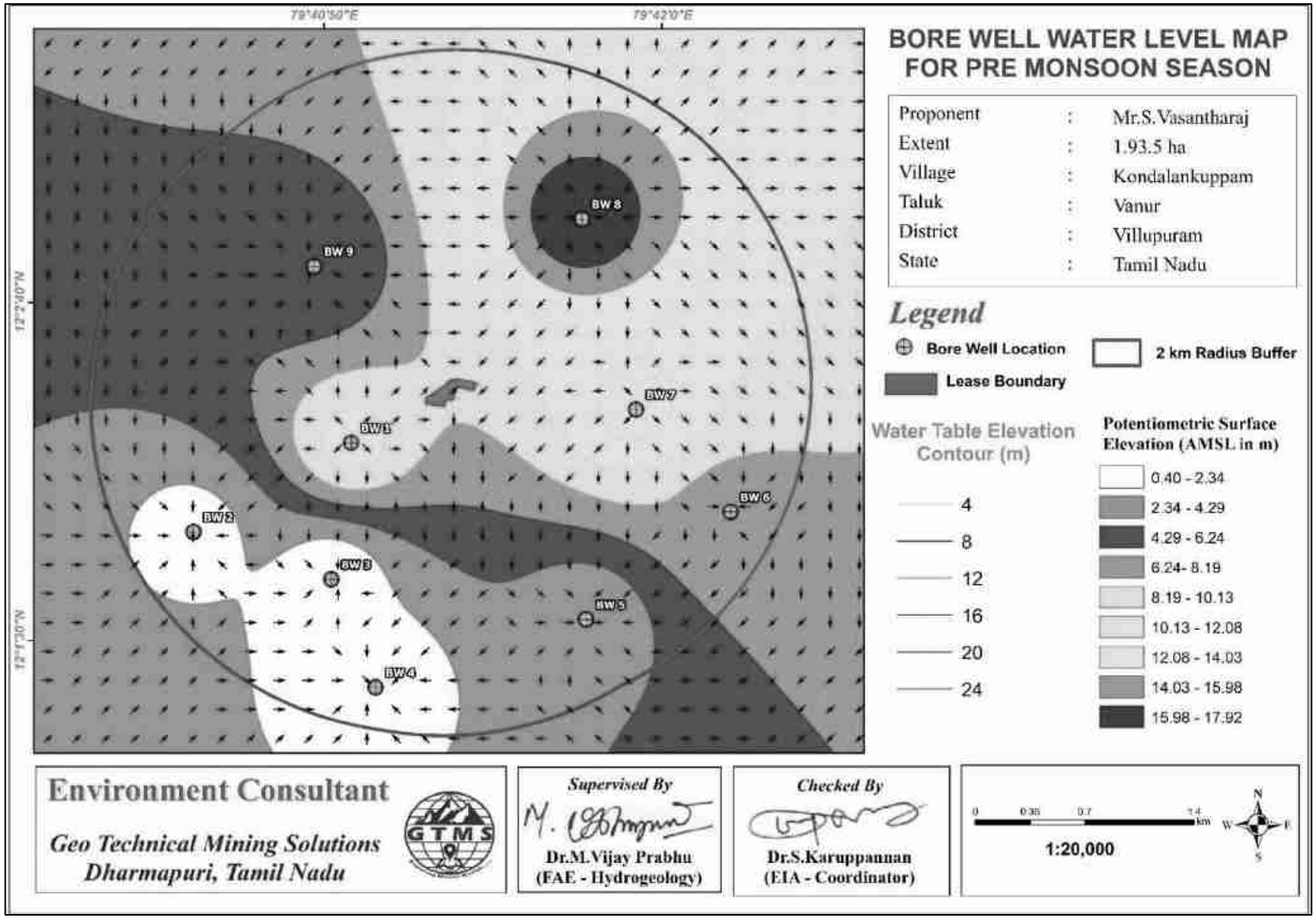


Figure 3.9 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

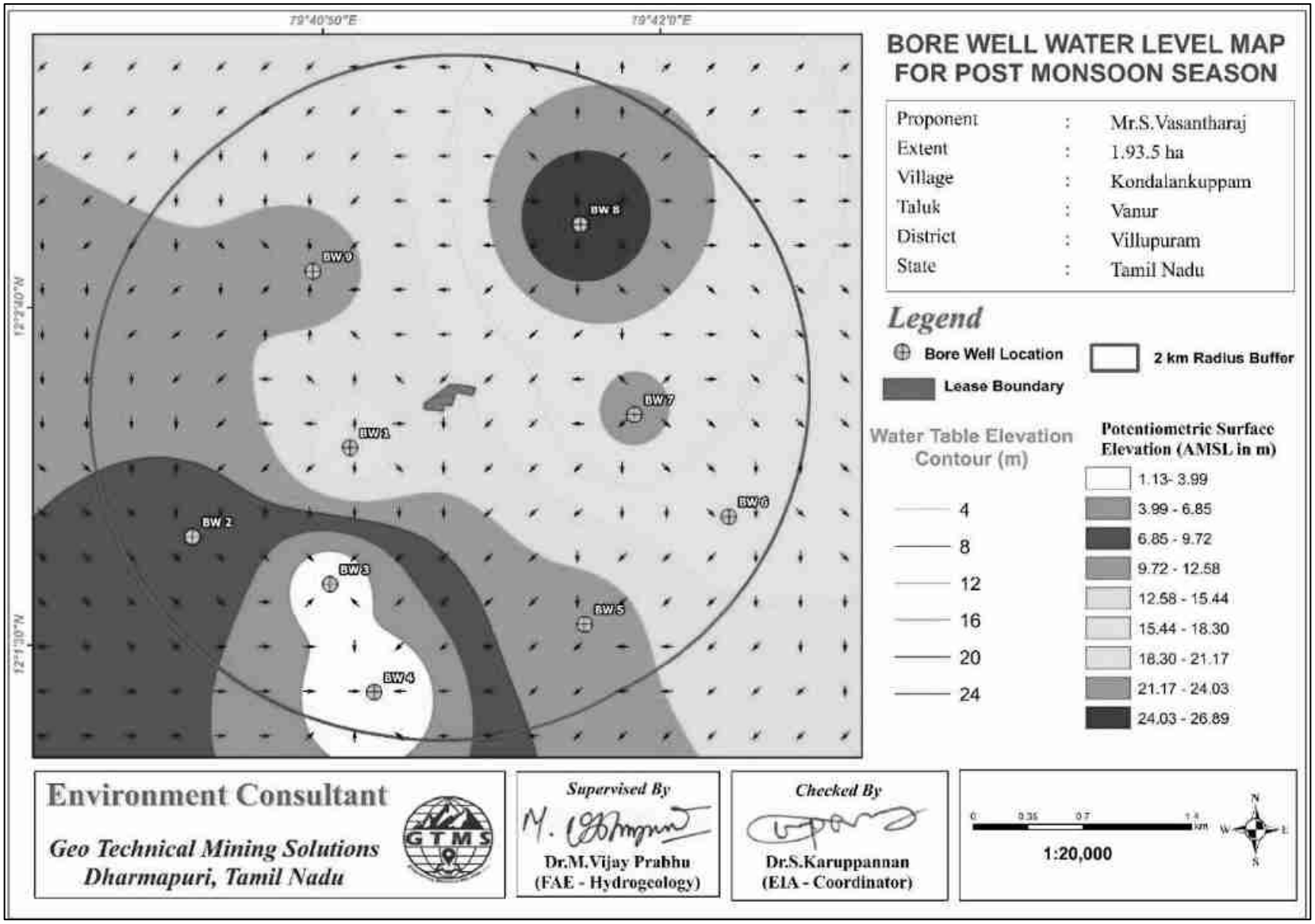


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

3.3.3.2 Electrical Resistivity Investigation

Electrical resistivity investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. The present study makes use of vertical electric sounding (VES) to delineate earth's subsurface layers. The electrical resistivity investigation uses four electrodes set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference.

Result

The Geophysical VES data obtained from the project site have been shown in Table 3.11. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.11.

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 12° 2'22.97"N, 79°41'16.77"E					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	5	2	16.50	7.410	122.26
2	10	2	75.43	2.446	184.48
3	15	5	62.86	4.540	285.38
4	20	5	117.86	3.260	384.22
5	25	5	188.58	2.630	495.96
6	25	10	82.50	5.940	490.05
7	30	10	125.72	4.209	529.12
8	35	10	176.79	4.060	717.76
9	40	10	235.73	3.680	867.48
10	45	10	302.51	3.550	1073.91
11	50	20	165.01	7.210	1189.65
12	60	20	251.44	3.238	886.42
13	70	20	353.59	3.506	1239.9
14	80	20	471.45	2.712	1281.12
15	90	20	605.03	2.558	1544.68
16	100	20	754.32	2.367	1785.32

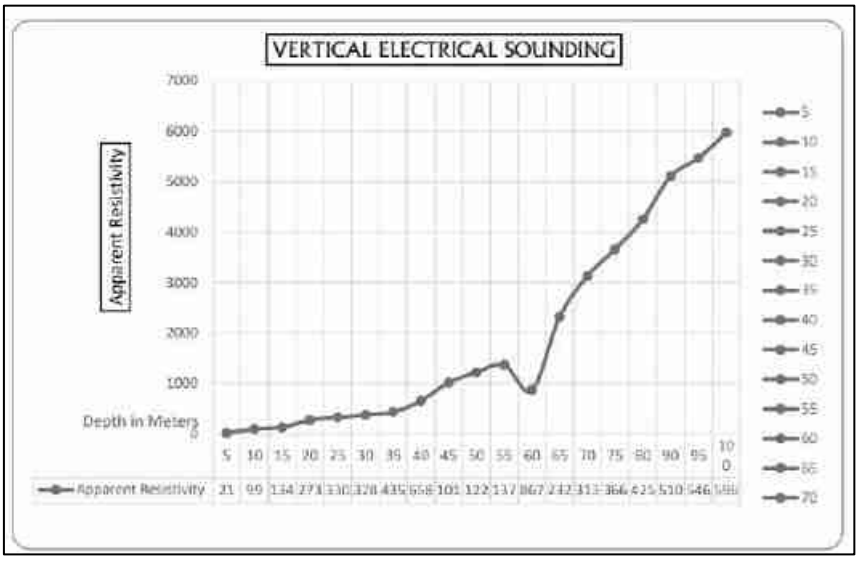


Figure 3.11 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 70 m Below Ground Level in Proposed Project

3.3.4 Air Environment

The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities.

Meteorology

Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.12.

Table 3.12 Onsite Meteorological Data

S. No.	Parameters	DEC, 2022	JAN,2023	FEB,2023
1	Temperature (^{0}C)	22.24	19.73	22.85
		28.97	31.58	29.72
		25.88	25.17	25.83
2	Relative Humidity (%)	67.19	49.12	46.69
		92.31	100.00	89.38
		83.88	74.88	72.94
3	Wind Speed (m/s)	1.10	1.49	0.56
		12.32	8.12	8.07
		5.46	4.69	3.95
4	Wind Direction (degree)	0.00	1.16	3.41
		359.24	107.38	117.76
		83.12	51.82	70.34
5	Surface Pressure(kPa)	100.08	98.14	100.63
		101.73	101.63	101.66
		100.89	101.00	101.09

*Source: On-site monitoring/sampling by **Ekdant Enviro Service (P) Limited** in association with GTMS*

Rainfall

Rainfall data for the study area were collected for the period of 1981-2021(POWER | Data Access Viewer (nasa.gov)**)**. Long term monthly average rainfall was estimated from the data of 1981- 2021 and compared with the monthly rainfall for the year 2021. The Figure 3.12 shows that long- term monthly average rainfall shows an increasing trend from March through November during the period of 1981-2021 and is higher in November of every year. Particularly, monthly average rainfall shows an increasing trend in September through

November of 2021 than the previous years and is higher in November 2021 when compared to monthly average of 30 years.

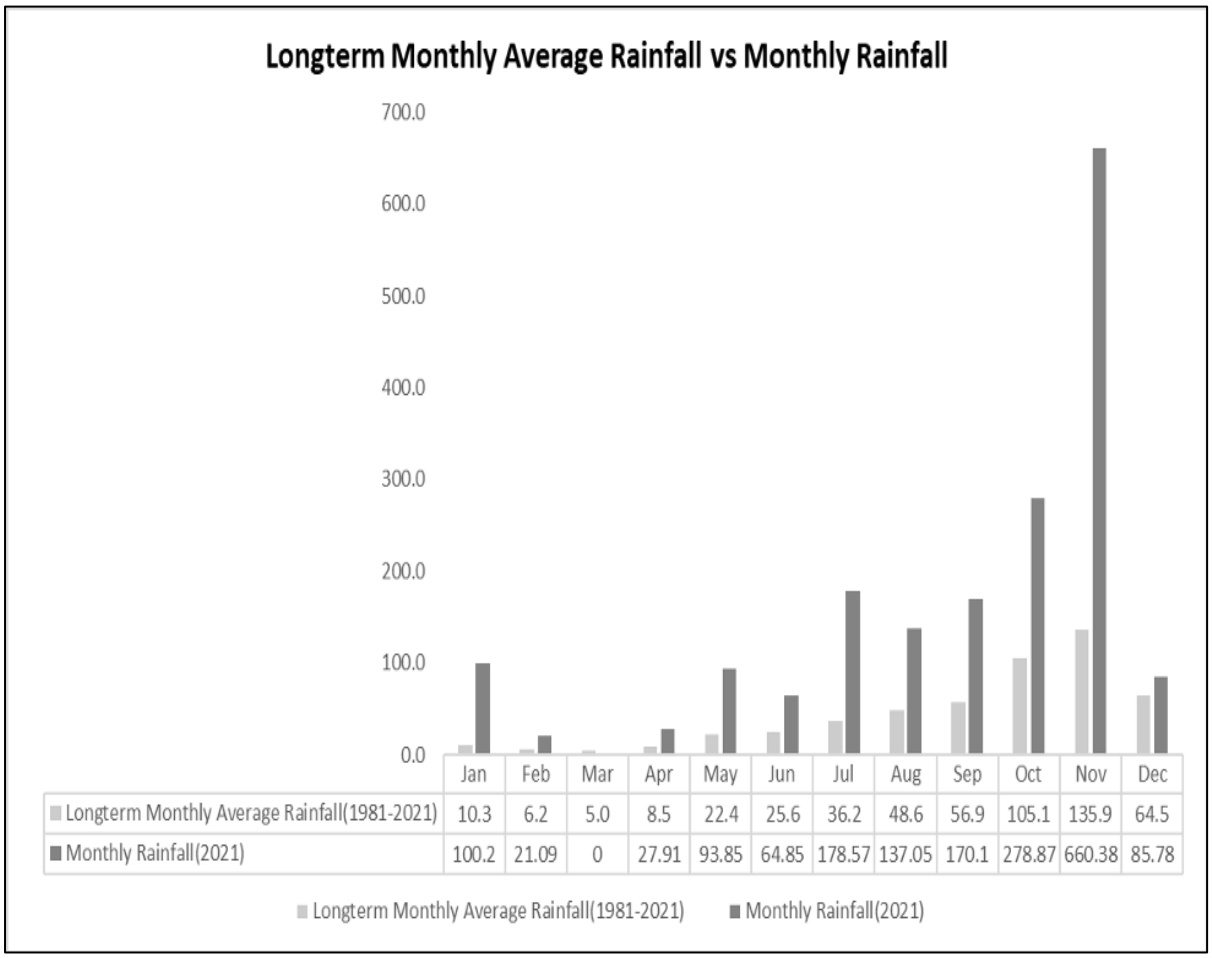


Figure 3.12 Long-term monthly average rainfall vs monthly rainfall

Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of December through February of the years from 2018 to 2021 and the seasonal wind rose for the study period of December through February 2022-2023. The wind rose diagrams thus produced are shown in Figures 3.13-3.14. Figure 3.15 reveals that:

- ❖ The measured average wind velocity during the study period is 4.76 m/s.
- ❖ Predominant wind was dominant in the directions ranging from northeast to southwest.

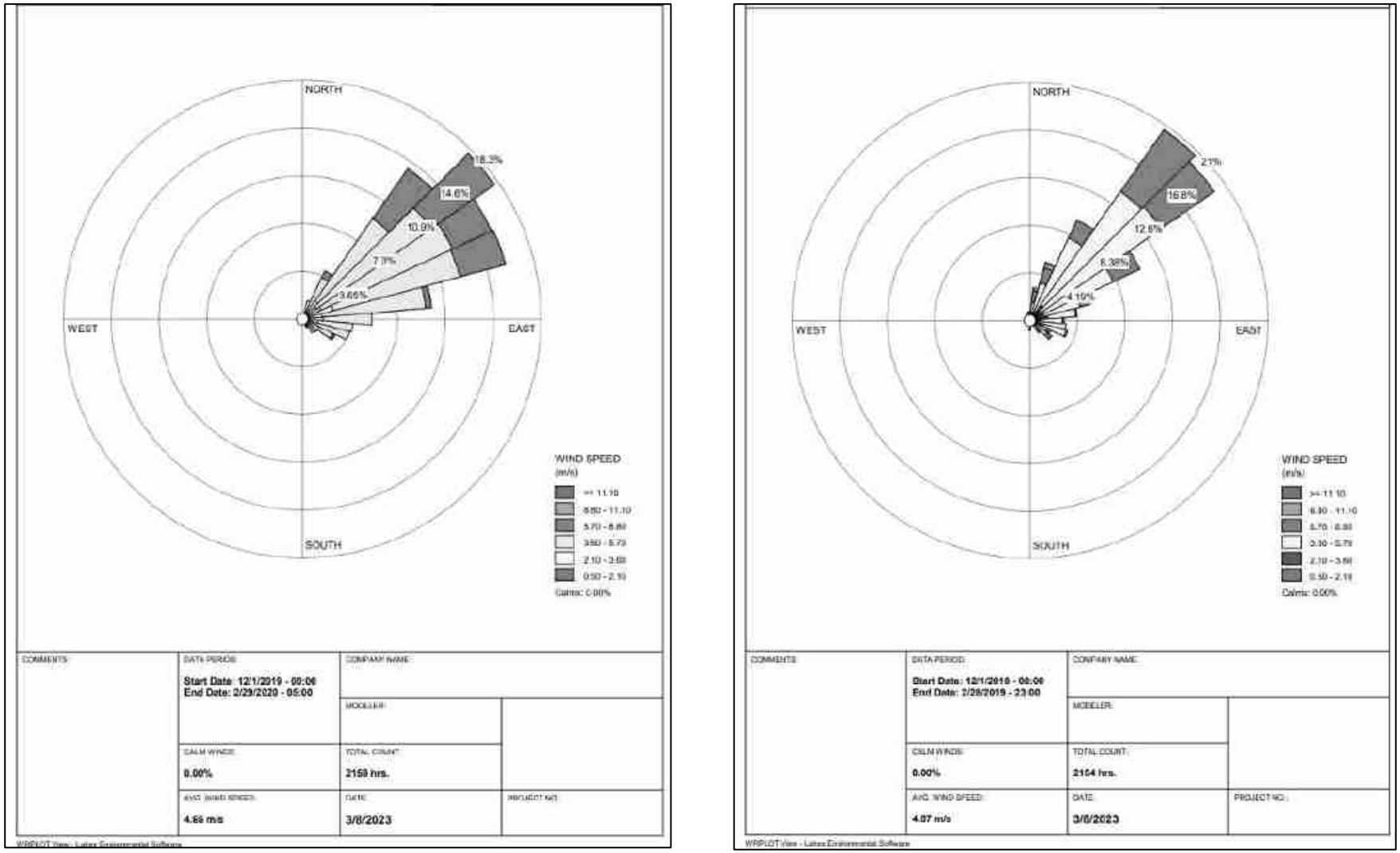
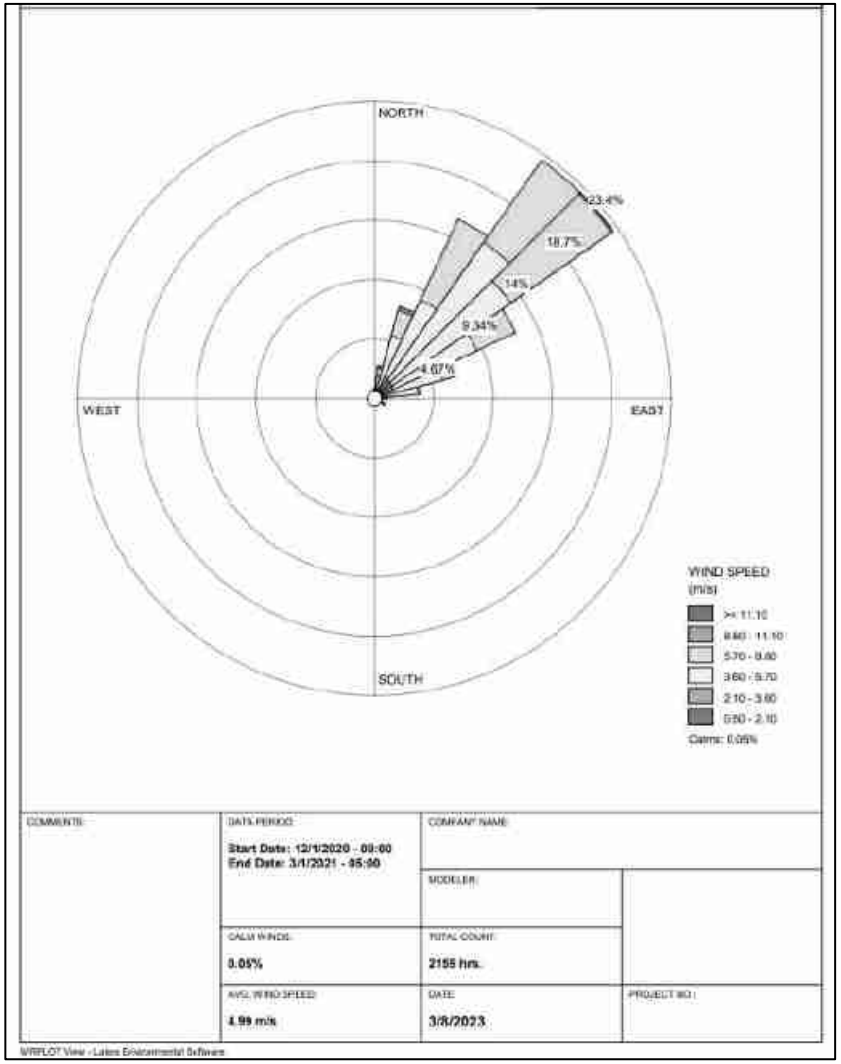


Figure 3.13 Windrose Diagram for 2018 - 2019 (December to February)



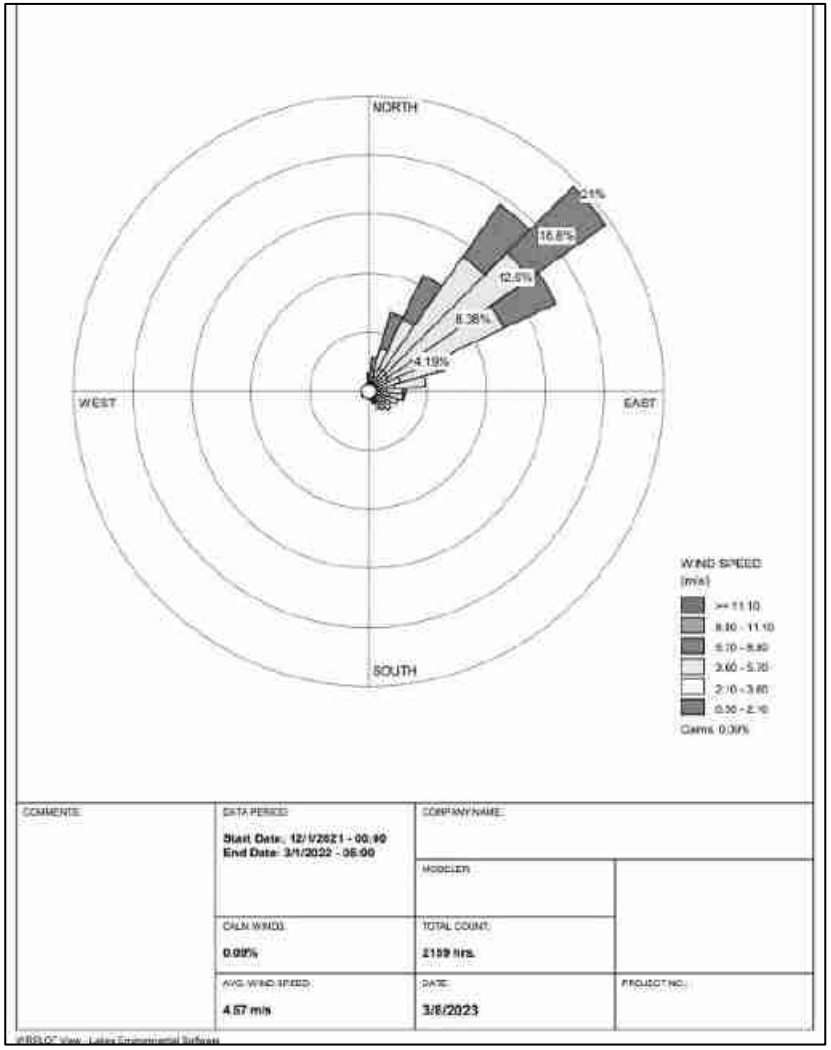


Figure 3.14 Windrose Diagram for 2020-2021 and 2021-2022 (December to February)

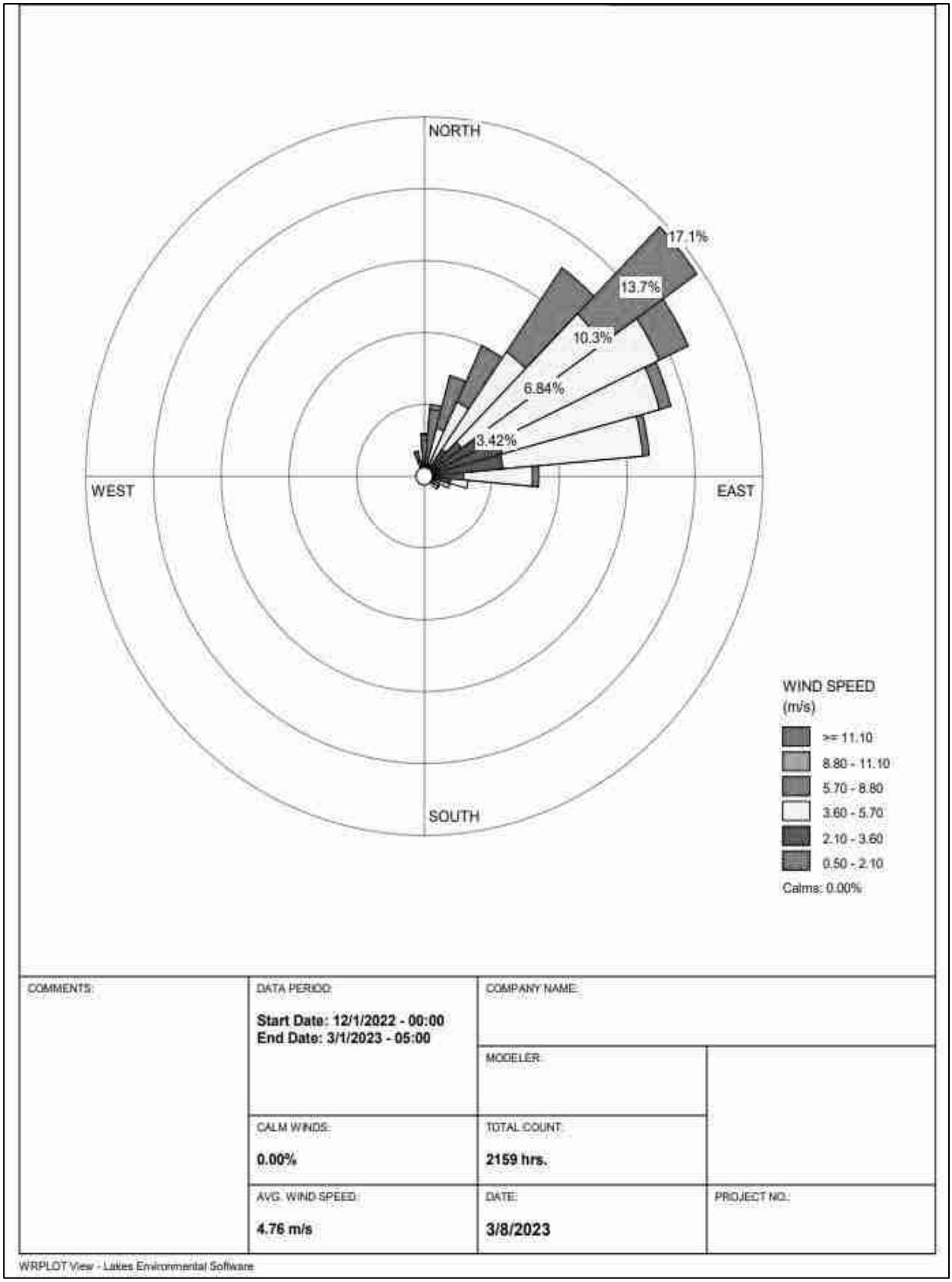


Figure 3.15 Onsite Wind Rose Diagram

Ambient Air Quality Study

The baseline ambient air quality is studied through a scientifically designed ambient air quality monitoring network considering the followings

- Meteorological condition on synoptic scale
- Topography of the study area
- Representatives of regional background air quality for obtaining baseline status
- Location of residential areas representing different activities
- Accessibility and power availability

Table 3.13 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
$PM_{2.5}$	Gravimetric method Beta attenuation method	Fine Particulate Sampler
PM_{10}	Gravimetric method Beta attenuation method	Respirable Dust Sampler
SO_2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology based ***Ekdant Enviro Service (P) Limited*** *& CPCB* Notification

Table 3.14 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO_2 ($\mu g/m^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_x ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} ($\mu g/m^3$)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	$PM_{2.5}$ ($\mu g/m3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for $PM_{2.5}$, PM_{10}, Sulphur Dioxide (SO_2) and nitrogen dioxide (NO_X). The sampling locations are shown in Figure 3.16 and average concentrations of air pollutants are summarized in Tables 3.15.

Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations

S. No.	Location Code	Monitoring Locations	Distance (km)	Coordinates
1	AAQ1	Nearby core	0.06km E	12° 2'22.73"N,79°41'23.19"E
2	AAQ2	Kadagampattu	1.65km SW	12° 1'48.11"N,79°40'26.66"E
3	AAQ3	Kodukkur	4.61km SW	12° 0'41.62"N,79°39'15.59"E
4	AAQ4	Eraiyur	3.91km NW	12° 3'27.46"N,79°39'24.45"E
5	AAQ5	Katterikuppam	4.24km SSE	12° 0'10.50"N,79°42'6.46"E
6	AAQ6	Ranganathapuram	1.96km NE	12° 2'41.68"N,79°42'23.40"E
7	AAQ7	Semangalam	3.81km NE	12° 4'7.86"N,79°42'28.80"E

*Source: On-site monitoring/sampling by **Ekdant Enviro Service (P) Limited** in association with GTMS*

Results

As per the monitoring data, PM2.5 ranges from 15.2 µg/m3 to 19.3 µg/m3; PM10 from 32.3 µg/m3 to 36.9 µg/m3; SO2 from 6.9 µg/m3 to 10.0 µg/m3; NOx from 13.0 µg/m3 to 18.9 g/m3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

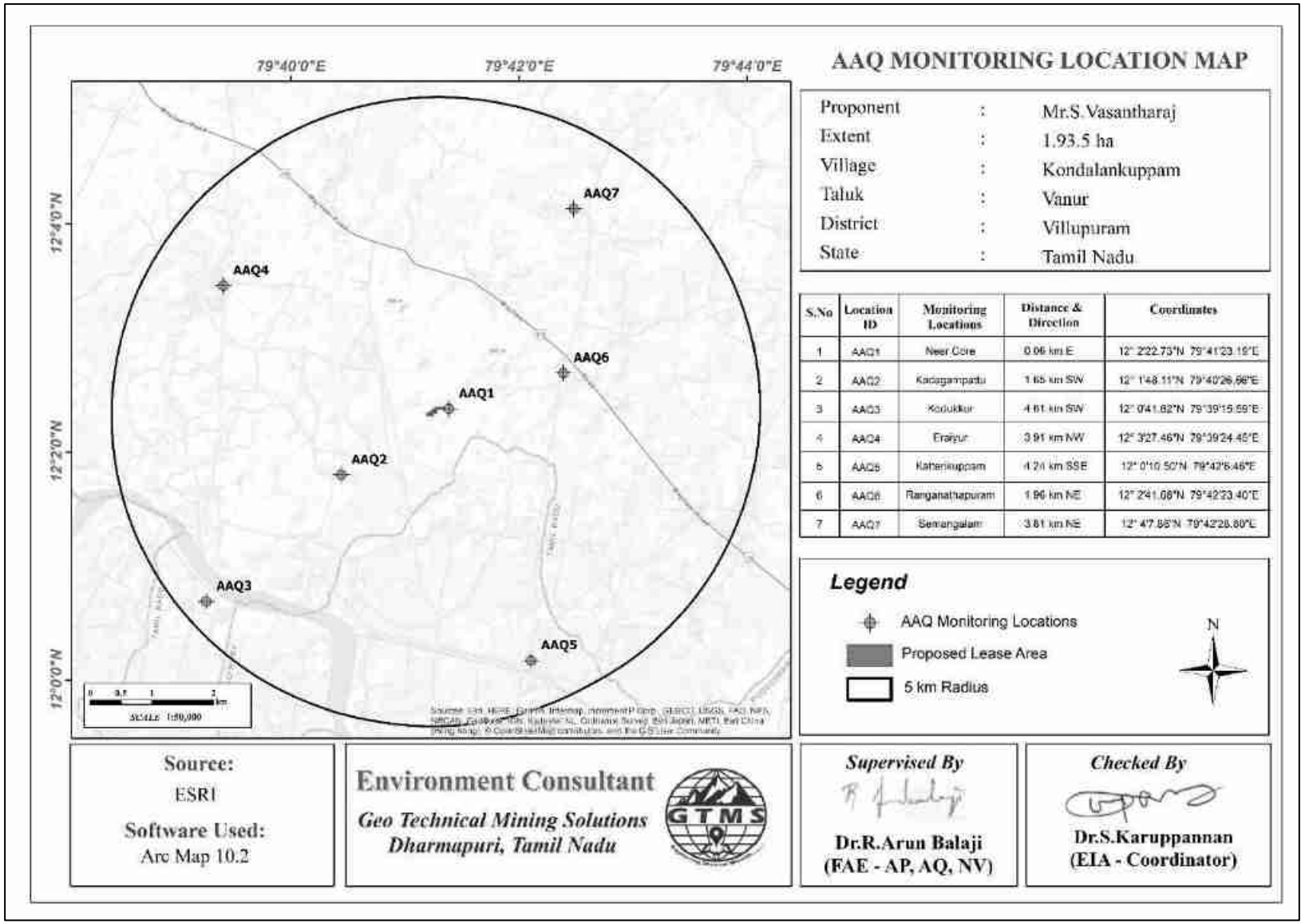


Figure 3.16 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

Table 3.16 Summary of AAQ Result

	$PM_{2.5}$				PM_{10}			
Station ID	**Max**	**Min**	**Mean**	**98th Percentile**	**Max**	**Min**	**Mean**	**98th Percentile**
AAQ1	22.4	17.8	20.6	22.3	40.4	33.9	37.7	40.3
AAQ2	17.6	14.2	15.8	17.4	35.5	30.8	33.3	35.1
AAQ3	18.5	14.3	16.7	17.9	38.7	33.1	35.8	38.5
AAQ4	21.6	18.2	19.8	21.4	40.2	35.5	38.0	39.8
AAQ5	20.7	14.8	17.9	20.5	34.7	31.9	33.2	34.5
AAQ6	16.7	12.9	14.8	16.7	32.7	29.9	31.2	32.5
AAQ7	17.3	13.9	15.4	17.1	35.9	31.2	33.7	35.5
	SO_2				NO_x			
AAQ1	13.5	10.4	11.5	13.2	21.9	17.7	19.5	21.9
AAQ2	9.1	6.0	7.5	9.1	18.6	12.7	15.8	18.4
AAQ3	9.5	6.4	7.9	8.8	19.8	8.6	16.8	19.6
AAQ4	11.2	8.1	9.6	11.2	20.7	14.8	17.9	20.5
AAQ5	9.3	6.2	7.8	9.3	17.7	14.1	16.0	17.5
AAQ6	8.3	5.2	6.8	8.3	15.9	12.3	14.2	15.7
AAQ7	9.2	6.1	7.7	9.2	17.9	11.0	15.0	17.3

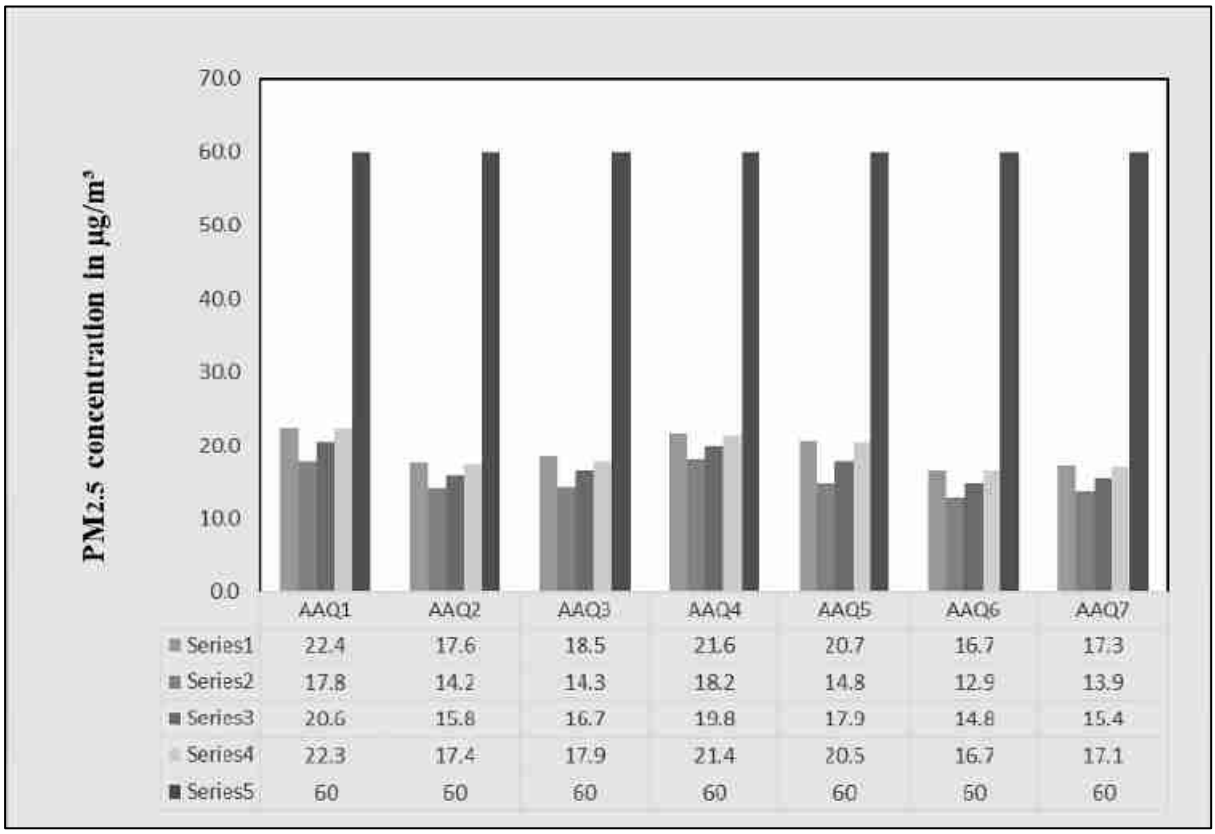


Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of $PM_{2.5}$ Measured from 7 Air Quality Monitoring Stations within 5 km Radius

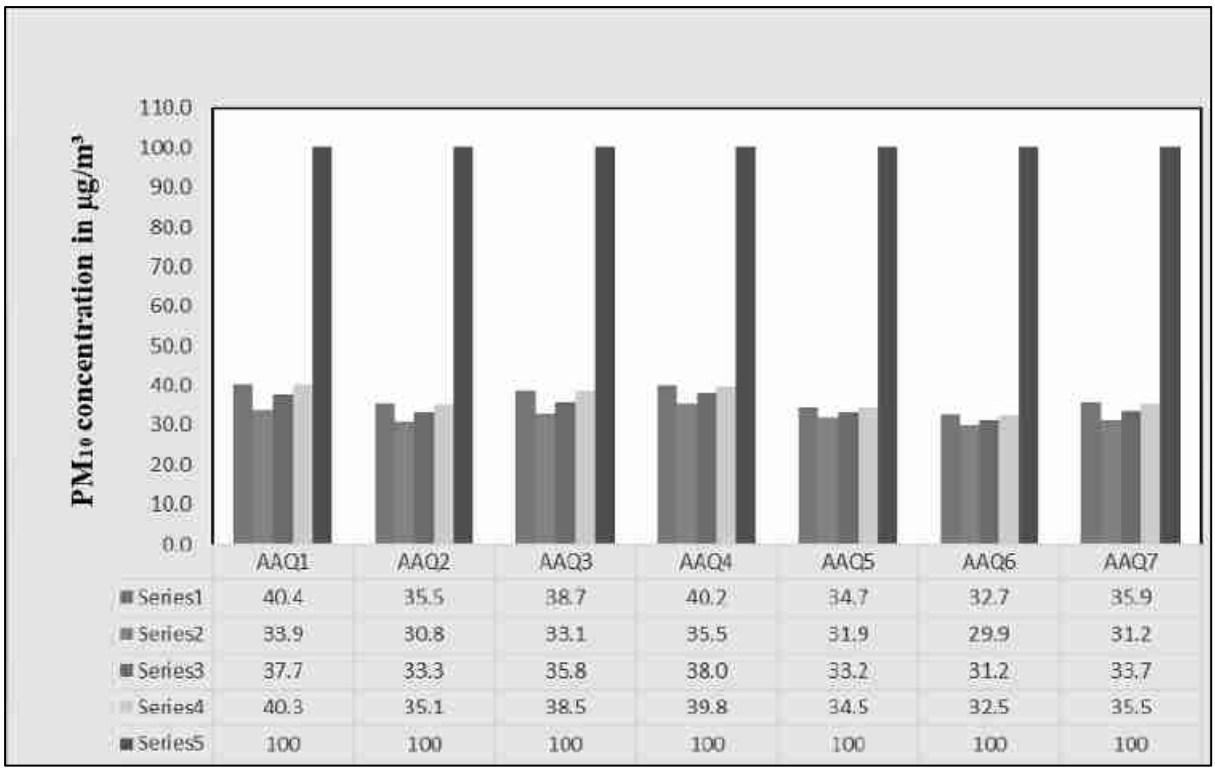


Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM_{10} Measured from 7 Air Quality Monitoring Stations within 5 km Radius

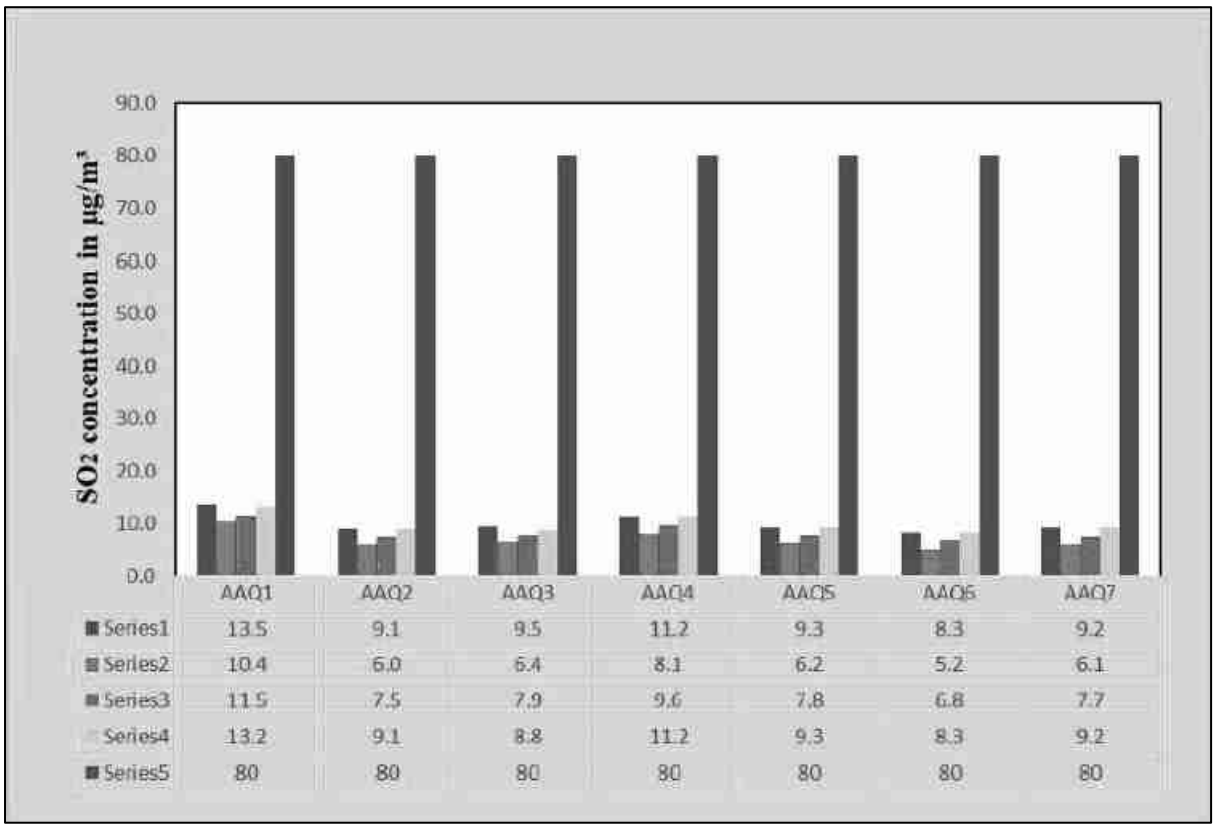
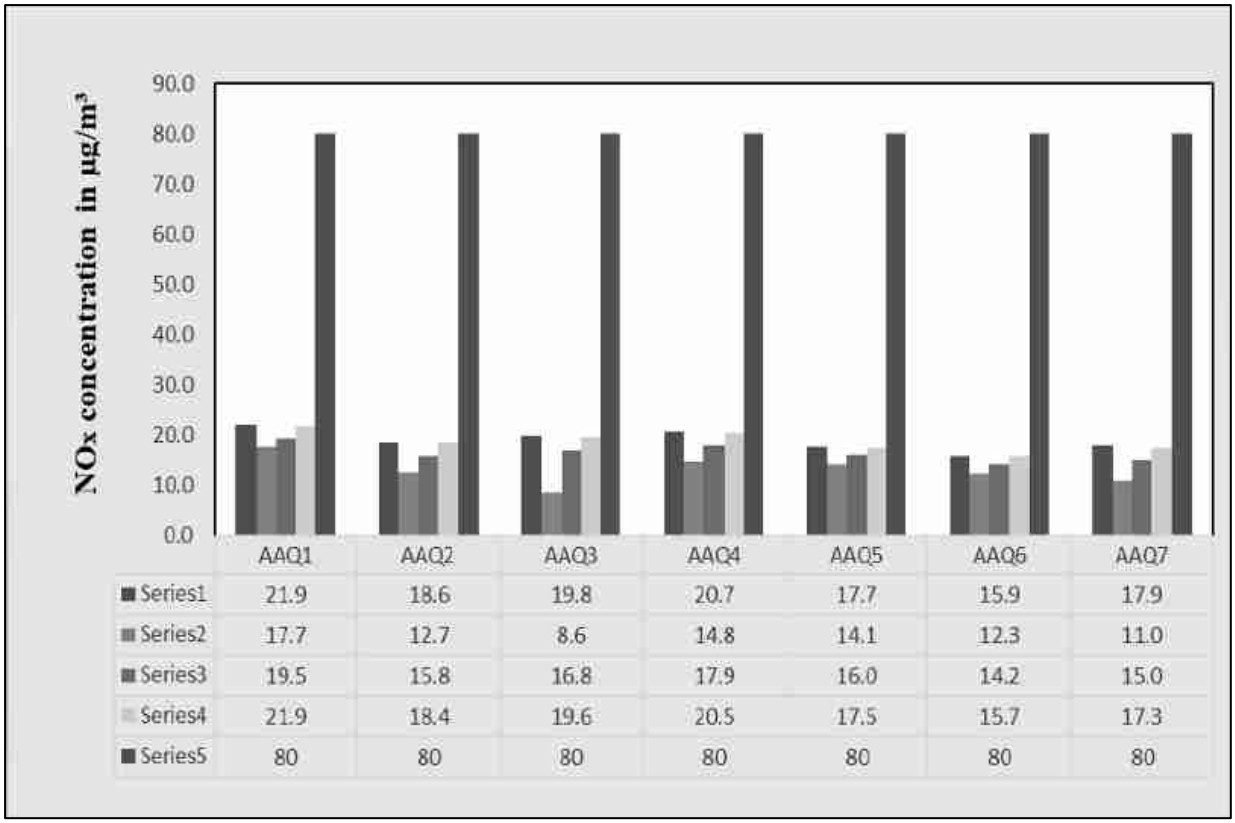
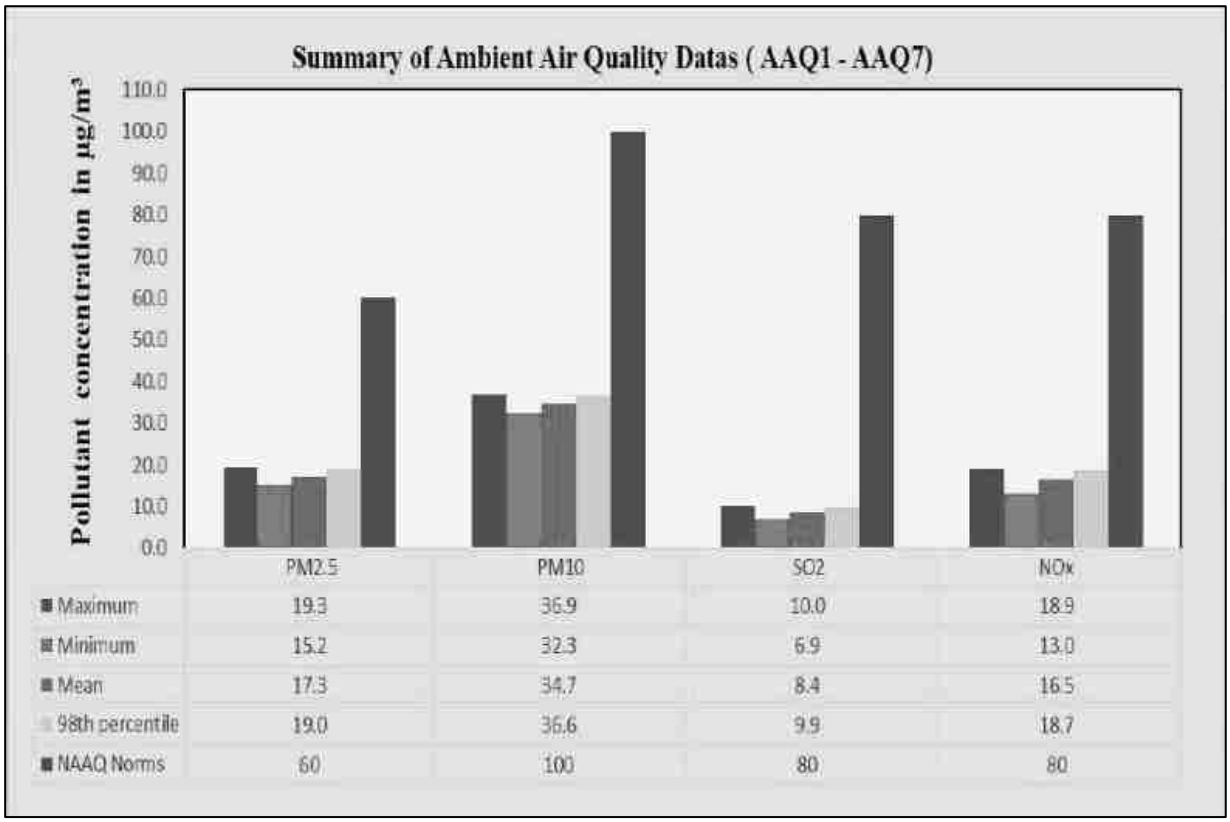


Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO_2 Measured from 7 Air Quality Monitoring Stations within 5 km Radius



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Series1	21.9	18.6	19.8	20.7	17.7	15.9	17.9
Series2	17.7	12.7	8.6	14.8	14.1	12.3	11.0
Series3	19.5	15.8	16.8	17.9	16.0	14.2	15.0
Series4	21.9	18.4	19.6	20.5	17.5	15.7	17.3
Series5	80	80	80	80	80	80	80

Figure 3.20 Bar Chart Showing Maximum, Minimum, and Average Concentrations of NO_x Measured from 7 Air Quality Monitoring Stations within 5km Radius



	PM2.5	PM10	SO2	NOx
Maximum	19.3	36.9	10.0	18.9
Minimum	15.2	32.3	6.9	13.0
Mean	17.3	34.7	8.4	16.5
98th percentile	19.0	36.6	9.9	18.7
NAAQ Norms	60	100	80	80

Figure 3.21 Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5 km Radius

3.3.5 Noise Environment

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Eight (8) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.17 and spatial occurrence of the locations are shown in Figure 3.24.

Table 3.17 Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance in km	Coordinates
1	N1	Nearby core	0.06km E	12° 2'22.73"N, 79°41'23.19"E
2	N2	Thollamur	1.69km NNW	12° 2'53.93"N, 79°40'31.53"E
3	N3	Kadagampattu	1.80km SW	12° 1'48.11"N, 79°40'26.66"E
4	N4	Kodukkur	4.74km SW	12° 0'41.62"N, 79°39'15.59"E
5	N5	Eraiyur	3.95km NW	12° 3'27.46"N, 79°39'24.45"E
6	N6	Katterikuppam	4.17km SSE	12° 00'10.50"N, 79°42'23.46"E
7	N7	Ranganathapuram	1.91km ENE	12° 2'41.68"N, 79°42'23.40"E
8	N8	Semangalam	3.78km NNE	12° 4'7.86"N, 79°42'28.80"E

*Source: On-site monitoring/sampling by **Ekdant Enviro Service (P) Limited** in association with GTMS*

Table 3.18 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level (dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (L_{eq} in dB (A))	
N1	Nearby core	Industrial area	39.2	35.6	75	70
N2	Thollamur	Residential area	41.8	36.4		
N3	Kadagampattu		41.0	35.8	55	50
N4	Kodukkur		42.4	37.4		
N5	Eraiyur		46.8	39.0		
N6	Katterikuppam		40.4	36.8		
N7	Ranganathapuram		45.8	41.6		
N8	Semangalam		40.6	36.4		

*Source: On-site monitoring/sampling by **Ekdant Enviro Service (P) Limited** in association with GTMS*

The Table 3.18 shows that noise level in core zone was 39.2 dB (A) Leq during day time and 35.6 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 40.4 to 46.8 dB (A) Leq and during night time from 35.8 to 41.6dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.22 and 3.23.

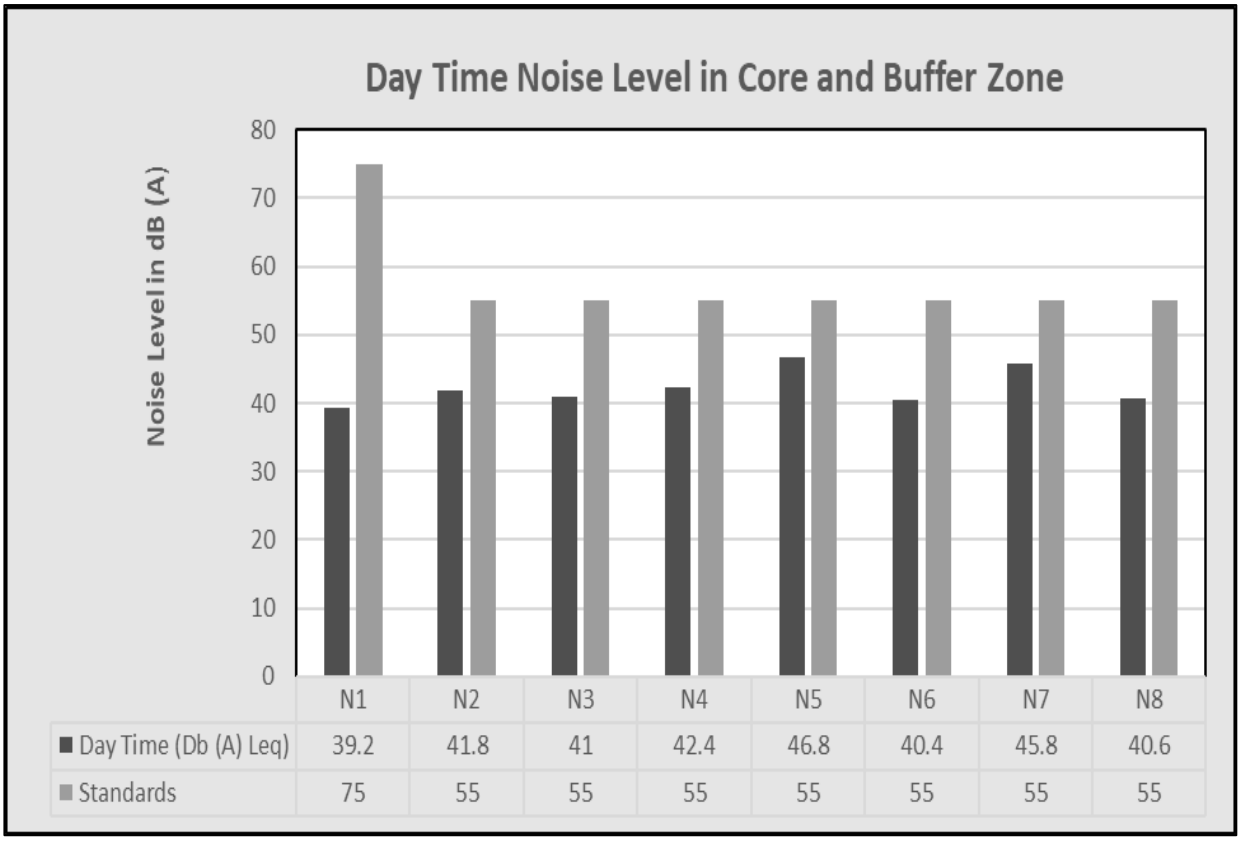


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

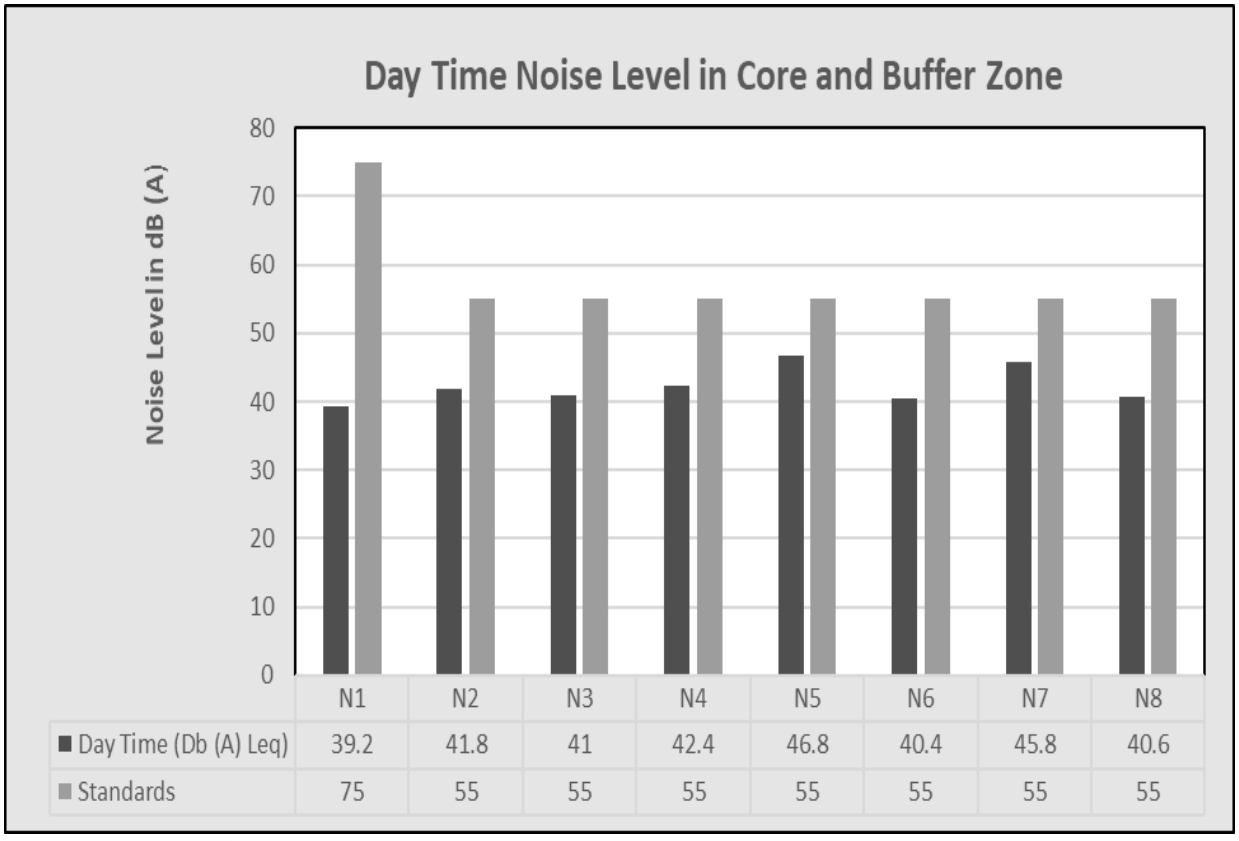


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

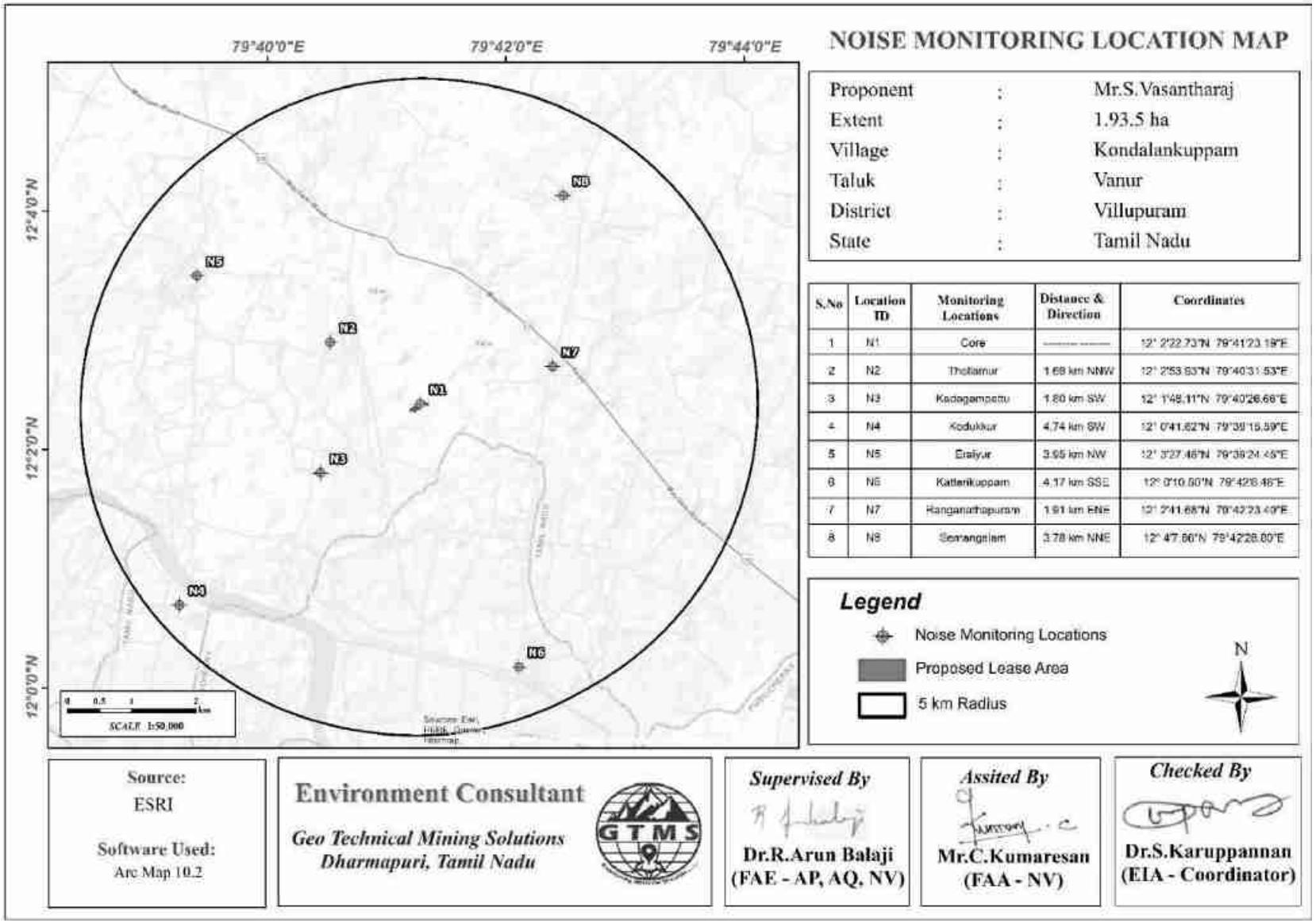


Figure 3.24 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site

3.3.6 Biological Environment

An ecological survey was conducted to collect the baseline data regarding flora and fauna in the study area of 10 km radius. Data were collected from different sources, i.e., government departments such as District Forest Office and Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

Methodology

Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study**,** quadrats of 25 m × 25 m were laid down to assess trees and quadrats of 10 m × 10 m were laid down for shrubs, as shown in Figure 3.25.

Figure 3.25 Quadrates Sampling Methods of Flora

Phyto-Sociological Studies

Phyto sociological parameters, such as Density, Frequency, Abundance and Importance Value Index of individual species were determined in randomly placed quadrat of different sizes in the study area, as shown in Table 3.19. Relative frequency, and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For shrubs, herbs and grasses, Density, Frequency, Relative Density & Relative Frequency were found. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the study area of 10 km radius. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if any economically valuable species is threatened in the process

Table 3.19 Calculation of Density, Frequency (%), Dominance, Relative Density, Relative Frequency, Relative Dominance & Important Value Index

Parameters	Formula
Density	Total No. of individuals of species/ Total No. of Quadrats used in sampling
Frequency (%)	(Total No. of Quadrats in which species occur/ Total No. of Quadrats studied)100
Abundance	Total No. of individuals of species/ No. of Quadrats in which they occur
Relative Density	(Total No. of individuals of species/Sum of all individuals of all species) * 100
Relative Frequency	(Total No. of Quadrats in which species occur/ Total No. of Quadrats occupied by all species) * 100
Important Value Index	Relative Density + Relative Frequency

Shannon – Wiener Index, Evenness and Richness

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant. The corresponding formulas are given in Table 3.20.

Table 3.20 Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness

Description	Formula
Species diversity – Shannon – Wien Index	**$H= \sum[(p_i)*\ln(p_i)]$** Where $p_{i:}$ Proportion of total sample represented by species i: number of individuals of species i/ total number samples
Evenness	H/H max, H_{max} = ln(s)= maximum diversity possible S=No. of species
Species Richness by Margalef	RI = S-1/ln N Where S = Total Number of species in the community N = Total Number of individuals of all species in the Community

3.3.6.1 Flora

Flora study was conducted using the above said methodology to inventory the existing terrestrial plants in both core and buffer zones. Details of plants have been described in the succeeding sections.

Flora in mine lease area (core zone)

Quarry leases have a large number of Acacia holoseicea plants whose seeds are wind-dispersed so that they are abundant both inside and outside the quarry leases area. It contains a total of 18 species belonging to 16 families have been recorded from the mine lease area. 3 Trees (16%), 6 Shrubs (33%) and 9 Herbs (50%) were identified. Details of flora with the scientific Name Details Mention in Table 3.21.

The shrub has a spreading habit and typically grows to a height of 3 m (9.8 ft) and a width of 4 m (13 ft). The large grey-green phyllodes have an ovate-lanceolate shape with a length of 10 to 25 cm (3.9 to 9.8 in) and a width of 2 to 9 cm (0.79 to 3.54 in) and are covered with white silky hairs, with three to four prominent veins. The flowers are rod-like and bright yellow, 3–5 cm long. The thinly crustaceous seed pods that form after flowering are tightly irregularly coiled and have a width of 2.5 to 4 mm (0.098 to 0.157 in). The pods are 3 to 5 cm (1.2 to 2.0 in) in length and twisted and curled. The shiny dark brown seeds are arranged longitudinally in the pods and have an obolid - ellipsoid shape and are 3 to 5 mm (0.12 to 0.20 in) in length with a bright yellow aril. The seed is edible.

Flora within 300 m radius zone

A variety of plant species are found within a radius of 300 meters. It is an arid landscape. There is no agricultural land nearby. It contains a total of 36 species belonging to 22 families have been recorded from the buffer zone. 9 Trees (25%), 7 Shrubs (19%) and 25 Herbs and Climbers, Creeper, Grass & Cactus (69%) were identified. Details of flora with the scientific name details and of diversity species Rich ness index were mentioned in Table 3.22 and figure 3.26. There is no threat to the Flora species in 300-meter radius.

Flora in 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area. It contains a total of species belonging to 40 families have been recorded from the buffer zone. The floral (81) varieties among them 35 Trees (38%), 15 Shrubs (18%) Herbs and Climbers, Creeper, Grass & Cactus, 31 (38%) were identified. Details of flora with the scientific name details of diversity species Rich ness index were mentioned in Table 3.27and figure 3.27.

Table 3.21 Flora in Mine Lease Area

S.No.	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Munderi maram	*Anacardium occidentale*	Anacardiaceae	3	3	5	0.6	60.0	0.6	12.5	13.3	25.8	Not Listed
2	Teak maram	*Tectona grandis*	Lamiaceae	2	2	5	0.4	40.0	1.0	25.0	25.0	50.0	Not Listed
3	Echamaram	*Arenga engleri Becc*	Arecaceae	3	3	5	0.6	60.0	1.0	37.5	37.5	75.0	Not Listed
Shrubs													
1	Erukku	*Calotropis gigantea*	Apocynaceae	7	5	8	0.9	62.5	0.1	2.9	82.3	85.2	Not Listed
2	Thuthi	*Abutilon indicum*	Meliaceae	7	6	8	0.9	75.0	1.2	9.7	17.6	27.4	Not Listed
3	Avarai	*Senna auriculata*	Fabaceae	8	5	8	1.0	62.5	1.6	11.1	14.7	25.8	Not Listed
4	Unichadi	*Lantana camara*	Verbenaceae	12	6	8	1.5	75.0	2.0	16.7	17.6	34.3	Not Listed
5	Suraimullu	*Zizyphus Oenoplia*	Rhamnaceae	6	4	8	0.8	50.0	1.5	8.3	11.8	20.1	Not Listed
6	Acacia	*Acacia holosecicea*	Fabaceae	32	8	8	4.0	100	4.0	44.4	23.5	68.0	Not Listed
Herbs													
1	Nayuruvi	*Achyranthes aspera*	Amaranthaceae	7	6	8	0.9	75.0	0.1	2.1	70.9	73.0	Not Listed
2	Nearunji mull	*Tribulus zeyheri* Sond	Zygophyllaceae	5	5	8	0.6	62.5	1.0	8.1	10.6	18.7	Not Listed
3	pill	*Cenchrus ciliaris*	Poaceae	6	3	8	0.8	37.5	2.0	9.7	6.4	16.1	Not Listed
4	pulapoo	*Aerva lanata*	Amaranthaceae	7	5	8	0.9	62.5	1.4	11.3	10.6	21.9	Not Listed
5	Rail poondu	*Croton bonplandianus*	Euphorbiaceae	13	7	8	1.6	87.5	1.9	21.0	14.9	35.9	Not Listed
6	Perandai	*Cissus quadrangularis*	Vitaceae	5	4	8	0.6	50.0	1.3	8.1	8.5	16.6	Not Listed

7	Thumbai chadi	*Leucas aspera*	Lamiaceae	7	6	8	0.9	75.0	1.2	11.3	12.8	24.1	Not Listed
8	Kolunji	*Tephrosia purpurea*	Fabaceae	8	8	8	1.0	100.0	1.0	12.9	17.0	29.9	Not Listed
9	Sapathikalli	*Opuntia ficus-indica*	Cactaceae	4	3	8	0.5	37.5	1.3	6.5	6.4	12.8	Not Listed

Table 3.22 Flora in 300-meter radius

S.No.	Local Name	Scientific name	Family name	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees												
1	Karuvealan	*Prosopis juliflora*	Fabaceae	4	10	0.5	40.0	1.3	15.6	16.7	32.3	Not Listed
2	Palm tree	*Borassus flabellifer*	Fabaceae	3	10	0.4	30.0	1.3	12.5	12.5	25.0	Not Listed
3	Vembu	*Azadirachta indica*	Meliaceae	2	10	0.3	20.0	1.5	9.4	8.3	17.7	Not Listed
4	Unjai maram	*Albizia amara*	Fabaceae	3	10	0.4	30.0	1.3	12.5	12.5	25.0	Not Listed
5	Vetpalai	*Wrightia tinctoria*	Apocynaceae	2	10	0.3	20.0	1.5	9.4	8.3	17.7	Not Listed
6	Munderi maram	*Anacardium occidentale*	Anacardiaceae	3	10	0.4	30.0	1.3	12.5	12.5	25.0	Not Listed
7	Teak maram	*Tectona grandis*	Lamiaceae	4	10	0.5	40.0	1.3	15.6	16.7	32.3	Not Listed
8	Echamaram	*Arenga engleri Becc*	Arecaceae	3	10	0.4	30.0	1.3	12.5	12.5	25.0	Not Listed
Shrubs												
1	Erukku	*Calotropis gigantea*	Apocynaceae	5	15	0.4	33.3	1.2	11.8	11.4	23.1	Not Listed
2	Uumaththai	*Datura metel*	Solanaceae	6	15	0.5	40.0	1.2	13.7	13.6	27.4	Not Listed
3	Thuthi	*Abutilon indicum*	Meliaceae	7	15	0.5	46.7	1.1	15.7	15.9	31.6	Not Listed
4	Avarai	*Senna auriculata*	Fabaceae	8	15	0.6	53.3	1.1	17.6	18.2	35.8	Not Listed
5	Unichadi	*Lantana camara*	Verbenaceae	5	15	0.4	33.3	1.2	11.8	11.4	23.1	Not Listed

6	suraimullu	*Zizyphus Oenoplia*	Rhamnaceae	6	15	0.5	40.0	1.2	13.7	13.6	27.4	Not Listed
7	Acacia	*Acacia holosecicea*	Fabaceae	7	15	0.5	46.7	1.1	15.7	15.9	31.6	Not Listed
Herbs												
1	Nayuruv	*Achyranthes aspera*	Amaranthaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
2	Nearunji mull	*Tribulus zeyheri*	Zygophyllaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
3	pill	*Cenchrus ciliaris*	Poaceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
4	pulapoo	*Aerva lanata*	Amaranthaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
5	kapok bush	*Aerva javani*	Amaranthaceae	4	20	0.3	20.0	1.3	3.0	2.8	5.8	Not Listed
6	Rail poondu	*Croton bonplandianus*	Euphorbiaceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
7	Perandai	*Cissus quadrangularis*	Vitaceae	8	20	0.5	40.0	1.1	5.4	5.6	10.9	Not Listed
8	Thumbai chadi	*Leucas aspera*	Lamiaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
9	Umathai	*Datura metel*	Solanaceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
10	Sethamutti	*Sida cordata*	Malvaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
11	Kolunji	*Tephrosia purpurea*	Fabaceae	8	20	0.5	40.0	1.1	5.4	5.6	10.9	Not Listed
12	Nayuruvi	*Achyranthes aspera*	Amaranthaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
13	Ishappukol Vitai	*Plantago coronopus*	Plantaginaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
14	vealiparuthi	*Pergularia daemia*	Apocynaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
15	Seppu nerinji	*Indigofera linnaei Ali*	Fabaceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
16	Sapathikalli	*Opuntia ficus-indica*	Cactaceae	8	20	0.5	40.0	1.1	5.4	5.6	10.9	Not Listed
17	Pal kodi	*Cynanchum viminale*	Apocynaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
18	Ilia perandai	*Cissus rotundifolia*	Vitaceae	8	20	0.5	40.0	1.1	5.4	5.6	10.9	Not Listed
19	Katralai	*Aloe vera*	Asphodelaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
20	Seammulli	*Barleria prionitis*	Acanthaceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
21	Kandakathri	*Solanum virginianum*	Solanaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
22	Ceruppaṭai	*Coldenia procumbens*	Boraginaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed
23	Karisalanganni	*Eclipta Prostata*	Asteraceae	7	20	0.4	35.0	1.1	4.8	4.9	9.7	Not Listed
24	Nayuruv	*Achyranthes aspera*	Amaranthaceae	5	20	0.3	25.0	1.2	3.6	3.5	7.1	Not Listed
25	Nearunji mull	*Tribulus zeyheri*	Zygophyllaceae	6	20	0.4	30.0	1.2	4.2	4.2	8.4	Not Listed

Table 3.23 Flora in Mine Lease area

S.No.	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Muntheri maram	*Anacardium occidentale*	3	-0.98	-0.37	0.38
2	Thakku maram	*Tectona grandis*	2	-1.39	-0.35	0.25
3	Echamaram	*Arenga engleri Becc*	3	-0.98	-0.37	0.38
H (Shannon Diversity Index) =1.08						
Shrubs						
1	Erukku	*Calotropis gigantea*	7	0.10	-2.33	-0.23
2	Thuthi	*Abutilon indicum*	7	0.10	-2.33	-0.23
3	Avarai	*Senna auriculata*	8	0.11	-2.20	-0.24
4	Unichadi	*Lantana camara*	12	0.17	-1.79	-0.30
5	Suraimullu	*Zizyphus Oenoplia*	6	0.08	-2.48	-0.21
6	Acacia	*Acacia holosecicea*	32	0.44	-0.81	-0.36
H (Shannon Diversity Index) =1.56						
Herbs						
1	Nayuruvi	*Achyranthes aspera*	7	0.11	-2.18	-0.25
2	Nearunji mull	*Tribulus zeyheri Sond*	5	0.08	-2.52	-0.20
3	Pill	*Cenchrus ciliaris*	6	0.10	-2.34	-0.23
4	Pulapoo	*Aerva lanata*	7	0.11	-2.18	-0.25
5	Rail poondu	*Croton bonplandianus*	13	0.21	-1.56	-0.33
6	Perandai	*Cissus quadrangularis*	5	0.08	-2.52	-0.20
7	Thumbai chadi	*Leucas aspera*	7	0.11	-2.18	-0.25
8	Kolunji	*Tephrosia purpurea*	8	0.13	-2.05	-0.26
9	Sapathikalli	*Opuntia ficus-indica*	4	0.06	-2.74	-0.18
H (Shannon Diversity Index) =2.16						

Table 3.24 Species Richness (Index) in Mine Lease Area

Details	H	Hmax	Evenness	Species Richness
Tree	1.08	1.10	0.99	0.96
Shrubs	1.56	1.79	0.87	1.17
Herbs	2.14	2.20	0.97	1.94

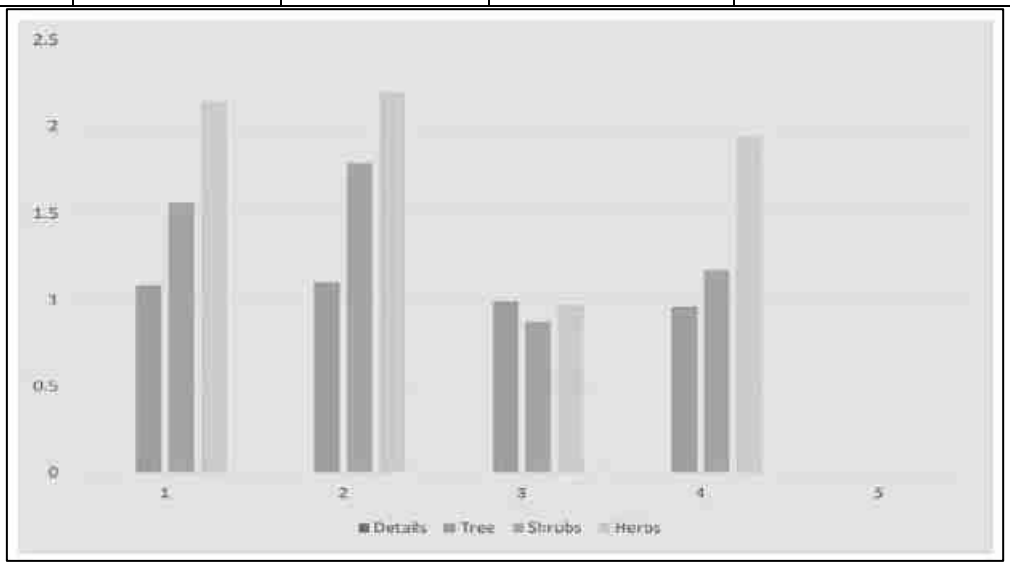


Figure 3.26 Calculation of Species Diversity in mine lease area radius

Table 3.25 Calculation of Species Diversity in 300 m Radius

S.No.	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Trees						
1	Karuvealam Maram	Prosopis juliflora	5	0.14	-2.00	-0.27
2	Palm tree	Borassus flabellifer	4	0.11	-2.22	-0.24
3	Vembu	Azadirachta indica	3	0.08	-2.51	-0.20
4	Unjai maram	Albizia amara	4	0.11	-2.22	-0.24
5	Vetpalai	Wrightia tinctoria	3	0.08	-2.51	-0.20
6	Munderi maram	Anacardium occidentale	4	0.11	-2.22	-0.24
7	Teak maram	Tectona grandis	5	0.14	-2.00	-0.27
8	Echamaram	Arenga engleri Becc	4	0.11	-2.22	-0.24
H (Shannon Diversity Index) =2.18						
Shrubs						
1	Erukku	Calotropis gigantea	6	0.12	-2.14	-0.25
2	Uumaththai	Datura metel	7	0.14	-1.99	-0.27
3	Thuthi	Abutilon indicum	8	0.16	-1.85	-0.29
4	Avarai	Senna auriculata	9	0.18	-1.73	-0.31
5	Unichadi	Lantana camara	6	0.12	-2.14	-0.25
6	Suraimullu	Zizyphus Oenoplia	7	0.14	-1.99	-0.27
7	Acacia	Acacia holosecicea	8	0.16	-1.85	-0.29
H (Shannon Diversity Index) =1.94						
Herbs						
1	Nayuruv	*Achyranthes aspera*	6	0.03	-3.40	-0.11
2	Nearunji mull	*Tribulus zeyheri Sond*	7	0.04	-3.25	-0.13
3	Pill	*Cenchrus ciliaris*	8	0.04	-3.11	-0.14
4	Pulapoo	*Aerva lanata*	6	0.03	-3.40	-0.11
5	Kapok bush	*Aerva javani*	5	0.03	-3.58	-0.10
6	Rail poondu	*Croton bonplandianus*	8	0.04	-3.11	-0.14
7	Mookuthi poondu	*pedalium murex*	9	0.05	-3.00	-0.15
8	Perandai	*Cissus quadrangularis*	6	0.03	-3.40	-0.11
9	Thumbai chadi	*Leucas aspera*	8	0.04	-3.11	-0.14
10	Umathai	*Datura metel*	7	0.04	-3.25	-0.13
11	Sethamutti	*Sida cordata*	9	0.05	-3.00	-0.15
12	Annanm	*Iva annua*	7	0.04	-3.25	-0.13
13	Kolunji	*Tephrosia purpurea*	6	0.03	-3.40	-0.11
14	Nayuruvi	*Achyranthes aspera*	7	0.04	-3.25	-0.13
15	Ishappukol Vitai	*Plantago coronopus*	8	0.04	-3.11	-0.14
16	Vealiparuthi	*Pergularia daemia*	9	0.05	-3.00	-0.15
17	Seppu nerinji	*Indigofera linnaei Ali*	6	0.03	-3.40	-0.11
18	Sapathikalli	*Opuntia ficus-indica*	9	0.05	-3.00	-0.15
19	Pal kodi	*Cynanchum viminale*	7	0.04	-3.25	-0.13
20	Ilia perandai	*Cissus rotundifolia*	8	0.04	-3.11	-0.14
21	Katralai	*Aloe vera*	6	0.03	-3.40	-0.11
22	Seammulli	*Barleria prionitis*	7	0.04	-3.25	-0.13
23	Kandakathri	*Solanum virginianum*	8	0.04	-3.11	-0.14
24	Ceruppaṭai	*Coldenia procumbens*	6	0.03	-3.40	-0.11
25	Karisalanganni	*Eclipta Prostata*	7	0.04	-3.25	-0.13
H (Shannon Diversity Index) =3.21						

Table 3.26 Species Richness (Index) in 300 m radius

Details	H	H max	Evenness	Species Richness
Tree	2.18	2.20	0.99	2.22
Shrubs	1.94	2.20	0.88	2.03
Herbs	3.21	3.22	1.00	4.62

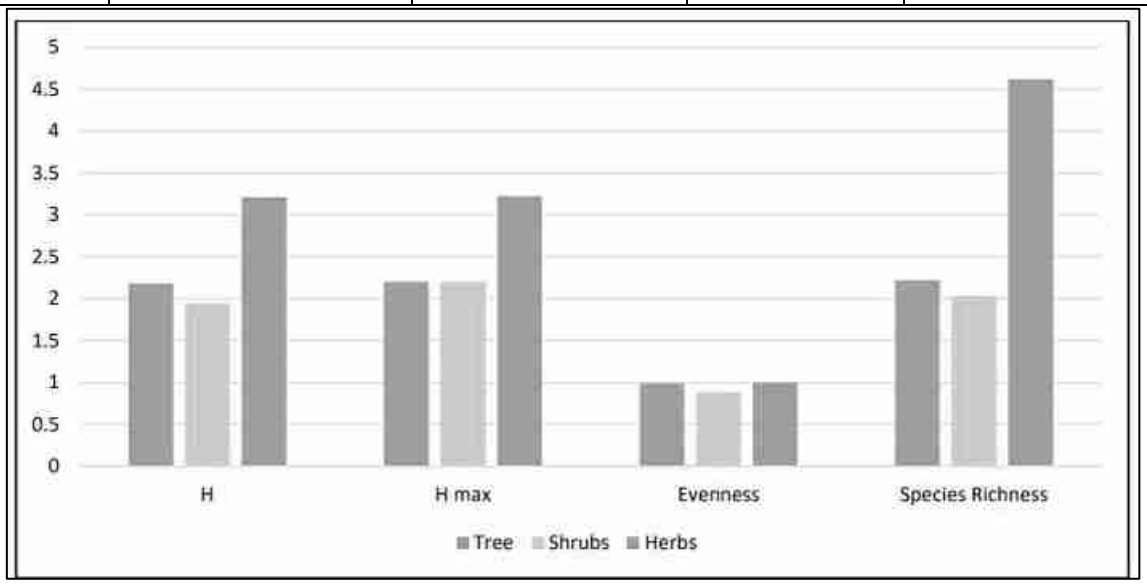


Figure 3.27 Floral diversity species Richness (Index) in buffer zone and 300m radius

Table 3.27 Flora in Buffer Zone

S.No	Local Name	Scientific name	Family name
TREES			
1	Vembu	*Azadirachta indica*	Meliaceae
2	Thekku	*Tectona grandis*	Verbenaceae
3	Pongam oiltree	*Pongamia pinnata*	Fabaceae
4	Thennai maram	*Cocos nucifera*	Arecaceae
5	Manga	*Mangifera indica*	Anacardiaceae
6	Puliyamaram	*Tamarindus indica*	Legumes
7	Vadanarayani	*Delonix elata*	Fabaceae
8	Thenpazham	*Muntingia calabura*	Tiliaceae
9	Punnai	*Calophyllu inophyllum*	Calophyllaceae
10	Ilanthai	*Ziziphus jujubha*	Rhamnaceae
11	Karuvelam	*Acacia nilotica*	Mimosaceae
12	Nettilinkam	*Polylathia longifolia*	Annonaceae
13	Arai nelli	*Phyllanthus acidus*	Euphorbiaceae
14	Panai maram	*Borassus flabellifer*	Arecaceae
15	Sapota	*Manilkara zapota*	Sapotaceae
16	Navalmaram	*Sygygium cumini*	Myrtaceae
17	Alamaram	*Ficus benghalensis*	Moraceae
18	Vazhaimaram	*Musa*	Musaceae
19	Karuvelam maram	*Vachellia nilotica*	Fabaceae
20	Nelli	*Emblica officinalis*	Phyllanthaceae

21	Eucalyptus	*Eucalyptus globules*	Myrtaceae
22	Maramalli	*Millingtonia hortensis*	Bignoniaceae
23	Kuduka puli	*Pithecellobium dulce*	Mimosaceae
24	Karungali	*Acacia sundra*	Legumes
25	Nochi	*Vitex negundo*	Lamiaceae
26	Karimurungai	*Moringa olefera*	Moraginaceae
27	Pappali maram	*Carica papaya L*	Caricaceae
28	Poovarasu	*Thespesia populnea*	Malvaceae
29	Arasanmaram	*Ficus religiosa*	Moraceae
30	Vilvam	*Aegle marmelos*	Rutaceae
31	Nuna maram	*Morinda citrifolia*	Rubiaceae
32	Nettilingam	*Polyalthia longifolia*	Annonaceae
33	Koyya	*Psidium guajava*	Myrtaceae
34	Seethapazham	*Annona reticulata*	Annonaceae
35	Savukku	*Casuarina L.*	Casuarinaceae
SHRUBS			
1	Avarai	*Senna auriculata*	Fabaceae
2	Sundaika	*Solanum torvum*	Solanaceae
3	Puramuttai	*Chrozophora rottleri*	Euphorbiaceae
4	Arali	*Nerium indicum*	Apocynaceae
5	Seemaiagaththi	*Cassia alata*	Caesalpinaceae
6	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae
7	Kattamanakku	*Jatropha curcas*	Euphorbiaceae
8	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae
9	Idlipoo	*xoracoc cinea*	Rubiaceae
10	Thuthi	*Abutilon indicum*	Meliaceae
11	Nithyakalyani	*Cathranthus roseus*	Apocynaceae
12	Uumaththai	*Datura metel*	Solanaceae
13	Kundumani	*Abrus precatorius*	Fabaceae
14	Erukku	*Calotropis gigantea*	Apocynaceae
15	Neermulli	*Hydrophila auriculata*	Acanthaceae
Herbs, Climber, Creeper & Grasses			
1	Nayuruv	*Achyranthes aspera*	Amaranthaceae
2	Veetukaayapoondu	*Tridax procumbens*	Asteraceae
3	Mukkirattai	*Boerhaavia diffusa*	Nyctaginaceae
4	Kuppaimeni	*Acalypha indica*	Euphorbiaceae
5	Karisilanganni	*Eclipta prostata*	Asteraceae
6	Korai	*Cyperus rotundus*	Cyperaceae
7	Thumbai	*Leucas aspera*	Lamiaceae
8	Nai kadugu	*Celome viscosa*	Capparidaceae
9	Parttiniyam	*Parthenium hysterophorus*	Asteraceae
10	Thulasi	*Ocimum tenuiflorum*	Lamiaceae

11	Arugampul	*Cynodon dactylon*	Poaceae
12	Thoiya keerai	*Digeria muricata*	Amarantheceae
13	Kovai	*Coccinia grandis*	Cucurbitaceae
14	Perandai	*Cissus quadrangularis*	Vitaceae
15	Mudakkotan	*Cardiospermum helicacabum*	Sapindaceae
16	Karkakartum	*Clitoria ternatea*	Fabaceae
17	Kovakkai	*Trichosanthes dioica*	Cucurbitaceae
18	Sangupoo	*Clitoriaternatia*	Fabaceae
19	Siru puladi	*Desmodium triflorum*	Fabaceae
20	Sithrapaalavi	*Euphorbia prostrata*	Euphorbiaceae
21	Thumattikai	*Cucumis callosus*	Cucurbitaceae
22	mookuthi poondu	*Wedelia trilobata*	Asteraceae
23	Kattu kanchippul	*Apluda mutica*	Poaceae
24	Musthakasu	*Kyllinga brevifolia*	Cyperaceae
25	Nagathali	*Opuntia dillenii*	Cactaceae
26	Peaiveratti	Anisomeles malabarica	Lamiaceae
27	Mosukkattan	Passiflora foetida	Passifloraceae
28	Etelepoo	Ixora coccinea	Rubiaceae
29	Kannadi kalli	Euphorbia tithymaloides	Euphorbiaceae
30	Kodi Rose	Antigonon leptopus	Polygonaceae
31	Peaiveratti	Anisomeles malabarica	Lamiaceae

Table 3.28 Aquatic Vegetation

S. No.	Scientific Name	Common Name	IUCN Red List of Threatened Species
Aquatic Flora			
1	*Eichornia Crassipe*	Water Hyacinth	NA
2	*Aponogetonnatans*	Floating Lace Plant	NA
3	*Nymphaea Nouchali*	Blue Water Lily	LC
4	*Carex Cruciata*	Cross Grass	NA
5	*Cynodon Dactylon*	Scutch Grass	LC
6	*Cyperus Exaltatus*	Tall Flat Sedge	LC
Aquatic Fauna			
7	Pale carplet	Amblyupharngodon mola	NA
8	Catla catla	Labeo Catla	LC
9	Mrigal carp	Cirrhina mrigala	NA
10	Mrigel	Cirrhina reba	NA

*Lc- Least Concern, Na-Not Yet Assessed

Food chain

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. This type of food chain is found in Sangarabarani River, Thiruvakkarai by phytoplankton, zooplankton, fish and Artiola gray.

Ex: Phytoplankton→Zooplankton→small fish→large fish

3.3.6.2 Fauna

The faunal survey was carried out for Mammals, Birds, Reptiles, Amphibians and Butterflies. There are no rare, endangered, threatened (RET) and endemic species present in core area. Fauna survey Methodology Mention in Table 3.29

Table 3.29 Methodology applied during survey of fauna

S. No.	Taxa	Method of Sampling	References
1	Insects	Random walk, Opportunistic observations	Pollard (1977); Kunte (2000)
2	Reptiles	Visual encounter survey (Direct Search)	Daniel J.C (2002)
3	Amphibians	Visual encounter survey (Direct Search)	
4	Mammals	Tracks and Signs	Menon V (2014)
5	Avian	Random walk, Opportunistic observations.	Grimmett R (2011); Ali S (1941)

Fauna in Core Zone

The 21 varieties of species observed in the core zone. Among them numbers of Insects 8 (41%), Reptiles 3 (14%), Mammals 1 (4%) and Avian 9 (41%). A total of 21 species belonging to 15 families have been recorded from the core mining lease area. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are under schedule IV according to Indian wild life Act 1972. A total eight species of birds were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna in core zone with the scientific name were mentioned in Table. 3.30.

Fauna in Buffer Zone

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. The Oussudu Lake Bird Sanctuary is located about 9.64 km southeast of the mining lease area. List of fauna in the buffer zone is provided in Table 3.31.

Table 3.30 Fauna in Core Zone

S. No	Common name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
INSECTS					
1	Common Tiger	Nymphalidae	*Danaus genutia*	NL	NL
2	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC

3	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
4	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
5	Stick insect	Lonchodidae	*carausius morosus*	NL	LC
6	Mottled emigrant	Peridae	*Catopsilia pyranthe*	NL	LC
7	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
8	Acraea violae	Nymphalidae	*Acraea violae*	NL	LC
REPTILES					
1	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
2	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
3	Fan-Throated Lizard	Agamidae	*Sitanaponticeriana*	NL	LC
MAMMALS					
1	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	NL
AVES					
1	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
2	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
3	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
4	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
5	House crow	Corvidae	*Corvus splendens*	NL	LC
6	Koel	Cucalidae	*Eudynamys scolopaceus*	Schedule IV	LC
7	Crow Pheasant	Cucalidae	*Centropus sinensis*	Schedule IV	LC
8	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
9	Grey drongo	Dicruridae	*Dicrurus leucophaeus*	Schedule IV	LC

Table 3.31 Fauna in Buffer Zone

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	*Danainae*	NL	LC
3	Tawny coster	Nymphalidae	*Danaus chrysippus*	Schedule IV	LC
4	Indian honey bee	Apidae	*Apis cerana*	Schedule IV	LC
5	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
6	Red-veined darter	Libellulidae	*Sympetrum fonscolombii*	NL	LC
7	Lime butterfly	Papilionidae	*Papilio demoleus*	Schedule IV	LC
8	Ant	Formicidae	*Camponotus Vicinus*	NL	NL
9	Dragonfly	Gomphidae	*Ceratogomphus pictus*	Schedule IV	LC
10	Common Tiger	Nymphalidae	*Danaus genutia*	Schedule IV	LC
11	Common Indian crow	Nymphalidae	*Euploea core*	Schedule IV	LC
12	Praying mantis	Mantidae	*mantis religiosa*	NL	NL
13	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
14	Lesser grass blue	Lycaenidae	*Zizina otis indica*	Schedule IV	LC
15	Jewel beetle	Buprestidae	*Eurythyrea austriaca*	Schedule IV	NA
REPTILES					
16	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
17	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC

18	Indian chameleon	Chamaeleonidae	*Chamaeleo zeylanicus*	Sch II (Part I)	LC
19	Olive keelback water snake	Natricidae	*Atretium schistosum*	Sch II (Part II)	LC
20	Brahminy skink	Scincidae	*Eutropis carinata*	NL	LC
21	Rat snake	Colubridae	*Ptyas mucosa*	Sch II (Part II)	LC
22	Common skink	Scincidae	*Mabuya carinatus*	NL	LC
MAMMALS					
23	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	Schedule IV	LC
24	Indian hare	Leporidae	*Lepus nigricollis*	Schedule IV	LC
25	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	LC
26	Asian Small Mongoose	Herpestidae	*Herpestes javanicus*	Schedule (Part II)	LC
AVES					
27	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
28	Black drongo	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
29	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
30	Red-breasted parakeet	Psittaculidae	*Psittacula alexandri*	NL	LC
31	Common Coot	Rallidae	*Fulica atra*	Schedule IV	LC
32	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
33	Shikra	Accipitridae	*Accipiter badius*	NL	LC
34	Koel	Cucalidae	*Eudynamys*	Schedule IV	LC
35	Common Quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
36	Red-vented Bulbul	Pycnonotidae	*Pycnonotuscafer*	Schedule IV	LC
37	Brahminy starling	Sturnidae	*Sturnia pagodarum*	Schedule IV	LC
38	golden oriole	Oriolidae	*Oriolus kundoo*	Schedule IV	LC
39	Rose-ringed parkeet	Psittaculidae	*Psittacula krameria*	NL	LC
40	Common quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
41	White-breasted waterhen	Rallidae	*Amaurornis phoenicurus*	NL	LC
42	Two-tailed Sparrow	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
43	Grey Francolin	Phasianidae	*Francolinus pondicerianus*	Schedule IV	LC
44	House crow	Corvidae	*Corvussplendens*	NL	LC
AMPHIBIANS					
45	Indian Burrowing frog	Dicroglossidae	*Sphaerotheca breviceps*	Schedule IV	LC
46	Green Pond Frog	Ranidae	*Rana hexadactyla*	Schedule IV	LC
47	Tiger Frog	Chordata	*Hoplobatrachus tigerinus (Rana tigerina)*	Schedule IV	LC

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

Forest Vegetation

There are no Reserve Forest or Biosphere Reserves or Wildlife Sanctuaries or National Parks or Important Bird Areas (IBAs), or migratory routes of fauna in 10km Radius. the

oussudu lake bird sanctuary located in 9.64km southeast side. the oussudu lake details discussed in given below.

Oussudu Lake Bird Sanctuary

The century-old man-made Oussudu Lake is located about 9.64 km southeast of the mining lease area and is recognized as one of the important wetlands of Asia by the International Union for Conservation of Nature. Resources (IUCN) and is the most important freshwater lake in the Pondicherry region. The structure of the lake is complex – consisting of water, swamp/swamp and mud flats; It serves as Puducherry's largest fresh water catchment. About 20,000 birds were recorded in the lake in 1995, which rose to 25,000 birds of 44 species in 1998 (BNHS, 2004). In addition to residents such as Little Cormorant and Common Coot, Cotton Teal, Spot Billed Pelican, Spoonbills, White Ibis; Migratory species such as the Eurasian Wigeon have been recorded in large numbers (up to 4600 individuals!). Diverse species of ducks, herons, cormorants, hawks, kites, darters, terns, kingfishers, lapwings, flycatchers abound.

Ouster Lake has been designated as one of the important wetlands of Asia by the International Union for Conservation of Nature and Natural Resources (IUCN). Bombay Natural History Society has also nominated it as an Important Bird Area. The lake has also been declared as a bird sanctuary by Government of Pondicherry. The small ordinary earth

3.3.6.3 Agriculture Cropping Pattern 1km Radius

The most important crop in the 1km radius is Saccharum officinarum, Arachis hypogaea, Benincasa hispida and Coccinia grandis food crops. Important crops grown in the Vanur Taluk, Villupuram district are paddy, black gram, groundnut, cumbu, maize, watermelon, tapiaco, small onion, and sugarcane. It is cultivable under both irrigatable and rainfed condition. Agriculture cultivation is limited within a radius of 1km around the quarry lease area and the details are given in Table 3.32.

Table 3.32 Agriculture Cropping Pattern in 1km radius

S.No	Crop	Scientific Name	Family
1	Paddy	Oryza sativa	Poaceae
2	Cholam	Sorghum	Poaceae
3	Bajra	Pennisetum glaucum	Poaceae
4	Maize	Zea mays	Poaceae
5	Redgram	Cajanus cajan	Fabaceae
6	Ground Nut	Arachis hypogaea	Fabaceae
7	Gingelly	Sesamum indicum	Pedaliaceae
8	Sugar cane	Saccharum officinarum	Poaceae
9	Banana	Musa	Musaceae
10	Chilles	Capsicum frutescens	Solanaceae
11	Onion	Allium cepa	Amaryllidaceae

Horticulture 1km radius

Apart from agriculture crops, Vanur Taluk, Villupuram District also contributes to the State's share on horticulture crops significantly. Villupuram district occupies fourth place in the State in terms of total vegetable cultivation area. Among which Yam and Watermelon occupies first place in the State in terms of cultivation area. Kovakai and coleus occupies third place and Turmeric, Guava, Cashew, Tapioca occupies fourth place in the State. Horticulture cultivation is limited within a radius of 1km around the quarry lease area and the details are given in Table 3.33**.**

Table No: 3.33 List Of Horticulture Cultivation in 1km Radius

S.No	Name of the crop	Scientific name	Family
1	Watermelon	*Citrullus lanatus*	Cucurbitaceae
2	Onion	*Allium cepa*	Amaryllidaceae
3	Chillies	*Capsicum frutescens*	Solanaceae
4	Tapioca	*Manihot esculenta*	Euphorbiaceae
5	Kathirikkai	*Solanum melongena*	Solanaceae
6	Pusanikkai	*Benincasa hispida*	Cucurbitaceae
7	Kovakkai	*Coccinia grandis*	Cucurbitaceae
8	Savukku	*Casuarina*	Casuarinaceae

Results

Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any. The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna

3.3.7 Socio Economics Environment

Introduction

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the possible impact depending upon the nature and

magnitude of the project. Socio-economic study of an area provides a good opportunity to assess the socio -economic condition and possibly makes a change in living and social standards of the particular area benefitted due to the project.

Objectives of the Study

The main objectives of the study are as follows:

- To know the current socio-economic condition in the region to cover the sub sectors education, health, sanitation, and water & food security.
- To recommend practical strategic interventions in the sector.
- To help in providing better living standards.
- To understand skill sets and plan for employment opportunities which shall be created.

Scope of Work

- To study the socio-economic environment of the area from the secondary sources
- Data collection & Analysis
- Prediction of project impact
- Mitigation Measures

Socio-Economic Status of Study area

The study area covers 21 villages including Agaram (Then), Ambuzhukkai, Eraiyur, Ilvampattu, Kadagampattu, Karasanur, Kenippattu, Kodukkur, Korakkeni, Kunnam, Nemili, Ottai, Parangani, Kaluperumbakkam, Semangalam, Sengamedu, Tiruvaikkarai, Tollamur, V. Pudupakkam, Vanur. As Kodanlankuppam is the village in which the proposed project site is located, the summary of population facts for the village is exclusively provided in Table 3.34 and for other 27 villages in Tables 3.34-3.37.

Table 3.34 Kondalangkuppam Village Population Facts

Number of Households	96
Population	353
Male Population	175
Female Population	178
Children Population	31
Sex-ratio	1017
Literacy	83.85%
Male Literacy	90.57%
Female Literacy	77.30%
Scheduled Tribes (ST) %	0
Scheduled Caste (SC) %	97
Total Workers	184
Main Worker	177
Marginal Worker	7

Table 3.35 Population and literacy data of study area

Village	No of Households	Total Population Person	Total Population Male	Total Population Female	Literates Population Person	Literates Population Male	Literates Population Female	Illiterate Persons	Illiterate Male	Illiterate Female
Agaram (Then)	110	518	263	255	361	200	161	157	63	94
Ambuzhukkai	134	558	294	264	377	224	153	181	70	111
Eraiyur	740	3257	1656	1601	1864	1085	779	1393	571	822
Ilvampattu	179	743	384	359	476	281	195	267	103	164
Kadagampattu	144	601	315	286	462	269	193	139	46	93
Karasanur	683	2862	1458	1404	1828	1084	744	1034	374	660
Kodukkur	588	2581	1272	1309	1662	920	742	919	352	567
Korakkeni	218	906	489	417	594	362	232	312	127	185
Nemili (V)	266	1238	627	611	835	471	364	403	156	247
Ottai	407	1704	862	842	1082	630	452	622	232	390
Parangani	773	3393	1684	1709	2205	1203	1002	1188	481	707
Sengamedu	234	1063	521	542	719	391	328	344	130	214
Tiruvaikkarai	738	3220	1627	1593	1904	1052	852	1316	575	741
V. Pudupakkam	596	2441	1208	1233	1710	935	775	731	273	458
Puducherry										
Vanur	1190	5161	2649	2512	3705	2067	1638	1456	582	874
Tollamur	332	1419	731	688	826	496	330	593	235	358
Kaluperumbakkam	509	2122	1062	1060	1386	769	617	736	293	443
Semangalam	863	3635	1859	1776	2331	1348	983	1304	511	793
Kenippattu	201	943	465	478	623	340	283	320	125	195
Kunnam	401	1742	873	869	1122	630	492	620	243	377

Table 3.36 Educational Facilities & Water & Drainage & Health Facilities Data of Study Area

Village	Private Primary School (Numbers)	Govt. Vocational Training School/ITI (Numbers)	Primary Health Centre (Numbers)	Tap Water Untreated	River/Canal	Is the Area Covered under Total Sanitation	Telephone (landlines)	Public Bus Service	Gravel (kutcha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres-Anganwadi Centre	Community Centre with/without TV	Power Supply for Domestic Use
Agaram (Then)	2	0	0	1	2	2	1	2	1	2	2	1	2	2	1
Ambuzhukkai	2	0	0	2	2	2	2	2	1	2	2	1	2	2	1
Eraiyur	2	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Ilvampattu	2	0	0	2	2	1	2	2	1	2	2	1	1	2	1
Kadagampattu	2	0	0	2	2	2	2	2	1	2	2	1	1	2	1
Karasanur	2	0	0	2	2	2	1	1	1	2	2	1	1	2	1
Kodukkur	2	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Korakkeni	2	0	0	2	1	2	1	1	1	2	2	1	1	2	1
Nemili (V)	2	0	0	2	2	2	1	1	1	2	2	1	1	2	1
Ottai	2	0	0	2	2	1	1	1	1	2	1	1	1	2	1
Parangani	2	0	0	1	2	2	1	1	1	2	1	1	1	2	1
Sengamedu	2	0	0	2	2	2	2	2	1	2	2	1	1	2	1
Tiruvaikkarai	1	0	0	1	2	2	1	1	1	2	2	1	1	2	1
V. Pudupakkam	2	0	0	2	2	2	2	2	1	2	2	1	1	2	1
Puducherry															
Vanur	1	0	0	2	2	1	1	1	1	2	1	1	1	1	1
Kenippattu	2	0	0	1	2	2	2	2	1	2	2	1	1	1	1
Kunnam	2	0	0	2	2	1	2	2	1	2	2	1	1	1	1
Kaluperumbakkam	1	0	0	2	2	1	1	1	1	2	2	1	1	2	1
Semangalam	2	0	0	1	2	2	1	2	1	2	2	1	1	2	1
Tollamur	1	0	0	2	2	1	2	2	1	2	1	1	1	1	1

Table 3.37 Other Facilities in the Study Area

Village	Total Worker Population Person	Total Worker Population Male	Total Worker Population Female	Main Working Population Person	Main Working Population Male	Main Working Population Female	Main Cultivator Population Person	Main Agricultural Labourers Population Person	Main Other Workers Population Person	Non-Working Population Person
Agaram (Then)	294	151	143	235	118	117	106	26	98	224
Ambuzhukkai	247	164	83	183	145	38	60	68	53	311
Eraiyur	1596	873	723	957	610	347	176	407	356	1661
Ilvampattu	396	223	173	281	215	66	74	53	154	347
Kadagampattu	443	238	205	53	30	23	36	7	10	158
Karasanur	1575	901	674	753	530	223	163	99	474	1287
Kodukkur	1455	758	697	947	514	433	35	701	204	1126
Korakkeni	482	299	183	447	281	166	195	144	108	424
Nemili (V)	677	397	280	456	313	143	28	134	264	561
Ottai	898	488	410	687	405	282	79	359	235	806
Parangani	1708	997	711	1057	755	302	124	452	466	1685
Sengamedu	511	298	213	291	184	107	33	171	84	552
Tiruvaikkarai	1496	877	619	992	775	217	84	122	751	1724
V. Pudupakkam	1303	757	546	1210	715	495	276	612	302	1138
Puducherry										
Vanur	2205	1551	654	1579	1157	422	280	593	657	2956
Tollamur	637	397	240	595	380	215	36	367	188	782
Semangalam	1936	1110	826	1354	818	536	63	982	286	1699
Kaluperumbakkam	969	623	346	349	285	64	125	31	192	1153
Kunnam	845	483	362	554	392	162	29	65	458	897
Kenippattu	545	284	261	252	151	101	14	137	100	398

Recommendation and Suggestion

- Awareness program should be conducted to make the population aware of education and to get a better livelihood.
- Vocational training programme should be organized to make the people self - employed, particularly for women and unemployed youth.
- On the basis of qualification and skills local community may be preferred. Long term and short-term employments should be generated.
- Health care centre and ambulance facility should be provided to the population to get easy access to medical facilities. Apart from that, as these areas are prone to various diseases a hospital with modern facilities should be opened on a priority basis in a central place to provide better health facilities to the villagers around the project.
- While developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.

Summary & Conclusion

The socio-economic study in the study area gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from a lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

3.3.8 Traffic Density

The traffic survey conducted based on the transportation route of material, the Red Soil is proposed to be transported mainly through Village Road and mayilam-pondicherry (SH-136) as shown in Table 3.38 and in Figure 3.28. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.38 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.96 Km-SW	Village Road
TS2	Mayilam- pondicherry	2.9 Km- NNW	Mayilam-pondicherry

Source: On-site monitoring by GTMS FAE & TM

Table 3.39 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	35	105	42	42	69	35	182
TS2	98	294	51	51	102	51	396

Source: On-site monitoring by GTMS FAE & TM

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

Table 3.40 Ordinary Earth Transportation Requirement

Transportation of Rough Stone Per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	7	21

Source: Approved Mining Plan

Table 3.41 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960guidelines
Village Road	182	21	203	1200
Mayilam-pondicherry	396	21	417	1200

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

Due to these projects the existing traffic volume will not exceed the traffic limit. As per the IRC 1960 this existing village road can handle 1,200 PCU in hour and Major district road can handle 1500 PCU in hour. Hence there will not be any conjunction due to this proposed transportation

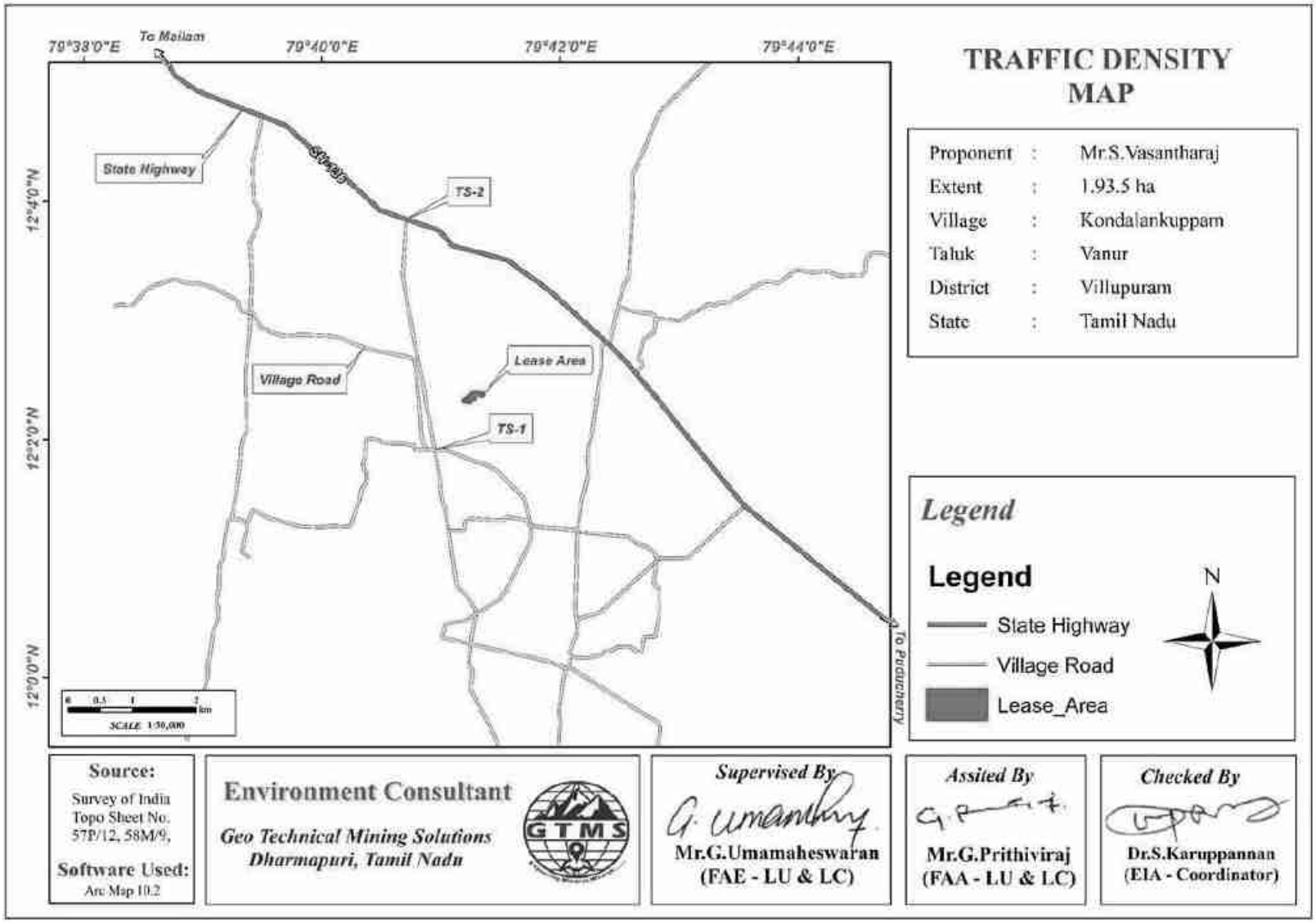


Figure 3.28 Traffic Density Map

3.3.9 Site Specific Features

There are no Wildlife Sanctuaries, Reserve Forest and National Park within the project area to10 km radius. There is no Protected and Reserved Forest area is found within 10 km radius from the proposed project area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Table 3.42.

Table 3.42 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No.	Sensitive Ecological Features	Name	Areal Distance in km
1	National Park / Wild life Sanctuaries	None	Nil within 10 km radius
		None	Nil within 10 km radius
2	Reserve Forest	None	Nil within 10 km radius
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Gingee River	3.62 km S
		Ossudu Lake	9.64 km SE
		Thollamur Tank	1.81 Km NW
		Sengamedu Tank	1.81 Km SW
		Semangalam Tank	3.38 Km NE
		T.Parangani Tank	4.46 Km W
		Vanur Peria Eri	5.39 Km SE
		Vidur reservoir	10.49 Km NW
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	Ossudu Bird Sanctuary	9.64 km SE
5	Densely Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Centrally Protected Archaeological Sites	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

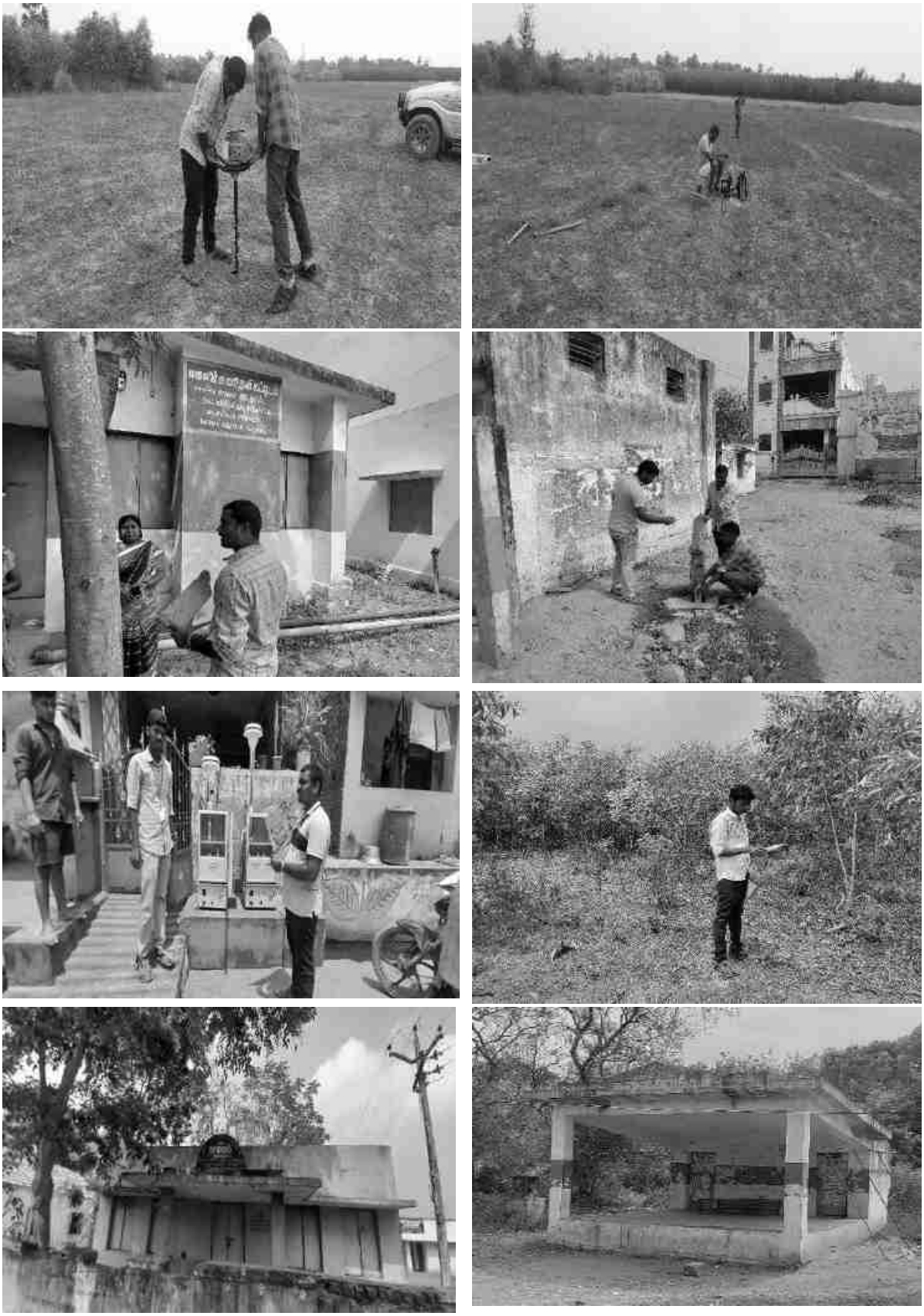


Figure 3.29 Base Line study photographs

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 INTRODUCTION

This chapter deals with not only the anticipated environmental impacts due to the proposed mining activities of the proposed mine lease area. Further, this chapter deals with the mitigation measures for the identified significant environmental impacts of the mining activities in quarry site.

4.1 DETAILS OF INVESTIGATED ENVIRONMENTAL IMPACTS DUE TO PROJECT LOCATION, POSSIBLE ACCIDENTS, PROJECT DESIGN, PROJECT CONSTRUCTION, REGULAR OPERATIONS, FINAL DECOMMISSIONING OR REHABILITATION OF A COMPLETED PROJECT.

Anticipated Environment Impacts Identification of all potential Environmental Impacts due to the open cast mining activity is an essential step of environmental impact assessment. These are critically examined and major impacts (both beneficial and adverse) are further examined and studied. In the mining project, the impact on air environment, noise environment, ecological environment, water environment, land environment (waste management) and social issues are significant. The significant impacts due to the mining activity are impacts on land use, drainage, air quality, ecology, noise, vibration, social impacts etc. Allied operations such as transportation of materials, operation of work shop affect the air, water and noise environment. Clearance of natural vegetation adversely affects the flora and fauna of the areas due to the changed environment and loss of habitats. There are few positive impacts like creation of employment opportunities and development of infrastructure such as roads etc due to the proposed mining activity.

4.2 MEASURES FOR MINIMIZING AND /OF OFFSETTING ADVERSE IMPACTS IDENTIFIED

4.2.1 Land Environment

Anticipated Impact

- Permanent or temporary change on land use and land cover.
- Change in topography of the mine lease area will change at the end of the life of the mine.
- Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- Degradation of the aesthetic environment of the core zone due to quarrying
- Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- Siltation of water course due to wash off from the exposed working area

Mitigation Measures

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.

4.2.2 Soil Environment

Anticipated Impact

- This project does not result in any impact on the soil of the project site as topsoil is neither removed from the project site nor preserved in the safety margin area. However, some of the common mitigation measures have been discussed in the following sections to protect the immediate soil environment surrounding the lease area.

Soil Erosion

- Low to moderate soil erosion is observed in the south side of the lease area

Mitigation Measures

- Soil erosion is very low in the proposed lease area. Therefore, the lease area will not cause soil erosion in any way. but Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion. Soil Erosion Map Showing in Figure 3.6
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.

- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.2.3 Water Environment

Anticipated Impact

- As the water required for the mining operations, as given in Table 2.10 is obtained from the approved water supplying agency, the project does not develop any abstraction structures in the lease area. Therefore, no impact responsible for the water table declination is anticipated.
- Surface and ground water resources may be contaminated due to mine pit water discharge, domestic sewage, waste water from vehicle washing, washouts from surface exposure or working areas, discharge of oil & grease, and suspended solids due to waste from washing of machineries. To address this impact, some of the important mitigation measures is provided as below.

Mitigation Measures

- Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10 m x 3 m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting system.
- The water collected will be reused during storm for dust suppression and greenbelt development within the mines.
- Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse.
- Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons.
- Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted.
- Domestic sewage from site office and urinals/latrines provided in ML is discharged in septic tank followed by soak pits.

- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (once every 6 months) and analysing the quality of water in open well, bore wells and surface water.

4.2.4 Air Environment

Anticipated Impact

- Emission of air pollutants such as particular matter (PM), gases such as sulphur dioxide, oxides of nitrogen at various stages of activities such as excavation and transportation of materials. The rate of emission and the incremental concentration of pollutants is estimated in the following sections before providing mitigation measures

Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chaulya et al.,2001. The equations used for SPM emission estimation have been given in Table 4.1.

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	E= [u0.4a0.2{9.7+ 0.01p+b/(4+0.3b)}]	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm^3/yr); a = Lease area(km^2); E = Emission rate(g/s).

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM_{10} emission rate is derived from the SPM estimation in the background that PM_{10} constitutes 52% of SPM emission. The $PM_{2.5}$ and PM_{10} emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated Value (g/s)	Lease Area in m^2	Calculated Value (g/s/m^2)
Overall Mine	$PM_{2.5}$	0.213643791	19350	1.1041E-05
Overall Mine	PM_{10}	1.424291938	19350	7.36068E-05

Modelling of Incremental Concentration

Anticipated incremental concentration and net increase in emissions due to quarrying activities within 500 m around the project area is predicted by open pit source modelling using AERMOD Software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.3-4.4.

Model Results

The post project resultant concentrations of PM_{10} and $PM_{2.5}$ (GLC) is given in Tables 4.3-4.4.

Table 4.3 Incremental & Resultant GLC of $PM_{2.5}$

Station ID	Distance to core area (km)	Direction	PM 2.5 concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.06	E	20.6	3.70	24.3	Below standard	17.96	Not significant
AAQ2	1.65	SW	15.8	1	16.8		6.33	
AAQ3	4.61	SW	16.8	0.5	17.2		2.99	
AAQ4	3.91	NW	19.8	0.5	20.3		2.53	
AAQ5	4.24	SSE	17.9	0	17.9		0.00	
AAQ6	1.96	NE	14.8	0	14.8		0.00	
AAQ7	3.81	NE	15.4	0	15.4		0.00	

Table 4.4 Incremental & Resultant GLC of PM_{10}

Station ID	Distance to core	Direction	PM_{10} concentrations(µg/m³)			Comparison against air quality standard (100 µg/m³)	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	0.06	E	37.7	8.72	46.42	Below standard	23.13	Not significant
AAQ2	1.65	SW	33.3	5	38.3		15.0	
AAQ3	4.61	SW	35.8	1	36.8		2.79	
AAQ4	3.91	NW	38.0	5	43		13.16	
AAQ5	4.24	SSE	33.2	0	33.2		0.00	
AAQ6	1.96	NE	31.2	0	31.2		0.00	
AAQ7	3.81	NE	33.7	0	33.7		0.00	

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

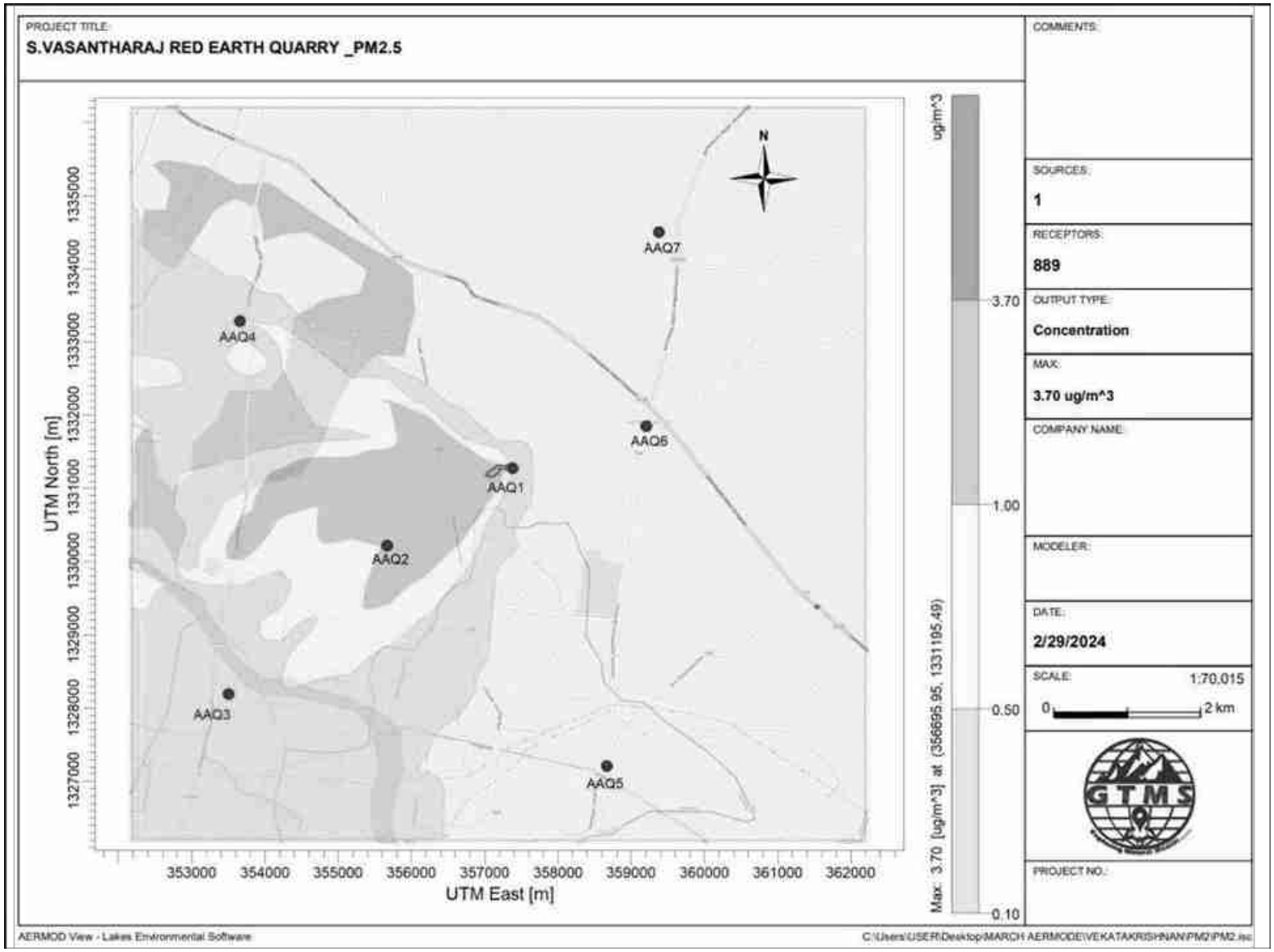


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

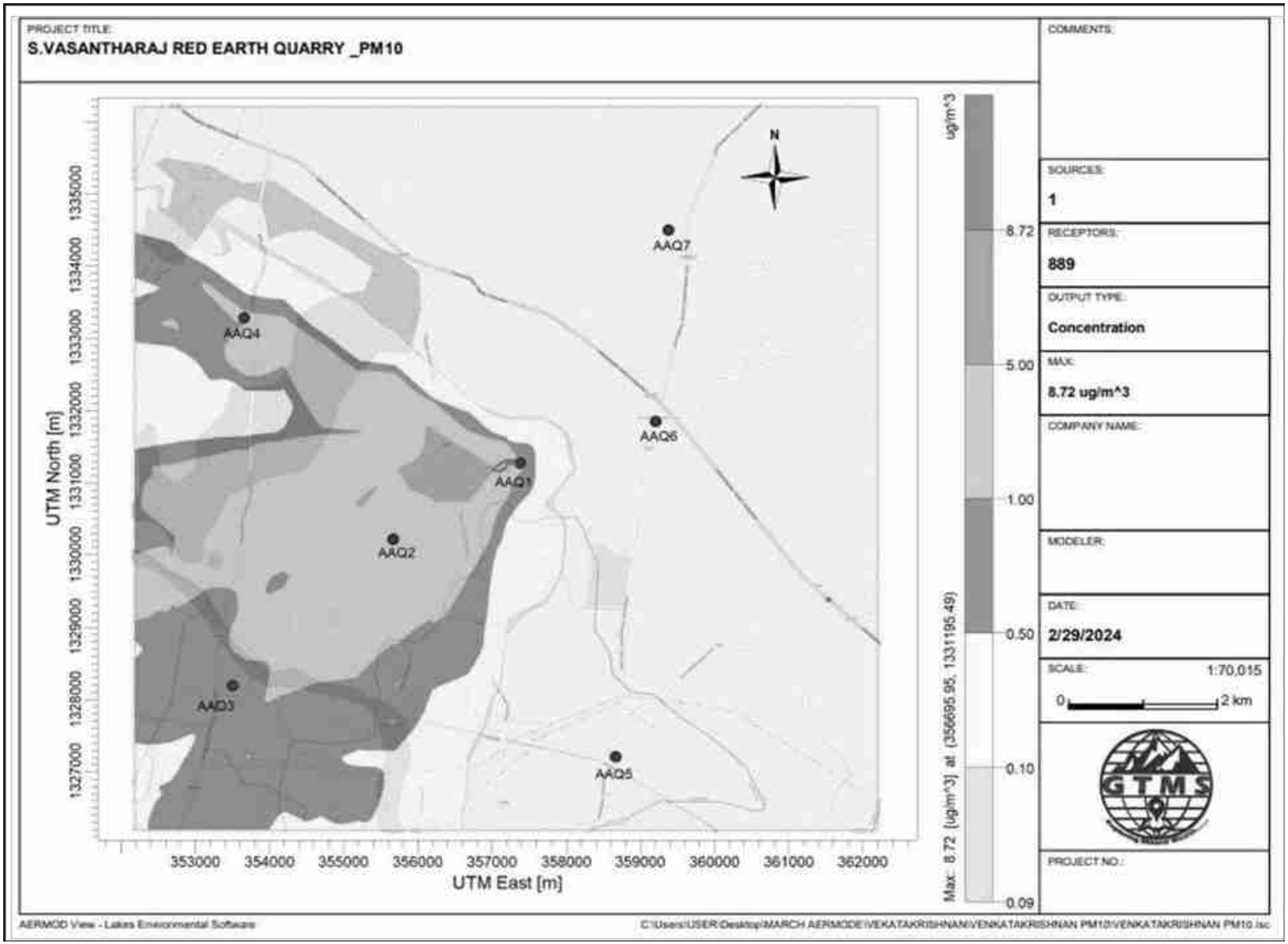


Figure 4.2 Predicted Incremental Concentration of PM_{10}

Mitigation Measures

Haul Road and Transportation

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- Water sprinkling on haul roads and loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral. Therefore, weekly maintenance of machines improves combustion process and reduces pollution.
- The un-metaled haul roads will be compacted weekly before being put into use.
- Overloading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate.
- Haul roads and service roads will be graded to clear accumulation of loose materials.

Green Belt

- Planting of trees all along mine haul roads outside the lease and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers.
- Green belt of adequate width will be developed around the project site.

Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored.
- Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.
- Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed.

4.2.5 Noise Environment

Noise pollution is mainly due to operation like playing of trucks & HEMM. These activities will not cause any problem to the inhabitants of this area because there is no human settlement in close proximity to the project area. Noise modelling has been carried out considering transportation activities.

Predictions have been carried out to compute the noise level at various distances around

the working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels.

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed of 1, 100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using a mathematical model based on first principle.

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

Where,

Lp1 & Lp2 are sound levels at points located at distances r1 and r2 from the source

Ae1,2 is the excess attenuation due to environmental conditions.

Combined effect of all sources can be determined at various locations by logarithmic addition.

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

Anticipated Impact

Anticipated due to Green Belt has been taken to be 4.9 dB (A). The Inputs required for the model are:

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.5.

Table 4.5 Activity and Noise Level Produced by Machinery

S. No.	Machinery / activity	Impact on environment?	Noise produced in dB(A) at 50 ft from source*
1	Excavator	Yes	85
2	Tipper	Yes	84
Total			**87.54**

The total noise to be produced by mining activity is calculated to be 87.54 dB (A). Therefore, we have considered equipment and operation noise levels (max) to be approx. 87.54 dB (A) for noise prediction modelling.

Table 4.6 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Core	60	39.2	40.14	42.70
Thollamur	1690	41.8	11.14	41.80
Kadagampattu	1800	41.0	10.59	41.00
Kodukkur	4740	42.4	2.18	42.40
Eraiyur	3950	46.8	3.77	46.80
Katterikuppam	4170	40.4	3.30	40.40
Ranganathapuram	1910	45.8	10.08	45.80
Semangalam	3780	40.6	4.15	40.60
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time - 70 dB (A) Residential Day Time - 55 dB (A) & Night Time - 45 dB (A)			

From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000. Therefore, no impact is anticipated on the noise environment due to the project

Mitigation Measures

- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise.
- Silencers / mufflers will be installed in all machineries
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.2.6 Ecology and Biodiversity

Impact on Ecology and Biodiversity

- Quarry leases have a large number of Acacia holoseicea plants whose seeds are wind-dispersed so that they are abundant both inside and outside the quarry leases area. It

contains a total of 18 species belonging to 16 families have been recorded from the buffer zone. 3 Trees (16%), 6 Shrubs (33%) and 9 Herbs (50%) were identified in mine lease area.

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- Most of the land in the buffer zone is undulating terrain with croplands, patches of grass and small shrubs. Therefore, excavation of the soil will also affect the vegetation of the croplands, grass patches and small shrubs in the area.
- Carbon released from quarrying machineries and tippers during quarrying would be 396 kg per day, 106979 kg per year and 213958 kg for five years, as provided in Table 4.7.

Table 4.7 Carbon Released During Five Years of Rough Stone and Gravel Production

	Per day	Per year	Per five years
Fuel consumption of excavator	7	1901	3802
Fuel consumption of compressor	0	0	0
Fuel consumption of tipper	141	38017	76033
Total fuel consumption in liters	148	39918	79835
Co_2 emission in kg	396	106979	213958

Mitigation Measures on Flora

- During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- None of the plants in the lease area will be cut during operational phase of the mine. We recommend uprooting and planting 3 trees in the 7.5-meter safety zone to prevent general damage during quarrying. As the survival rate due to uprooting was only 30%, 90 seedlings were procured at the rate of 10 seedlings per tree. Seedlings are planted and protected in 7.5- meter safety zone.

Carbon Sequestration

- To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 23197 kg of

carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.

- As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 968 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of 68 about kg of the total carbon, as provided in Table 4.8.

Table 4.8 CO_2 Sequestration

CO_2 sequestration in kg	86	23197	46394
Remaining CO_2 not sequestered in kg	310	83782	167564
Trees required for environmental compensation	3491		
Area required for environmental compensation in hectares	7		

Table 4.9 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	*Azadirachta indica*	Meliaceae	Vembu	Tree	Well distinct thick at both the layer Well distinct in Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series
2	*Techtona grandis*	Lamiaceae	Teak	Tree	
3	*Polyalthia longifolia*	Annonaceae	Nettilling	Tree	
4	*Albizia lebbeck*	Fabaceae	Vagai	Tree	
5	*Delonix regia*	Fabaceae	Cemmayir-konrai	Tree	
6	*Bauhinia racemose*	Fabaceae	Aathi	Tree	
7	*Cassia fistula*	Fabaceae	Sarakondrai	Tree	
8	*Aegle marmelos*	Rutaceae	Vilvam	Tree	
9	*Pongamia pinnata*	Fabaceae	Pungam	Tree	
10	*Thespesia populnea*	Malvaceae	Puvarasu	Tree	

Table 4.10 Greenbelt Development Plan

	No. of trees proposed for plantation	**No. of trees expected to survive @ 80%**	**Area to be covered(m^2)**
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	387	310	3483
	Number of plants outside the mine lease area		
	581	464	5225
Total	**968**	**774**	**8707**

Table 4.11 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	387	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	77400	11610
Plantation outside the area	581	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	174150	17415
Total			**251550**	**29025**

Source: EMP budget

After complete extraction of mineral, the excavated pits will be allowed to collect rainwater and seepage water to serve as a reservoir to charge the nearby wells. Fish culture will also be attempted. A bund will be constructed around the pits. In order to minimize the impact of mining on the vegetation outside the mine lease area, it is recommended that adequate protection measures must be implemented. As mining involves movement of vehicles and increased anthropogenic activities, some of the areas can be fenced by involving local people and educating them about increased benefits of such activities.

Anticipated Impact on Fauna

- Osudu Lake Bird Sanctuary is located 9.64 km south-east of the mining lease area. Theare are no any impacts in osudu lake bird Sanctuary. this a small mining operation.
- No rare, endemic & endangered species are reported in mine lease area. However, during the course of mining, the management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.
- Fencing around all the proposed mine lease areas will be constructed to restrict the entry of stray animals
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

Measures for Protection and Conservation of Wildlife Species

- Undertaking mitigative measures for conducive environment to the flora and fauna in consultation with Forest Department.
- Dust suppression system will be installed within mine and periphery of mine for proposed project.
- Plantation around mine area will help in creating habitats for small faunal species and to create better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

Mitigation Measures

- All the preventive measures will be taken for growth & development of fauna.
- Creating and development awareness for nature and wildlife in the adjoin villages.
- The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.

Artificial Nest or Man-made Nest

Since the area is also declared as IBA (Important Bird and Biodiversity Area), it is important to have habit management for birds. Man-made nests should be installed on near water bodies, railway cabin and villages that provide suitable conditions for the existence and reproduction of birds and at the same time. Many species of birds find their homes in artificial nests mostly Common Kestrels, Black kite, Owls, parakeets, sparrows etc. By accepting the offered artificial nesting opportunities, these birds make it possible for ornithologists to study their lives and behaviour. Apart from this to cope up with the habitat loss due to clearance of vegetation in the project site, artificial nest should be put up on big trees for other birds for nesting. Artificial nest can also be put up in the houses in the villages around the project site. Awareness and training programme will be organised for birds and installation of nest in their houses for conservation of avifauna as mitigation measures.

Impact on Aquatic Biodiversity

Mining activities will not disturb the existing aquatic ecology as there is no effluent discharge proposed from the Ordinary Earth quarry. There is no natural perennial surface water body within the mine lease area. Hence, aquatic biodiversity is not observed in the mine lease area.

Impact on agriculture and horticulture crops in 1km Radius

- Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.

- The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.
- Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- Dust from quarries can affect plant growth and reduce vegetable yields.

Mitigation Measures on agriculture and horticulture crops.

- The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- It is a granite quarry, no explosives are used, there is no possibility of vibration and dust, thus there is no possibility of damage to the adjacent agricultural land.
- Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled.
- A green belt will be created in 7.5 safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

4.2.7 Socio Economic Environment

Anticipated Impact

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region.

Mitigation Measures

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken to minimize the environmental impact within the core zone.

- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc.., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS

- The commitments under the mining plan will be followed.
- The conditions as per "Consent to Operate" (CTO) will be followed.
- All conditions in Environmental Clearance and other statutory approvals will be followed.

4.4 ASSESSEMENT OF SIGNIFICANCE OF IMPACT (CRITERIA FOR DETERMINING SIGNIFICANCE, ASSIGNING SIGNIFICANCE)

The criteria involved in mine closure are discussed below:

Physical Stability

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

Chemical Stability

The solid wastes on the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental attributes. If the pollutant discharge likely to cause adverse impacts is predicted in advance, appropriate mitigation measures like settling of suspended solids or passive treatment to improve water quality as well as quantity, etc., could be planned. Monitoring should demonstrate that there is no adverse effect of pollutant concentrations exceeding the statutory limits for the water, soil and air qualities in the area around the closed mine.

Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly

influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc.,

A vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilizing the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful under three situations.

- Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor. For example, development of green barriers
- The Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

4.5 MITIGATION MEASURES

Occupational Health and Safety

Occupational health and safety hazards occur during the operational phase of mining and primarily include the following:

- Respiratory hazards
- Noise
- Physical hazards

Respiratory Hazards

Long-term exposure to silica dust may cause silicosis the following measures are proposed:

- Cabins of excavators and tippers will be enclosed with AC and sound proof
- Use of personal dust masks will be made compulsory

Noise

- No employee will be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection
- The use of hearing protection will be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A)
- Ear muffs provided will be capable of reducing sound levels at the ear to at least 85 dB(A)

- Periodic medical hearing checks will be performed on workers exposed to high noise levels.

Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;
- Natural barriers, temporary railing, or specific danger signals will be provided along rock benches or other pit areas where work is performed at heights more than 2m from ground level;
- Maintenance of yards, roads and footpaths, providing sufficient water drainage and preventing slippery surfaces with an all-weather surface, such as coarse gravel will be taken up.

Occupational Health Survey

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- General physical tests
- Audiometric tests
- Full chest, X-ray, Lung function tests, Spirometric tests
- Periodic medical examination – yearly
- Lung function test – yearly, those who are exposed to dust
- Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

CHAPTER V
ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

Consideration of alternatives to a proposed project is a requirement of EIA process. During the scoping process, alternatives to a proposed project can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost-effective options.

Factors Behind the Selection of Project Site

The proposed project is site specific and has the following advantages:

- The mineral deposit occurs in a non-forest area.
- There is no habitation within the project area; hence no R & R issues exist.
- There is no river, stream, nallah and water bodies in the applied mine lease area.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- As the proposed project area falls in seismic zone II, there is no major history of landslides, earthquake, subsidence etc., recorded in the past history.

Analysis of Alternative Site

No alternatives are suggested as the mine site is mineral specific.

Factors Behind Selection of Proposed Technology

The proposed mining lease areas have following advantages:

- As the mineral deposition is homogeneous and batholith formation, open cast method of working is preferred over underground method.
- The material will be loaded with the help of excavators into tractors/tippers and transported to the need by customers.
- Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

Analysis of Alternative Technology

Open cast mechanized method has been selected for this project. This technology is having least gestation period, economically viable, safest and less labour intensive. The method has inbuilt flexibility for increasing or decreasing the production as per market condition.

CHAPTER VI
ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections. The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA-TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

6.1 TECHNICAL ASPECTS OF MONITORING THE EFFECTIVENESS OF MITIGATION MEASURES (INCL. MEASUREMENT METHODOLOGIES, FREQUENCY, LOCATION, DATA ANALYSIS, REPORTING SCHEDULES, EMERGENCY PROCEDURES, DETAILED BUDGET & PROCUREMENT SCHEDULES)

Methodology of Monitoring Mechanism

Implementation of EMP and periodic monitoring will be carried out by respective project proponents. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project; Environmental protection measures like dust suppression, control of noise maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of Environmental Management Plan and environmental clearance conditions will be monitored by the respective mine management. On the other hand, implementation of area level protection measures like green belt development, environmental quality monitoring etc., are taken up by a senior executive who reports to their Mine Management.

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry. The responsibilities of this cell will be:

- Implementation of pollution control measures

- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert's advice when needed.

The environmental monitoring cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies as compliance status reports.

The sampling and analysis report of the monitored environmental attributes will be submitted to the Tamil Nadu Pollution Control Board (TNPCB) at a frequency of half-yearly and yearly by the proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA-TN as well.

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC). The Environmental Monitoring Cell will be formed for the proposed project. The structure of the cell will be as shown in Figure 6.1.

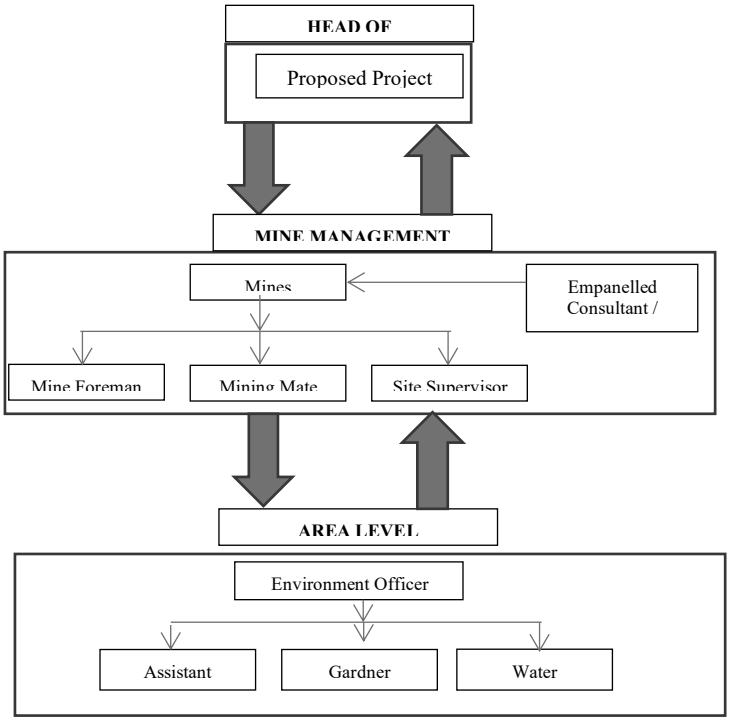


Figure 6.1 Proposed environmental monitoring chart

Implementation Schedule of Mitigation Measures

The mitigation measures proposed in chapter IV will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in Table 6.1.

Table 6.1 Implementation Schedule for Proposed Project

S. No.	Recommendations	Time Period	Schedule
1	Land Environment Control Measures	Before commissioning of the project	Immediately after the commencement of project
2	Soil Quality Control Measures	Before commissioning of the project	Immediately after the commencement of project
3	Water Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
4	Air Pollution Control Measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
5	Noise Pollution Control measures	Before commissioning of the project and along with mining operation	Immediately and as project progress
6	Ecological Environment	Phase wise implementation every year along with mine operations	Immediately and as project progress

Monitoring Schedule and Frequency

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes, for measurement against statutory standards. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The environmental monitoring will be conducted in the mine operations as follows:

- Air quality
- Water and wastewater quality
- Noise levels
- Soil quality and
- Greenbelt development

The details of proposed monitoring schedule have been provided in Table 6.2.

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone	-	Once in 6 months	Depth in m BGL

		around 1 km at specific wells			
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and chemical characteristics
7	Greenbelt	Within the project area	Daily	Monthly	Maintenance

Source: Guidance of manual for mining of minerals, February 2010

Budgetary Provision for Environment Monitoring Program

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF. The proposed recurring cost for Environmental Monitoring Programme is **Rs 1,45,00**0 /- per annum for the proposed project site.

Table 6.3 Environment Monitoring Budget

S. No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	-	Rs 60,000/-
2	Meteorology	-	Rs 15,000/-
3	Water Quality	-	Rs 20,000/-
4	Water Level Monitoring		Rs 10,000/-
5	Soil Quality	-	Rs 20,000/-
6	Noise Quality	-	Rs 10,000/-
7	Greenbelt	-	Rs 10,000/-
Total		**-**	**Rs 1,45,000 /-**

Source: Field Data

Reporting Schedules of Monitored Data

The monitored data on air quality, water quality, noise levels and other environmental attributes will be periodically examined by the Cluster Mine Management Coordinator and Respective Head of Organization for taking necessary corrective measures. The monitoring data will be submitted to Tamil Nadu State Pollution Control Board in the Compliance to CTO Conditions & environmental audit statements every year to MoEF & CC and Half-Yearly Compliance Monitoring Reports to MoEF & CC Regional Office and SEIAA.

Periodical reports to be submitted to:

- MoEF & CC – Half yearly status report
- TNPCB - Half yearly status report
- Department of Geology and Mining: quarterly, half yearly annual reports

Besides the Mines Manager/Agent of respective project will submit the periodical reports to:

- Director of mines safety
- Labour enforcement officer
- Controller of explosives as per the norms stipulated by the department.

CHAPTER VII
ADDITIONAL STUDIES

7.0 GENERAL

Additional studies deal with:

- Public Consultation for Proposed Project
- Risk Assessment
- Socio Economic Environment

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district was made and the public opinions on the proposed project will be updated in the final EIA/EMP report.

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project.

Factors of risks involved due to human induced activities in connection with these proposed mining & allied activities with detailed analysis of causes and control measures for the mine is given in Table 7.1.

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Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No.	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries.	Improper handling and unsafe working practice	✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. ✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited. ✓ Fire-fighting and first-aid provisions in the mine office complex and mining area. ✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use. ✓ Working of quarry, as per approved plans and regularly updating the mine plans. ✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut. ✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager. ✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.
2	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material	✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.

		While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. ✓ Concave mirrors should be kept at all corners ✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point ✓ Loading according to the vehicle capacity ✓ Periodical maintenance of vehicles as per operator manual
3	Natural calamities	Unexpected happenings	✓ Escape Routes will be provided to prevent inundation of storm water ✓ Fire Extinguishers & Sand buckets
4	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.

Source: Analysed and proposed by FAE & EC

Disaster Management Plan for Proposed Project

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone II. The area is far away from the sea. Hence, the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

In case a disaster takes place, despite preventive actions, disaster management will have to be done in line with the descriptions below. There is an organization proposed for dealing with the emergency situations. Structure of the team has been shown in Figure 7.1.

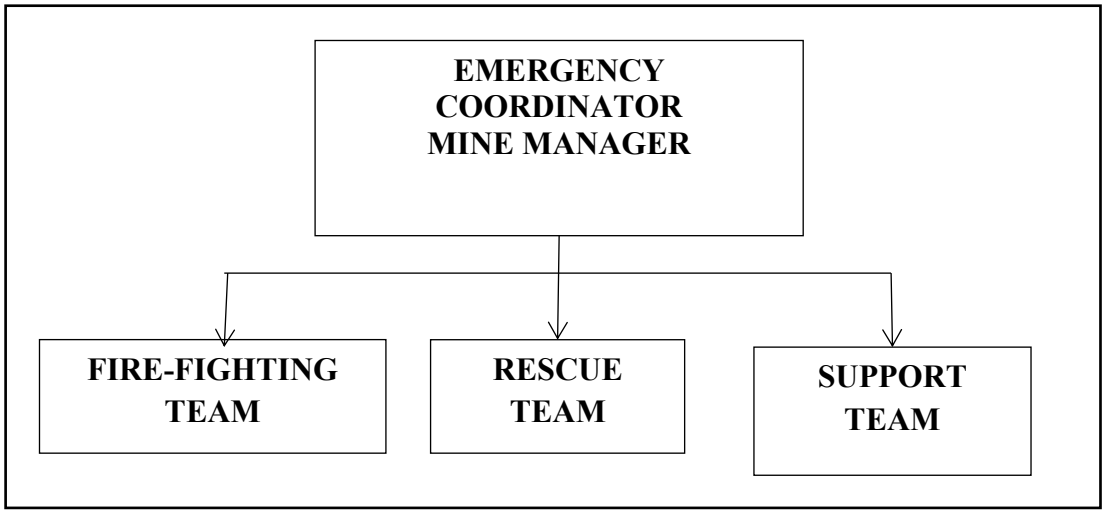

Figure 7.1 Disaster management team layout for proposed project

Emergency Control Procedure

The onset of emergency, will in all probability, commence with a major fire or explosion or collapse of wall along excavation and shall be detected by various safety devices and also by members of operational staff on duty. If located by a staff member on duty, he (as per site emergency procedure of which he is adequately briefed) will go to nearest alarm call point, break glass and trigger off the alarms. He will also try his best to inform about location and nature of accident to the emergency control room. In accordance with work emergency procedure the following key activities will immediately take place to interpret and take control of emergency.

- On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- Emergency security controller will commence his role from main gate office
- Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
- He will receive information continuously from incident controller and give decisions and directions to:
- Incident controller
- Mine control rooms
- Emergency security controller

7.3 SOCIO ECONOMIC ENVIRONMENT

Cumulative Impact Study

The cumulative impact is mainly anticipated due to excavation and transportation activities in all the quarries within the cluster and major impact anticipated is on air and noise environment. For this cumulative study, 3 proposed projects, known as P1, P2 and P3 are taken into consideration. The details of P1 have been given in Table 1.2 and the details of P2 and P3 are given in Table 7.2 & 7.3.

Table 7.2 Salient Features of the Proposed Project 'P2'

Name of the Quarry	Mr. B. Venkatakrishnan		
Type of Land	Patta land		
Extent	1.53.5 ha		
S.F. No.	70/2, 70/3, 70/4 70/5A & 71/3		
Toposheet No.	57 P/12		
Maximum Elevation	48 m AMSL		
Latitude	12°02'19.41"N to 12°02'23.38"N		
Longitude	79°41'16.53"E to 79°41'23.40"E		
Ultimate Depth of Mining	2 m BGL		
Geological Resources	Ordinary earth (m^3)		
	30712		
Mineable Reserves	23004		
Proposed production for 2 years	23004		
Ultimate Pit Dimensions	Length (m)	Width (m)	Depth (m)
	67	92	2
Method of Mining	Open cast semi mechanized method		
Topography	Undulated Terrain		
	Excavator		1
	Tipper		3
Proposed Manpower Deployment	5 persons		
Project Cost	Rs.13,75,000/-		
CER Cost	Rs. 2,00,000		
Proposed Water Requirement	2.0 KLD		

Table 7.3 Salient Features of Proposed Project Site "P3"

Name of the Quarry	**Thiru.N.Hariramachandran**	
Extent	1.46.0 ha	
Toposheet No.	57 P/12	
Latitude	12°02'37.00"N to 12°02'41.00"N	
Longitude	79°41'14.00"E to 79°41'20.00"E	
Maximum Elevation	44 m AMSL	
Ultimate Depth of Mining	2 m BGL	
Geological Resources	Red Soil in m^3 - 73000	
Mineable Reserves	Red Soil in m3 - 21120	
Proposed production for 3 years	Red Soil in m^3 - 21120	
Ultimate Pit Dimension (Proposed)	132 m (L) x 80 m (W) x 2 m (D)	
Method of Mining	Opencast Semi mechanized mining	
Topography	Undulated topography	
Machines Required	Hydraulic Excavator	1
	Tippers	3
Proposed Manpower Deployment	12	
Project Cost	Rs. 26,50,000	
CER Cost	Rs. 2,00,000	
Proposed Water Requirement	4.5 KLD	

Source: Approved Mining Plan

Air Environment

As the production of ordinary earth plays a vital role in affecting the air environment. The data on the cumulative production resulting from the three proposed quarries have been given in Table 7.4.

Table 7.4 Cumulative Production Load of Ordinary earth

Proposed Production Details				
Quarry	**For 2 Years in m^3**	**For 1 Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	22810	11405	42	**7**
P2	23004	11502	43	7
P3	21120	10560	39	6
Grand Total	**66934**	**33467**	**124**	**20**

The cumulative study shows that the overall production of red soil from the three quarries is 124 m^3 per day with a capacity of 20 trips of red soil per day.

Cumulative Impact of Air Pollutants

The results on the cumulative impact of the three proposed projects on air environment of the cluster have been provided in Table 7.5. The cumulative values resulting from the three projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.5 Cumulative impact results from the three proposed projects

Pollutants	Baseline Data ($\mu g/m^3$)	Incremental Values ($\mu g/m^3$)			Cumulative Value ($\mu g/m^3$)
		P1	P2	P3	
$PM_{2.5}$	20.6	3.7	5.87	8.93	39.1
PM_{10}	37.7	8.72	9.18	13.97	69.57

Noise Environment

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities. Predictions have been carried out to compute the noise level at various distances around the different quarries within the 500 m radius.

Table.7.6 Cumulative Impact of Noise from three Proposed Quarries

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	1690m	NNW	41.8	11.14	41.80	55
Habitation Near P2	1690 m	NNW	41.8	11.14	41.80	
Habitation Near P2	2130 m	NNW	41.8	9.13	41.82	
Cumulative Noise (dB (A))					**46.58**	

Source: Lab Monitoring Data

The cumulative analysis of noise due to three proposed projects shows that habitation will receive about 46.58 dB (A), respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for daytime.

Socio Economic Environment

Socio Economic benefits of the three proposed projects were calculated and the results have been shown in Table 7.7. The 3 projects together will contribute Rs.15,00,000 towards CER fund.

Table 7.7 Socio Economic Benefits from three Mines

Location ID	Project Cost	CER
P1	Rs.15,33,000	Rs. 2,00,000
P2	Rs.13,75,000	Rs. 2,00,000
P3	Rs.26,50,000	Rs. 2,00,000
Grand Total	**Rs.55,58,000**	**Rs. 6,00,000**

Table 7.8 Employment Benefits from three Mines

Location ID	Employment
P1	8
P2	5
P3	12
Grand Total	**25**

A total of 25 people will get employment due to three proposed quarries in cluster

Ecological Environment

Table 7.9 Greenbelt Development Benefits from three Mine

Code	Number of Trees proposed	Area to be covered (m^2)	No. of Trees expected to be grown @ 80% survival rate	Species recommended
P1	968	8707	774	*Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis, etc.,*
P2	768	6907	614	
P3	730	6570	584	
Total	**2466**	**22184**	**1972**	

Cumulative studies show that the three proposed projects will plant about 2466 native tree species like Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 1972 trees will survive in this green belt development program.

Plastic Waste Management Plan for Proposed Project

All the Project Proponent shall comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forest (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.

Objective

- To investigate the actual supply chain network of plastic waste.
- To identify and propose a sustainable plastic waste management by installing bins for collection of recyclables with all the plastic waste
- Preparation of a system design layout, and necessary modalities for implementation and monitoring.
- A detailed action plan to manage plastic waste has been provided in Table 7.10.

Table 7.10 Action Plan to Manage Plastic Waste

S. No.	Activity	Responsibility
1	Framing of Layout Design by incorporating provision of the Rules, user fee to be charged from waste generators for plastic waste management, penalties/fines for littering, burning plastic waste or committing any other acts of public nuisance.	Mines Manager
2	Enforcing waste generators to practice segregation of bio-degradable, recyclable and domestic hazardous waste.	Mines Manager
3	Collection of plastic waste.	Mines Foreman
4	Setting up of Material Recovery Facilities.	Mines Manager
5	Segregation of Recyclable and Non-Recyclable plastic waste at Material Recovery Facilities.	Mines Foreman
6	Channelization of Recyclable Plastic Waste to registered recyclers.	Mines Foreman
7	Channelization of Non-Recyclable Plastic Waste for use either in Cement kilns, in Road Construction.	Mines Foreman
8	Creating awareness among all the stakeholders about their responsibility.	Mines Manager
9	Surprise checking's of littering, open burning of plastic waste or committing any other acts of public nuisance.	Mine Owner

Source: Proposed by FAEs and EC

7.4 RÉHABILITATION & RE-SETTLEMENT (R & R) ACTION PLAN

The land for the proposed quarry is private own land and without any human habitation. Therefore, there is no displacement of people from the core zone of the project, hence Rehabilitation & Resettlement (R & R) is not applicable to the instant project. The nearest habitation is located at 1.96km (NNW direction).

CHAPTER VIII
PROJECT BENEFITS

8.0 GENERAL

The proposed project at Kondalankuppam Village aims to produce **22810 m^3** of ordinary earth over a period of 2 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

- Improvement in Physical Infrastructure
- Improvement in Social infrastructure
- Increase in Employment Potential
- Other Tangible Benefits

8.1 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

The proposed quarry project is located in Kondalankuppam Village, Vanur Taluk, Villuppuram District, Tamil Nadu. The area has already well-established communications roads and other facilities. The following physical infrastructure facilities will further improve due to proposed project.

- Road transport facilities
- Communications
- Medical, Educational and social benefits will be made available to the nearby civilian population in addition to the workmen employed in the mine.

8.2 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.3 EMPLOYMENT POTENTIAL - SKILLED; SEMI-SKILLED AND UN-SKILLED

It is proposed to provide employment to about 8 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

8.4 OTHER TANGIBLE BENEFITS

The proposed mine is likely to have other tangible benefits as given below

- Indirect employment opportunities to local people in contractual works like construction of infrastructural facilities, transportation, sanitation for supply of goods and services to the mine and other community services
- Additional housing demand for rental accommodation will increase
- Cultural, recreation and aesthetic facilities will also improve
- Improvement in communication, transport, education, community development and medical facilities and overall change in employment and income opportunity
- The State Government will also benefit directly from the proposed mine, through increased revenue from royalties, cess, DMF, GST etc.,

8.4.1 Corporate Social Responsibility

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

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 5 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment
- CSR Cost Estimation
- CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Kondalankuppam Village. CSR budget is allocated.

8.4.2 Corporate Environment Responsibility

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is ≤ 100 crores, the proposed project shall contribute 2% of capital investment

towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 2,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

Table 8.1 CER Action Plan

S. No.	Activity	Budget (Rs.in Lakh)
1	The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby government higher secondary school, Semangalam	Rs. 2,00,000
	Total	**Rs. 2,00,000**

Source: Field survey conducted by FAE in consultation with project proponent

8.4.3 Summary of Project Benefits

The project would pay about **Rs. 17,32,832** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Ordinary Earth (Rs.)
CER	200000
Seigniorage @ Rs.56/m^3 of ordinary earth	1277360
District Mineral Foundation Tax @ 10% of Seigniorage	127736
Green Tax @ 10% of Seigniorage	127736
Total	**17,32,832**

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X
ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of environmental management plan will ensure to keep all the environmental parameters of the project in respect of ambient air quality, water quality, socio economic improvement standards. Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

10.1 DESCRIPTION OF THE ADMINISTRATIVE ASPECTS OF ENSURING MITIGATIVE MEASURES ARE IMPLEMENTED AND THEIR EFFECTIVENESS MONITORED, AFTER APPROVAL OF EIA

The lessee (project proponent) will adopt Environmental Management System (EMS) which will assist the management to meet both current and future environmental requirements and challenges. The following components are being taken to establish an EMS; Organizational Commitment, Environmental Policy, Description of the Administration and Technical Setup, Environmental Management Plan (EMP) and Budgetary Provision for Environmental Management. The mine management will follow a comprehensive and systematic health and safety function which involves all personnel seeking to identify hazards and assessing risk to prevent and eliminate all accidents/injuries. The management will prepare a detailed eco-restoration and mine closure plan of mine operation prior to the commencement of the mine operation.

Environmental Policy

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance. The Proponent Mr.S.Vasantharaj will:

- Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities.
- Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- Allocate necessary resources to ensure the implementation of the environmental policy.

- Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- Implement monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

Description of the Administration and Technical Setup

The environment monitoring cell discussed under chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated.
- Analysis of the water and air samples collected through external laboratory.
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies.
- Collection of health statistics of the workers and population of the surrounding villages.
- Green belt development.
- Monitoring the progress of implementation of the environmental monitoring program.
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

Budgetary Provision for Environmental Management

Adequate budgetary provision has been made by the company for execution of Environmental Management Plan. The Table 10.1 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost (Rs.)	Recurring Cost/annum (Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	19350	19350
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance	25000	2500
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed	20000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	5000

	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare	0	38700
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			**914350**	**205550**
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of portable blasting shelter	0	0
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	0
Total Noise Environment			**0**	**0**

Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	19350	9675
Total Water Environment			**19350**	**9675**
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal).	25000	20000
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Total Waste Management			**30000**	**22000**
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000
Total Implementation of EC, Mining Plan			10000	1000
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	32000	8000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	8000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	7740
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum (4.82.7 hectare)	387000	19350
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	96750	19350

	/HEMMs. Flaggers will be deployed for traffic management			
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	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 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
Total Occupational Health and Safety			**555750**	**849440**
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	77400	11610
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	174150	17415
Total Development of Green Belt			**251550**	**29075**
Mine Closure	Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs)		0	65790
	G.O.(Ms)No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Ordinary earth = Rs.56)	127736	0
TOTAL			**1908736**	**1116690 (Exclude. Mine Closure)**

Table 10.2 Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation

Ist Year	IInd Year	Total Recurring Cost	Total EMP Cost
1116690	1172525	**2289215**	**4197951**

In order to implement the environmental protection measures, an amount of **Rs.1908736** as capital cost and recurring cost as **Rs.1116690** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 2 years will be **Rs.4197951** as shown in Table 10.2.

Conclusion

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.

CHAPTER XI

SUMMARY AND CONCLUSION

11.1 OVERALL JUSTIFICATION FOR IMPLEMENTATION OF THE PROJECT

11.1.1 INTRODUCTION

As the proposed ordinary earth quarry mining project (P1) falls within the quarry cluster of 500 m radius with the total extent of 7.98.50ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. 71/2 and 88/1 over the extent of 1.93.5ha is situated in the cluster falling in Kondalankuppam Village, Vanur Taluk, Villupuram District, Tamil Nadu. The quarries involved in the calculation of cluster extent are three proposed quarries one existing Quarrie.

11.1.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 12°2'18.66"N to 12°2'23.97"N Longitudes from 79°41'11.19"E to 79°41'21.41"E in Kondalankuppam Village, Vanur Taluk, Villupuram District, Tamil Nadu. According to the approved mining plan, about 22810m3 of ordinary earth will be mined up to the depth of 2m BGL in the five years. The quarrying operation is proposed to be carried out by open cast manual mining method involving drilling and formation of benches of the prescribed dimensions.

11.1.3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected to evaluate the existing environmental condition in the core and buffer areas during **December 2022 through February 2023** as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified **Ekdant Enviro Services (P) Limited** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

Land Environment

Land use pattern of the area of 5 km radius was studied using Sentinel II imagery. LULC types and their extent are given in Table 11.1.

Table.11.1 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky / stony waste	155.10	2.02
2	Crop land	2732.18	35.58
3	Dense Forest	1028.16	13.39
4	Fallow land	14.73	0.19
5	Land with or without scrub	380.53	4.95
6	Mining/Industrial Area	113.19	1.47
7	Plantations	2668.75	34.75
8	Settlement	232.98	3.03
9	Water bodies	354.62	4.62
Total		**7680.00**	**100**

Soil Environment

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 7.10 to 7.50 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 217 to 523 µs/cm. Bulk density ranges between 1.01 and 1.53 g/cm3. Calcium ranges between 78 and 156 mg/kg. Magnesium ranges between 18.76 and 29.21 mg/kg. Potassium ranges between 17.34 and 34.90 mg/kg. Iron content ranges between 78.65-172.4 mg/kg. Organic matter content ranges between 0.95 and 1.41 %.

Water Environment

Surface Water Resources

Sangarabarani River is the prominent surface water resources present in the study area. This river was ephemeral in nature, which convey water only after rainfall events. The proposed project area is located in 4.47 (Thiruvakkarai) km WSW of Sangarabarani River and 3.60 (Kaikilampattu) km SW of Sangarabarani River, Two surface water sample, known as SW01 and SW02 were collected from the Sangarabarani River in Thiruvakkarai (4.47 km) and Sangarabarani River in Kaikilampattu (3.60 km), to assess the baseline water quality.

Ground Water Resources

Groundwater in the study area occurs in the crystalline rocks of Archaean age and recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose.

Six groundwater samples, known as OW01, OW02, BW01, BW02, BW03 and BW04 collected from bore wells and open wells were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water.

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May 2022 (Pre-Monsoon Season) and from December 2022 through February, 2023 (Post Monsoon Season).

According to the data, average depths to the static water table in open wells range from 11.3 to 15.9 m BGL in pre monsoon and 6.5 to 10.5 m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static

potentiometric surface in bore wells for the period of December 2022 through February, 2023 (Post Monsoon Season) vary from 55.10 to 60.0 m and from 60.2 to 70.0 m for the period of March through May, 2022 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

Air Environment

As per the monitoring data, $PM_{2.5}$ ranges from 15.2 µg/m^3 to 19.3 µg/m^3; PM_{10} from 32.3 µg/m^3 to 36.9 µg/m_3; SO_2 from 6.9 µg/m^3 to 10.0 µg/m^3; NOx from 13.0 µg/m^3 to 18.9 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

Noise Environment

Noise level in core zone was 39.2 dB (A) Leq during day time and 35.6 dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 40.4 to 46.8 dB (A) Leq and during night time from 35.8 to 41.6 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

Biological Environment

The study found that there is no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

Flora in core zone

Quarry leases have a large number of Acacia holoseicea plants whose seeds are wind-dispersed so that they are abundant both inside and outside the quarry leases area. It contains a total of 18 species belonging to 16 families have been recorded from the buffer zone. 3 Trees (16%), 6 Shrubs (33%) and 9 Herbs (50%) were identified.

Flora in 300 m radius zone

A variety of plant species are found within a radius of 300 meters. It is an arid landscape. There is no agricultural land nearby. It contains a total of 36 species belonging to 22 families have been recorded from the buffer zone. 9 Trees (25%), 7 Shrubs (19%) and 25 Herbs and Climbers, Creeper, Grass & Cactus (69%) were identified.

Fauna in Core Zone

The 21 varieties of species observed in the core zone. Among them numbers of Insects 8 (41%), Reptiles 3 (14%), Mammals 1 (4%) and Avian 9 (41%). A total of 21 species belonging

to 15 families have been recorded from the core mining lease area. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are under schedule IV according to Indian wild life Act 1972. A total eight species of birds were sighted in the mining lease area.

Fauna in Buffer Zone

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. The Oussudu Lake Bird Sanctuary is located about 9.64 km southeast of the mining lease area.

Socio Economic Environment

An attempt has been made to assess the impact of the proposed mining project on Socio-economic aspect of the study area. The various attributes that have been taken into account are population composition, employment generation, occupational shift, household income and consumption pattern. Implementation of the Proposed Mine Project will generate both direct and indirect employment. Besides, mining operation will be legally valid and it will bring income to the state exchequer. At present seasonal agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in mining- based activities rather in seasonal agriculture.

11.2 EXPLANATION OF HOW, ADVERSE EFFECTS HAVE BEEN MITIGATED.

11.2.1 Anticipated Environmental Impacts and Mitigation Measures

Land Environment

Anticipated Impact

- Change in land use and land cover and topography of the mine lease area
- Problems to human habitations due to dust and noise caused by movement of heavy vehicles
- Soil erosion and sediment deposition in the nearby water bodies during the rainy season
- Siltation of water course due to wash off from the exposed working area
- Deterioration of soil quality in the surrounding area due to runoff from the project area
- Decrease in the agricultural productivity of the surrounding land due to soil quality degradation

Mitigation Measures

- Construction of garland drains, settling pits, and check dams to prevent runoff and siltation

- Runoff water will be discharged into the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site
- The vegetation will be retained at the site wherever possible
- Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

Water Environment

Anticipated Impact

- Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- As the proposed project acquires 2.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Mitigation Measures

- Rain water from mine pit will be treated in settling tanks before being used for dust suppression and tree plantation purposes
- Domestic sewage from site office will be discharged in septic tank and then directed to soak pits
- Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program

Air Environment

Anticipated Impact

Anticipated increase of the air pollutants due to quarrying activities have been predicted using AERMOD software. The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further

Haul Road and Transportation

- Water will be sprinkled on haul roads twice a day to avoid dust generation

during transportation

- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- Water sprinkling on haul roads and loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral. Therefore, weekly maintenance of machines improves combustion process and reduces pollution.
- The un-metaled haul roads will be compacted weekly before being put into use.
- Overloading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate.
- Haul roads and service roads will be graded to clear accumulation of loose materials.

Green Belt

- Planting of trees all along mine haul roads outside the lease and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of tractors/tippers.
- Green belt of adequate width will be developed around the project site.

Occupational Health

- Dust mask will be provided to the workers and their use will be strictly monitored.
- Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.
- Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed.

Noise Environment

Anticipated Impact

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. The peak particle velocity is below that of 0.3 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

Mitigation Measures

- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- Provision of sound insulated chambers for the workers working on machines

(HEMM) producing higher levels of noise.

- Silencers / mufflers will be installed in all machineries
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

Biological Environment

Anticipated Impact

- During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- The Number of plants in the mining lease area is given in Chapter 3 which vegetation in the lease area may be removed during mining.
- Carbon released from quarrying machineries and tippers during quarrying would be 396 kg per day, 106979 kg per year and 213958 kg for five years.

Mitigation Measures

- During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 23197 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- As per the greenbelt development plan as recommended by SEAC, about 968 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 86 kg of the total carbon.

Socio Economic Environment

Anticipated Impact

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area
- Approach roads can be damaged by the movement of tippers

- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

Mitigation Measures

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines
- Air pollution control measure will be taken to minimize the environmental impact within the core zone
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc.., from this project directly and indirectly

Occupational Health

- All the persons will undergo pre-employment and periodic medical examination
- Employees will be monitored for occupational diseases by conducting medical tests: General physical tests, Audiometric tests, Full chest, X-ray, Lung function tests, Spiro metric tests, Periodic medical examination – yearly, Lung function test – yearly, those who are exposed to dust and Eye test
- Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost.
- The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

11.2.2 Environment Monitoring Program

Table 11.2 Environment Monitoring Program

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall

3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Peak particle velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and chemical characteristics
8	Greenbelt	Within the project area	Daily	Monthly	Maintenance

Source: Guidance of manual for mining of minerals, February 2010

11.2.3 ADDITIONAL STUDIES

Risk Assessment

The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project.

Disaster Management Plan

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

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

Cumulative Impact Study

The results on the cumulative impact of the four proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.

- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- PPV resulting from three proposed project is well below the permissible limit of Peak Particle Velocity of 3mm/s.
- The proposed three projects will allocate Rs. 6,00,000/- towards CER as recommended by SEAC.
- The proposed three projects will directly provide jobs to 25 local people, in addition to indirect jobs.
- The proposed three projects will plant 2466 about trees in and around the lease area
- The proposed three projects will add 60 PCU per day to the nearby roads.

11.2.4 Project Benefits

Various benefits are envisaged due to the three proposed mine and benefits anticipated from the proposed project to the locality, neighbourhood, region and nation as a whole are:

- Direct employment to 8 local people
- Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- Strengthening of existing community facilities through the Community Development Program
- Skill development & capacity building like vocational training.
- Rs. 2,00,000 will be allocated for CER

11.2.5 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of Rs.1908736 as capital cost and recurring cost as Rs.1116690 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 2 years will be Rs.4197951.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent, Mr.S.Vasantharaj has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR issued.

Address of the consultancy:

No: 1/213B Natesan Complex,

Oddapatti, Dharmapuri – 636705,

Tamil Nadu, India.

Email:info.gtmsdpi@gmail.com

Web: www.gtmsind.com

Phone: 04342 232777.

The accredited experts and associated members who were engaged in this EIA study are given below:

S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1	Dr.S.Karuppannan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	A
2	Dr.J.Rajarajeswari	In-house, FAE	1(a)(i)	EB, SC	B
3	Dr.G.Prabakaran	In-house, FAE	1(a)(i)	SE	B
4	Dr.R.Arunbalaji	In-house, FAE	1(a)(i)	AP, AQ, NV	B
5	Dr. S. Malar	In-house, FAE	1(a)(i)	WP	B
6	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG, LU, GEO	B
7	S. Gopalakrishnan	In-house, FAE	1(a)(i)	HG, GEO	B
8	P. Venkatesh	In-house, FAE	1(a)(i)	AP	B
9	Dr. D.Kalaimurugan	In-house, FAE	1(a)(i)	SC	B
10	J.N. Manikandan	Empanelled, FAE	1(a)(i)	RH, SHW, AP	B
Approved Functional Area Associates					
10	G. Prithiviraj	FAA	1(a)(i)	LU, HG	B
11	C. Kumaresan	FAA	1(a)(i)	NV	B
12	P. Vellaiyan	FAA	1(a)(i)	HG, GEO	B

13	P. Dhatchayini	FAA	1(a)(i)	AQ	B
14	V. Malavika	FAA	1(a)(i)	NV, SHW	B

Abbreviations			
EC	EIA Coordinator	NV	Noise and Vibration
FAE	Functional Area Expert	SE	Socio Economics
FAA	Functional Area Associates	HG	Hydrology, ground water and water conservation
TM	Team Member	SC	Soil conservation
GEO	Geology	RH	Risk assessment and hazard management
WP	Water pollution monitoring, prevention and control	SHW	Solid and hazardous wastes
AP	Air pollution monitoring, prevention and control	MSW	Municipal Solid Wastes
LU	Land Use	ISW	Industrial Solid Wastes
AQ	Meteorology, air quality modelling, and prediction	HW	Hazardous Wastes
EB	Ecology and bio-diversity	GIS	Geographical Information System

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

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

Signature : 

Date :

Name : **Dr. S. Karuppannan**

Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for Mr.S. Vasantharaj Oridinary Earth project with the extent of 1.93.5 ha situated in the cluster with the extent of 7.98.50 ha in Kondalankuppam Village, Vanur Taluk, Villuppuram District of Tamil Nadu is true and correct to the best of our knowledge.

List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity ○ Prediction of air pollution and propose mitigation measures / control measures	P.Venkatesh	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr.S. Malar	
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	G. Uma Maheswaran	
4	GEO	○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	S.Gopala Krishnan	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ CorporateEnvironment esponsibility.	Dr. G. Prabhakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and	Dr.J. Rajarajeshwari	

		fauna. o Suggesting species for greenbelt development.		
7	RH	o Identification of hazards and hazardous substances o Risks and consequences analysis o Vulnerability assessment o Preparation of Emergency Preparedness Plan o Management plan for safety.	J.N. Manikandan	
8	LU	o Construction of Land use Map o Impact of project on surrounding land use o Suggesting post closure sustainable land use and mitigative measures.	G.Uma Maheswaran	
9	NV	o Identify impacts due to noise and vibrations o Suggesting appropriate mitigation measures for EMP.	Dr.R. Arun Balaji	
10	AQ	o Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. o Recommending mitigations measures for EMP	Dr.R. Arun Balaji	
11	SC	o Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. D.Kalaimurugan	
12	SHW	o Identify source of generation of non-hazardous solid waste and hazardous waste. o Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	J.N. Manikandan	

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	o Site visit with FAE o Provide inputs & Assisting FAE for LU and HG	
2	C. Kumaresan	NV	o Assistance to FAE in both primary and secondary data collection o Assistance in noise prediction modelling	
3	P. Vellaiyan	HG & GEO	o Field visits along with FAE o Assistance to FAE in both primary and secondary data collection	
4	P. Dhatchayini	AQ	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
5	V. Malavika	NV, SHW	o Site visit along with FAE o Assistance in report preparation	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. S. KARUPPANNAN, Managing Partner, Geo Technical Mining Solutions, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for Mr.S. Vasantharaj, Ordinary Earth project with the extent of 1.93.5 ha situated in the cluster with the extent of 7.98.50 ha in Kondalankuppam Village, Vanur Taluk, Villupuram District of Tamil Nadu is true and correct to the best of my knowledge.

Signature :

Date :

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/23-26/RA 0319

Validity : Till 31.12.2026

File No: 10560
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated **02/04/2024**

To,

VASANTHARAJ
VASANTHARAJ
S. Vasantharaj, S/o.Selvaraj, No.477, M.G Road, Ramakrishna Nagar, Muthialpet, Puducherry-605003., PUDUCHERRY , PONDICHERRY, PUDUCHERRY, 605003
vasantharajpuducherry@gmail.com

Subject: Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project KONDALANKUPPAM VILLAGE ORDINARY EARTH QUARRY LEASE submitted to Ministry vide proposal number SIA/TN/MIN/451203/2023 dated 25.11.2023.
Ref:
1. Online proposal No. SIA/TN/MIN/451203/2023, Dated: 25.11.2023
2. Your application submitted for Terms of Reference dated: 25.11.2023

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO23B0108TN5920417N
(ii) File No.	10560
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	KONDALANKUPPAM VILLAGE ORDINARY EARTH QUARRY LEASE
(viii) Name of Company/Organization	VASANTHARAJ
(ix) Location of Project (District, State)	VILLUPURAM, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	yes
(xiii) Applicability of Specific Conditions	no

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

4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) Appraisal Committee of SEIAA in the meeting held on 18/03/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

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

6. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the State Environment Impact Assessment Authority(SEIAA) Appraisal Committee hereby decided to grant Terms of Reference for instant proposal of Mr. VASANTHARAJ under the provisions of EIA Notification, 2006 and as amended thereof.

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

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

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

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

Copy To

1. The Additional Chief Secretary to Government, Environment, Climate Change and 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 - 110 032.
3. The Chairperson, 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 - 110 003.
6. The District Collector, Viluppuram District.
7. Stock File.

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Specific Conditions:

S. No	Terms of Reference
1.1	1.The PP shall change the Name of the mineral as “Ordinary Earth” instead of “Red Earth” in the 500m cluster letter issued by Deputy Director mines vide dated 11.10.2023 and also in the approved

S. No	Terms of Reference
	mine plan wherever it occurs. 2.The PP shall furnish NOC obtained from the Director, Agriculture Department that the removal of ordinary earth will not affect the agriculture nearby area.

2. Mining Conditions - Site Specific

S. No	Terms of Reference
2.1	1. The PP shall change the Name of the mineral as "Ordinary Earth" instead of "Red Earth" in the 500m cluster letter issued by Deputy Director mines vide dated 11.10.2023 and also in the approved mine plan wherever it occurs.

3. Seiaa Standard Conditions:

S. No	Terms of Reference
3.1	**<u>Cluster Management Committee</u>** 1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry. 2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc., 3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines. 4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. 5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan. 6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail. 7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner. 8. The committee shall furnish the Emergency Management plan within the cluster. 9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public. 10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety. 11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents. **<u>Impact study of mining</u>** 12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following a) Soil health & soil biological, physical land chemical features . b) Climate change leading to Droughts, Floods etc. c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health.

S. No	Terms of Reference
	e) Agriculture, Forestry & Traditional practices. f) Hydrothermal/Geothermal effect due to destruction in the Environment. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams. **Agriculture & Agro-Biodiversity** 13. Impact on surrounding agricultural fields around the proposed mining Area. 14. Impact on soil flora & vegetation around the project site. 15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP. 16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. **Forests** 19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife. 20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. **Water Environment** 23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 24. Erosion Control measures. 25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities. 28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. **Energy** **Climate Change** 32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. 33. The Environmental Impact Assessment should study impact on climate change, temperature

S. No	Terms of Reference
	rise, pollution and above soil & below soil carbon stock. **Mine Closure Plan** **EMP** 35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued. 36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan. **Risk Assessment** **Disaster Management Plan** **Others** 39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc. 40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan. 41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	An EIA-EMP Report shall be prepared for peak capacity (…..MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of mineral production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
1.3	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical

S. No	Terms of Reference
	features such as water bodies, etc should be furnished.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights S.N ML/Project Land use Area under Surface Rights(ha) Area Under Mining Rights(ha) Area under Both (ha) 1 Agricultural land 2 Forest Land 3 Grazing Land 4 Settlements 5 Others (specify)

S. No	Terms of Reference
	S.N. Details Area (ha) 1 Buildings 2 Infrastructure 3 Roads 4 Others (specify) Total
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laborartory and NABET accreditation of the consultant to be provided.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly

S. No	Terms of Reference
	mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP to evaluate the green house emission gases from the mine operation and corresponding carbon absorption plan.
1.27	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
1.28	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
1.29	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.

S. No	Terms of Reference
1.30	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.
1.31	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
1.32	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
1.33	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route.
1.34	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.
1.35	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.
1.36	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.
1.37	Corporate Environment Responsibility:
1.38	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.
1.39	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
1.40	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.
1.41	d) To have proper checks and balances, the company should have a well laid down 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.
1.42	e) Environment Managament Cell and its responsibilities to be clearly spleel out in EIA/ EMP report
1.43	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.

S. No	Terms of Reference
1.44	Status of any litigations/ court cases filed/pending on the project should be provided.
1.45	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.
1.46	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.
1.47	Details on the Forest Clearance should be given as per the format given: Total Project Area (ha) / Total ML Forest land (ha) If more than one provide details of each FC / Date of FC / Extent of Forest Land / Balance area for which FC is yet to be obtained / Status of appl For diversion of forest land
1.48	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report
1.49	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
1.50	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
1.51	Detailed Chronology of the project starting from the first lease deed alloted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
1.52	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET acrreditation) and Laboratory (NABL / MoEF & CC certification)
1.53	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.

Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS
Member Secretary, SEIAA

Date: 02/04/2024

From

Tmt.N.Vijayalakshmi, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Viluppuram.

To

Thiru S.Vasantharaj,
S/o. Selvaraj,
No.477, MG Road,
Ramakrishna Nagar,
Muthiyalpet,
Puducherry.

Rc.No.A/G&M/93/2023 Dated 11.10.2023

Sir,

Sub: Mines & Minerals – Minor Mineral – Oridnary Earth - Viluppuram District – Vanur Taluk – Kondalankuppam Village - over an extent of 1.93.5 Hectss- Kondalankuppam of patta lands – S.F.Nos. 71/2 (0.93.5 Hects) and 88/1 (1.00.0 Hects) – Quarry lease application preferred by Thiru S.Vasantharaj, S/o Selvaraj, Puducherry – Precise area communicated – mining plan submitted- approval - approved reg.

Ref :
1. G.O.Ms.No.79, Industries (MMC-1) Department dated 06.04.2015.
2. G.O.(Ms).No.169, Ind. (MMC.1) Dept. dated 04.08.2020.
3. Quarry lease application dated 24.07.2023 preferred by Thiru S.Vasantharaj, S/o Selvaraj, Puducherry.
4. Deputy Director, Geology and Mining, Viluppuram Letter Rc.No.A G&M/93/2023 Dated 09.10.2023.
5. Representation from Thiru S.Vasantharaj, S/o Selvaraj, Puducherry Dated 10.10.2023.

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Kind attention invited to the references cited.

In response to the precise area communicated vide the reference 4th cited, the applicant viz., Thiru S.Vasantharaj, S/o Selvaraj, Puducherry vide reference 5th cited has submitted three copies of mining plan for the area applied seeking grant of quarry lease for Ordinary Earth over an extent of 1.93.5 hectares of patta lands in S.F.Nos. 71/2 (0.93.5 Hects) and 88/1 (1.00.0 Hects) of Kondalankuppam Village, Vanur Taluk, Villupuram District with a request to approve the same.

2. The mining plan so submitted has been verified in detail.

3. As per the guidelines / instructions issued by the Commissioner of Geology and Mining, Chennai vide letter Rc.No.3868/LC/2012, dated 19.11.2012, the mining plan 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) This approval of the mining plan does not in any way imply the approval of the Government in terms or any other provisions of the Mines and Minerals (Development and Regulation) Amended Act, 2015, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, 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) As per the Deputy Director, Geology and Mining, Viluppuram letter Rc.No.B/G&M/93/2023 Dated 09.10.2023, the following conditions have been incorporated in the Mining Plan.

A) 7.5m safety distance shall be provided to the adjacent patta lands and 10m shall be provided for adjacent Government pormboke land to the lease applied area.

(v) Quarrying shall be strictly done as per the approved Mining Plan.

Encl: Two copies of Approved Mining Plan.

11.10.2023

Deputy Director,
Dept. of Geology and Mining,
Viluppuram.

Copy to:

The Commissioner of Geology and Mining, Chennai-32.

11.10.23

From
Tmt.N.Vijayalakshmi, M.Sc.,
Deputy Director,
Dept. of Geology and Mining,
Viluppuram.

To
Thiru S.Vasantharaj,
S/o. Selvaraj,
No.477, MG Road,
Ramakrishna Nagar,
Muthiyalpet,
Puducherry.

Rc.No.A/G&M/93/2023 Dated .10.2023

Sir,

Sub: Mines & Minerals – Minor Mineral – Oridnary Earth - Viluppuram District – Vanur Taluk – Kondalankuppam Village - over an extent of 1.93.5 Hectss- Kondalankuppam of patta lands – S.F.Nos. 71/2 (0.93.5 Hects) and 88/1 (1.00.0 Hects) – Quarry lease application preferred by Thiru S.Vasantharaj, S/o Selvaraj, Puducherry – Precise area communicated – Precise area communicated – Details of quarries situated within 500 meter radial distance – furnished - reg.

Ref: 1. Deputy Director, Geology and Mining, Viluppuram Letter Rc.No.A G&M/93/2023 Dated 09.10.2023.

2. Representation from Thiru S.Vasantharaj, S/o Selvaraj, Puducherry Dated 10.10.2023.

****

With reference to your letter in the reference 2nd cited, the details of existing, proposed and abandoned quarries located within 500 meter radius from the proposed Ordinary Earth over an extent of 1.93.5 hectares of patta lands in S.F.Nos. 71/2 (0.93.5 Hects) and 88/1 (1.00.0 Hects) of Kondalankuppam Village, Vanur Taluk, Villupuram District are as follows.

1. Existing quarries:

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Lease period	Remarks
1.	S.Devamani, S/o.Subramani, No.2A/68, Mariyamman Kovil Street, Kadagampattu Village, Vanur Taluk, Viluppuram District	Red Earth	Vanur Kondalan kuppam	69/2 70/5B 70/6 70/7B 70/8 88/2	0.95.0 0.28.5 0.55.0 0.23.0 0.65.0 0.39.0 3.05.5	06.10.2022 to 05.10.2025	

II. Proposed quarries :

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Remarks
1.	S.Vasantharaj, S/o. Selvaraj, No.477, MG Road, Ramakrishna Nagar, Muthiyalpet, Puducherry.	Red Earth	Vanur Kondalankuppam	71/2 88/1	0.93.5 1.00.0 **1.93.5**	-
2.	B.Venkatakrishnan, S/o.Balaraman, No.25, 2nd Cross Street, Kurumbapet, Housing Board, Puducherry – 605009	Red Earth	Vanur Kondalan-kuppam	70/2 70/3 70/4 70/5A 71/3	0.11.0 0.10.0 0.64.0 0.30.5 0.38.0 **1.53.5**	-
3.	N.Hariramachandiran, S/o. Narayana Nadar, No.41, Kumbakonam Road, Pantruti, Cuddalore District.	Red Earth	Vanur Taluk, Kondalankuppam Village	60/3	1.46.0	-

III. Abandoned quarries :

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Lease period
NIL						

Deputy Director,
Geology and Mining,
Viluppuram.

MINING PLAN

FOR

KONDALANKUPPAM VILLAGE ORDINARY EARTH QUARRY LEASE WITH FINAL QUARRY CLOSURE PLAN

Patta- Ryotwari Land/Open Cast-Semi-Mechanized mining/Non- Forest/Non-Captive use/"B2' Category

Lease period of Two years

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

LOCATION OF THE LEASE AREA

STATE	:	TAMILNADU
DISTRICT	:	VILUPPURAM
TALUK	:	VANUR
VILLAGE	:	KONDALANKUPPAM
S.F. NO'S	:	71/2 and 88/1
EXTENT	:	1.93.5HECTARES

ADDRESS OF THE APPLICANT

Mr.S.VASANTHARAJ,

S/o. Selvaraj,

No.477, M.G Road,

Ramakrishna Nagar, Muthialpet,

Puducherry - 605003.

PREPARED BY

Dr.S.KARUPPANNAN.M.Sc., Ph.D.,

Qualified person

GEO TECHNICAL MINING SOLUTIONS

(A NABET Accredited & ISO Certified Company)

No: 1/213 -B, Ground Floor, Natesan Complex,

Oddapatti, Collectorate Post office,

Dharmapuri-636705. Tamil Nadu.

Mob. : +91 9443937841, +917010076633,

E-mail: info.gtmsdpi@gmail.com ,

Website: www.gtmsind.com

CONTENTS

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of precise area communication letter	I
2.	Copy of **FMB** (Field Measurement book)	II
3.	Copy of A- Register	III
4.	Copy of Chitta	IV
5.	Soil test report	V
6.	Copy of Photocopy of the applied lease area	VI
7.	Copy of ID Proof of the authorized signatory	VII
8.	Copy of Qualified person experience certificate	VIII

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Topo Sheet Map	I-B	1:1,00,000
4	Satellite Imagery Map	I-C	1: 5,000
5	Environmental Plan	I-D	1: 5,000
6	Mine Lease Plan	II	1:1000
7	Surface, Geological Plan & Sections	III	Plan 1:1000 Section Hor 1:1000 Ver 1: 500
8	Year wise development, Production plan & Sections	IV	Plan 1:1000 Section Hor 1:1000 Ver 1: 500
9	Conceptual plan and sections	V	Plan 1:1000 Section Hor 1:1000 Ver 1: 500

Mr.S.VASANTHARAJ,
S/o. Selvaraj,
No.477, M.G Road,
Ramakrishna Nagar, Muthialpet,
Puducherry - 605003.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of Ordinary Earth quarry lease in S.F.No: 71/2 (0.93.5Hect) & 88/1 (1.00.0Hect) - over an extent of 1.93.5hectares, Patta land of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu State has been prepared by

Dr. S. KARUPPANNAN.M.Sc., Ph.D., (Qualified person)

I request **the Deputy Director, Department of Geology and Mining, Viluppuram District** to make further correspondence regarding modifications of the Mining Plan with the said Qualified Person on this following address.

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
(A NABET Accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841,7010076633.
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

I hereby undertake that all modifications so made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

Place: Viluppuram, TN
Date: 1.11.2023

Signature of the applicant
(S.Vasantharaj)

Mr.S.VASANTHARAJ,
S/o. Selvaraj,
No.477, M.G Road,
Ramakrishna Nagar, Muthialpet,
Puducherry - 605003.

DECLARATION

The Mining Plan in respect of Ordinary Earth quarry lease in S.F.No: 71/2(0.93.5Hect) & 88/1 (1.00.0Hect), over an extent of 1.93.5hectares, Patta land of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu State has been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

Place: Viluppuram, TN
Date: 1.11.2023

Signature of the applicant
(S.Vasantharaj)

CERTIFICATE

I, Dr.S.KARUPPANNAN.M.Sc.,Ph.D, Dharmapuri had the qualified person to prepare mining plan have an office at **GEO TECHNICAL MINING SOLUTIONS** (A NABET accredited & ISO certified Company) No: 1/213-B, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705, Tamil Nadu.

I, Dr.S.KARUPPANNAN.M.Sc.,Ph.D prepared this Mining plan in respect of Ordinary Earth quarry lease in S.F.No: 71/2 (0.93.5Hect) & 88/1 (1.00.0Hect) over an extent of 1.93.5Hect of Kondalankuppam village, Vanur Taluk, Viluppuram District, Tamil Nadu State. The mining plan prepare under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Place: Dharmapuri, TN
Date: 10|10|23

Dr.S.KARUPPANNAN.M.Sc.,Ph.D.,

Qualified Person
GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
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Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841,7010076633
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

This is to certify that, the provisions of under rule 19 of Tamil Nadu Minor Mineral Concession Rules, 1959 have been observed in the Mining Plan for the grant of Ordinary Earth quarry lease in S.F.No:71/2(0.93.5Hect) & 88/1 (1.00.0Hect) over an extent of 1.93.5hectares, Patta land of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu State applied by **Mr.S.Vasantharaj.**

Wherever specific permission/ exemptions/ relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central Governments for granting such permissions etc.

Place: Dharmapuri, TN
Date: 10/10/23

Dr.S.KARUPPANNAN.M.Sc.,Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705

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Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
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Ph: +91 9443937841,7010076633
E-mail: info.gtmsdpi@gmail.com
Website: www.gtmsind.com

CERTIFICATE

Certify that, in preparation of Mining Plan for Ordinary Earth quarry lease in S.F.No: 71/2(0.93.5Hect) & 88/1 (1.00.0Hect) over an extent of 1.93.5hectares, Patta land of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu State for **Mr.S.Vasantharaj,** covers all the provisions of Mines Act, Rules, and Regulations etc made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN
Date: 10/10/23

Dr.S.KARUPPANNAN.M.Sc.,Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705

MINING PLAN

FOR

KONDALANKUPPAM VILLAGE ORDINARY EARTH QUARRY LEASE WITH FINAL QUARRY CLOSURE PLAN

Patta-Ryotwari land /Open Cast-Semi-Mechanized mining/Non- Forest/Non-Captive use/"B2' Category

Lease period of Two years

(Prepared under rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959)

INTRODUCTORY NOTES:

a) **Introduction:** The applicant Mr.S.Vasantharaj, S/o. Selvaraj No.477, M.G Road, Ramakrishna Nagar, Muthialpet, Puducherry - 605003. and field with application for new proposals has submitted to the Deputy Director, Department of Geology and Mining, Viluppuram grant of quarry lease Ordinary Earth for under rule 19 of Tamil Nadu Minor Mineral Concession Rules, 1959 for in S.F.No: 71/2(0.93.5Hect) & 88/1 (1.00.0Hect) over an extent of 1.93.5hectares of Kondalankuppam Village, Vanur Taluk, Viluppuram District, Tamil Nadu State within a period of two years.

b) **The Precise area communication letter:** The Deputy Director, Department of Geology and Mining, Viluppuram has directed to the applicant Mr.S.Vasantharaj through precise area communication letter **Roc.No. A/G&M/932023 dated:09.10.2023** before execution of lease deed should submit the mining plan for approval and obtain Environmental Clearance from the competent authority of State Level Environment Impact Assessment Authority-TamilNadu (SEIAA) as per EIA Notification 2006 and S.O.3977 (E), dated 14th August 2018 and MoEF & CC office memorandum vide F.No.22-1/2019-IA.III [E116917] dated 15th December, 2021 for quarrying lease Ordinary Earth at Tamil Nadu State, Viluppuram District, Vanur Taluk, Thollamur Village in S.F.No: 71/2(0.93.5Hect) & 88/1 (1.00.0Hect) over an extent of 1.93.5hectares for a period of two (2) years under Rule 19 of Tamil Nadu Minor Mineral Concession Rules, 1959 subject to the following special conditions,

i. A safety distance of 7.5 meter and 10.0 meter should be provided for the adjacent patta lands and Government Poramboke lands.
ii. While carrying out the quarry, the quarrying should be done without any disturbance to the nearby patta lands, odai and government lands.
iii. The applicant should fence the area with barbed wire and submit the DGPS survey report before execution of lease deed.

iv. Necessary Environmental clearance should be obtained from the SEIAA Tamilnadu as required under rule 42 of TNMMCR, 1959.

c) **Preparation and Submission of Mining Plan:** The Mining Plan with final quarry closure plan has been prepared under rule 41 and submission under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 as per precise area communication letter **Roc.No. A/G&M/93/2023 dated 09.10.2023.**

d) **Geological resources and Mineable reserves:** Geological resource of Ordinary Earth ar10e estimated as **38714m^3** up to depth of 2.0m below ground level. Mineable reserves of Ordinary Earth are estimated about **22810m^3** up to depth of 2.0m below ground level.

e) **Proposed Production Schedule:** Total Proposed production of Ordinary Earth are **22810m^3** up to a depth of 2.0m below ground level.

f) **Environmental Sensitivity of the proposed lease area: -**

a). **Interstate boundary:** There is no interstate boundary found within radius of 10Km. The union territory of Pondicherry boundary is Situated about 0.62Km away on southeast side.

b). **Wildlife Protection Act, 1972:** There is Ossudu lake bird sanctuary within 9.64Km radius from the project site area under the wildlife (Protection) Act, 1972.

c). **Indian Reserve Forest Act, 1980:** There is no reserve forest found within radius of 1km. The nearest reserved forest is Melkondai R.F – 15.2km - West side from the lease area.

d). **CRZ Notification, 2019:** There is no Sea coastal zone found within 10km radius and this project site doesn't attract CRZ Notification,2019.

g) Environmental measures to be adopted shall be during the ongoing activity period,

i) Dust suppression at loading point and transport haul roads,

ii) Emission test of vehicles should be in stack to maintain minimum emission level of flue gases.

iii) Noise level should not exceed 58db and the vehicles should use only permitted Air Horn while on road near residential areas.

iv) And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	**Name of the Applicant**	:	Mr.S.Vasantharaj
	Applicant address	:	S/o. Selvaraj, No.477, M.G Road, Ramakrishna Nagar, Muthialpet, Puducherry - 605003.
	District	:	Puducherry
	State	:	Tamilnadu
	Pin code	:	605003
	Phone	:	9786035757
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	Nil
b.	**Status of the Applicant**		
	Private individual	:	Private individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---
c.	**Mineral(s) Which are occurring in the area and which the applicant intends to mine**	:	Ordinary Earth quarry lease
d.	**Period for which the mining lease granted /renewed/ proposed to be applied**	:	Permission for excavation of Ordinary Earth lease request for the period of two (2) years to the Deputy Director, Department of Geology and Mining, Viluppuram.
e.	**Name of the Qualified Person**	:	**Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,**
	Address	:	**Geo Technical Mining Solutions** (A NABET Accredited & ISO certified Company) No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office,Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	Nil
	Registration Number	:	Nil
	Date of grant/renewal	:	Nil

	Valid upto	:	Nil
f.	Reference No. and date of consent letter from the state government	:	The precise area communication letter issued by the Deputy Director, Department of Geology and Mining, Viluppuram vide **Roc. No. A/G&M/93/2023 dated 09.10.2023**

2.0 LOCATION AND ACCESSIBILITY:

a.

Details of the Area	:	Refer plate no: I, IA & IB,
District & State	:	Viluppuram, Tamil Nadu
Taluk	:	Vanur
Village	:	Kondalankuppam

Khasra No./ Plot No./ Block Range / Felling Series etc.:

Survey No.	Sub division	Total Extent in Hect.	Patta No.	Village and Name of the land owner	Mine lease Applied S.F. No.	Mine lease Applied Area out of total area in Hect.
71	2	0.93.5	572	Mr.S.Vasantharaj S/o. Selvaraj	71/2	0.93.5
88	1	1.00.0			88/1	1.00.0
Total Extent		**1.93.5**		**Applied lease area extent**		**1.93.5**

Lease area (hectares)	:	1.93.5 hectares
Whether the area is recorded to be in forest (please specify whether protected,reserved etc.)	:	The proposed lease area is recorded as patta land (Ref. Annexure No: IV)
Ownership / Occupancy	:	This is a Patta land of S.F.No's: 71/2 & 88/1 is registered in the name of Mr. S.Vasantharaj S/o. Selvaraj vide patta No. 572.
Existence of Public Road /Railway line if any nearby and approximate distance	:	➢ Exploited Ordinary Earth materials will be transported through the south side from the site. ➢ The SH-136 road is situated about 2.14km away on north side. ➢ The MDR-808 road is situated about 3.26km away on West side. ➢ There is no NH road and railway line is situated around 5km radius. ➢ There is no railway line situated around 5km radius from the site.

Toposheet No. with latitude and longitude: SOI Toposheet No. 57 P/12

Geo-Coordinates of the lease boundary pillar:

PILLAR ID	LATITUDE	LONGITUDE
1	12° 2'23.19"N	79°41'21.41"E
2	12° 2'21.98"N	79°41'20.91"E
3	12° 2'22.42"N	79°41'18.97"E
4	12° 2'22.67"N	79°41'17.43"E
5	12° 2'19.90"N	79°41'16.53"E
6	12° 2'20.18"N	79°41'15.22"E
7	12° 2'18.66"N	79°41'14.74"E
8	12° 2'19.22"N	79°41'11.19"E
9	12° 2'20.12"N	79°41'11.36"E
10	12° 2'21.56"N	79°41'13.52"E
11	12° 2'22.97"N	79°41'15.45"E
12	12° 2'23.79"N	79°41'16.31"E
13	12° 2'23.67"N	79°41'17.33"E
14	12° 2'23.97"N	79°41'17.58"E

	Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is a vrigin land
b).	***Attach a general location and vicinity map showing area boundaries and existing and proposed access routes. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.***	:	Refer plate no-IA & IB

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	V.Parangani	2.25Km	North
b.	Nearest police station	Katterikuppam	5.24Km	Southeast
c.	Nearest fire station	Vanur	4.30km	East
d.	Nearest Medical facility	Vanur	4.64Km	East
e.	Nearest school	V.Parangani	2.0Km	North
f.	Nearest Railway station	Chinna Babu samudram	12.9km	South
g.	Nearest port facility	Chennai	132.5km	North
h.	Nearest Airport	Puducherry	15.9km	Southeast
i.	Nearest DSP office	Kottakuppam	11.5km	East
j.	Nearest Villages	Parankani	1.7km	North
		Ramanathapuram	1.73km	Nort east
		Kondalamkuppam	0.98km	Southwest
		Thollamur	1.16km	West

PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

(a) Briefly describe the topography and general geology and local/mine geology of the mineral deposit including drainage pattern:

(i)	Topography	:	The proposed lease area almost flat topography and the maximum elevation (80.0m AMSL) and falls in Toposheet no. 57 P/12.

(ii) **a) Geology of the District:**

A greater part of the district is covered by rocks belonging to Archaean age comprising the charnockite Group, the migmatite Complex, Sathyamangalam Group and the Bhavani Group and alkali complex of Proterozoic age. West of Kallakurichi (Southwestern part of the district), the area comprises the Charnockite Group of rocks viz. Charnockite, pyroxene-granulite and garnetiferous gabbro. West of Tirukoilur (central part of the district) and east of the charnockite terrain (i.e., Kallakurichi area) the Migmatite complex is made up of Hornblende -biotite gneiss. Pink augen gneiss and pink migmatite with younger instructions of Tindivanam and Gingee Granites (2250 Ma) and basic dykes (Proterozoic). The migmatite complex forms the major country rock of the area covering more than sixty percent and extending towards east upto vikravandi, south of Gingee. Epidote-hornblende gneiss (Proterozoic age) occurs as small isolated outcrops. Dolerite dykes form the youngest basic instrusives traversing both charnockite as well as the migmatite equally. Overlying the Archaeans are the marine fossiliferous upper, cretaceous and palaeogene formations occurring in two separate sub basins separated by thick cover of alluvial sediments deposited by gadilam and pennaiyar rivers. The two sub-basins are recognized as virudhachalam sub-basin and Pondicherry sub-basin.

The generalized Geology of the district is as follows:

Recent and sub-recent	Soil
	Alluvium
	Laterite
Mio-Pliocene	Cuddalore sandstone with intercalations of clay, shale and pebble bed
Lower Jurassic (Upper Gondwana)	Shales and sandstones
Archaean	Basic dykes, pegmatites and quartz

		veins	
		Granites	
		Norites	
		Charnockite rocks	
		Garnet plagioclase and pyroxene plagioclase rock (Anorthosite)	
		Talc Rock (altered ultrabasic rock)	
		Talc – Chlorite- Epidote Rock	
		Sillimanite – Quartzite	
		Magnetite Quartzite	
		Hornblende granulites and amphibolites	

(iii) **i) Regional Geology of the proposed area:**

i) Topography of the proposed lease area:

The proposed lease area almost flat topography and the maximum elevation (80.0m AMSL).

Ordinary Earth combination of fines properties is obviously dominated by those respective fractions. The Surface plan showing contour, accessibility road and Geological map was prepared the proposed lease area.

ii) Mode of origin:

Ordinary Earth combination of fines deposited by patta land. Thus, the parent material of these soils is old crystalline igneous and metamorphic rocks weather to form Ordinary Earth. It is red in color because it is iron-rich. **Order of superposition of the proposed lease area,**

Age	Group	Rock Formation
Recent to Sub recent	----	Ordinary Earth (0-2m thick)

(iv)	Drainage Pattern	:	It is a patta land. The drainage pattern of the area is sub-dendritic in nature.

(b)	***The topographic plan of the lease area prepared on a scale of 1:1000 or 1: 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:***		
	a. Present status	:	No exploration carried out. It is a patta land with covered with red soil deposit. Hence, the QP personally examined during mining survey.
	b. Surface Plan	:	Surface plan showing contour and accessibility road was prepared at the scale of 1: 1000, as shown in Plate No.III.

(c)	Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	:	Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:500, as shown in Plate No.III

(d) ***Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next year's as in table below:-***

Year	No. of boreholes	Total meterage	No. of Pits and Dimensions	No. of Trenches and Dimensions
2 years	N.A	---	---	N.A

No future exploration programmed is proposed in this area. It's a loose soil not required to this mining project.

(e) ***Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.***

The Geological resources are calculated by cross sectional method.

The Geological resources is estimated as cross sectional method are following

Geological Resources				
Section	**Length in (m)**	**Width in (m)**	**Depth in (m)**	**Red Earth in m^3**
XY-AB	117	78	2	18252
XY-CD	65	89	2	11570
X1Y1-EF	38	117	2	8892
Total				**38714**

(f) ***Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters.***

The mineable reserves of Ordinary Earth estimated as **22810m^3** up to depth of 2.0m below ground level and the commercially viable Ordinary Earth has been prepared on 1: 1000 Scales. Sections are prepared as scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Plate No's. V).

Mineable Reserves				
Section	**Length in (m)**	**Width in (m)**	**Depth in (m)**	**Earth in m^3**
XY-AB	108	58	1.5	9396
	104	50	0.5	2600
XY-CD	56	68	1.5	5712
	52	61	0.5	1586
X1Y1-EF	20	99	1.5	2970
	12	91	0.5	546
Total				**22810**

4.0 MINING:

a. Briefly describe the existing/ proposed method for developing / working the deposit with all design parameters.

It is a fresh quarry lease. The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only. It is being loose in nature. No drilling or blasting is proposed for this type of Ordinary Earth quarry lease; it is an eco-friendly quarrying operation.

Machineries like hired tippers and excavator combination will be adapted for transportation to the customer.

b. Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.

Period	Pit No.(s)	Topsoil/ Overburden (m^3)	ROM (m^3)	Saleable Ordinary Earth (m^3)	Sub grade/ Weathered rock in (m^3)	Rejects (m^3)	Ore to Waste ratio
I[st] Year	I	---	15512	15512	---	---	1.0
II[nd] Year	I	---	7298	7298	---	---	---
Total	**---**	**---**	**22810**	**22810**	**---**	**---**	**---**

c. i) Composite plans and Yearwise sections (In case of 'A' class mines):

Not applicable

ii) Composite plans and Yearwise sections (In case of 'B' class mines):

The average proposed rate of production of Ordinary Earth as under.

Yearwise Production Reserves					
Year	**Section**	**Length in (m)**	**Width in (m)**	**Depth in (m)**	**Red Earth in m^3**
I	**XY-AB**	108	58	1.5	9396
		104	50	0.5	2600
	X1Y1-EF	20	99	1.5	2970
		12	91	0.5	546
Total					15512
II	**XY-CD**	56	68	1.5	5712
		52	61	0.5	1586
Total					7298
Grand Total					**22810**

d.	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	It is a fresh quarry lease (Refer Plate No: III)
e.	***Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:*** At this rate of production, the expected life of quarry is calculated as given below: Mineable reserves of Ordinary Earth = **22810m³**		
f.	***Attach a note furnishing a conceptual mining plan for the entire lease period (for" B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:***		
(i)	Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame:	:	Considering the indefinite depth persistence of the Ordinary Earth deposit is proved beyond the workable limits about 2.0m depth of below ground level
(ii)	Whether ultimate pit limit has been determined and demarcated on surface and geological plan:- The ultimate pit limit has been determined & demarcated in the conceptual plan		

Pit	Overburden/ Mineral	Length (m)	Width (m)	Depth (m)
I	Ordinary Earth	108	58	1.5
		104	50	0.5
		56	68	1.5
		52	61	0.5
		20	99	1.5
		12	91	0.5

(iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long-term use in the event of continuation of mining activity: -	:	There is no waste will be proposed in this lease area.
(iv)	Whether back filling of pits after recovery of mineral upto	:	May not continue for further quarrying depth and do not backfill the quarry pit.

	techno-economically feasible depth envisaged. If so, describe the broad features of the proposal:-		
(v)	Whether post mining land use envisaged: -	:	At the end of mining activities, the quarried-out land will be leveled and using for agricultural activity purposes.
g.	***Open cast Mines:***		
(i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	:	The mining operation is open-cast, semi-Mechanized methods are adopted and on single shift basis only. It is being loose in nature no drilling or blasting is proposed for this type of Ordinary Earth quarry lease; it is an eco-friendly quarrying operation. Machineries like tippers and excavator combination will be adapted for transportation to the needy destination for construction purpose in and around the district.
(ii)	Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/ waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice	:	The Ordinary Earth is proposed to quarry at 2.0m depth of below ground level opencast semi-mechanized method.
	a. Details of Topsoil / Overburden	:	There is no topsoil will be removed.
	b. Gravel waste and side burden waste: -	:	It is Ordinary Earth lease quarry. There is no waste or side burden removed.
h.	***Underground Mines:***	:	It is a simple open cast, eco-friendly quarry operation only.
i.	***(a) Extent of mechanization:*** Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used lease area.		

(1) Drilling Machines:

It is being loose in nature no drilling is proposed for this type of Ordinary Earth quarrying; it is an eco-friendly quarrying operation.

(2) Loading Equipment:

1 JCB (0.60m^3 capacity, Diesel Drive) and tippers (15 tons capacity) utilized for transport and deliver to road making area.

(3) Haulage and Transport Equipment

(a) Haulage within the mining lease hold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	4	15T	---	Diesel	--

Whether the dumpers are fitted with exhaust conditioner should be indicated:

The dumpers are not used in this quarry; hence it's a small B2 category of Ordinary Earth quarry.

(b) Transport from mine head to the destination	:	The Ordinary Earth will be loaded directly to the tippers for transportation to the customer.
c. Describe briefly the transport system (please specify)	:	The hired tipper and excavator will be used for carrying out day to day mining activities on the day basis or hourly basis as per market scenario.
d. Ore transported by: own trucks / hired trucks	:	Hired excavator and tippers
e. Main destination to which ore is transported (giving to and from distance)	:	The excavated Ordinary Earth materials will be used to transport to the customer.

f. Details of hauling / transport equipment:

Not applicable

(4). Miscellaneous:

Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.

(A) Operations	:	The mining operation is open-cast, semi-Mechanized methods are adopted and on single shift basis only.

	(B) Machineries deployed	:	Machineries like JCB (0.60m^3 capacity Diesel Drive) and tipper combination are adapted.
5.	**BLASTING:** ***a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.*** It is being loose in nature no blasting is proposed for this type of Ordinary Earth quarrying; it is an eco-friendly quarrying operation.		
	b) Type of explosives used / to be used: Not applicable		
	c) Powder factor in ore and overburden / waste / development heading / stope	:	Not applicable
	d) Whether secondary blasting is needed, if so describe it briefly	:	Not applicable
	e) Storage of explosives (like capacity and type of explosive magazine)	:	There is no stock dumped along lease area.
6.	***MINE DRAINAGE***		
	a) Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 25m in summer and 20m in rainy season from the general ground level in the adjacent open wells of the area.
	b) Workings expected to be _____ m. above / reach below water table by the year _____.	:	Proposed mining depth is 2.0m below ground level below from the general ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.

	c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	The ground water may not rise immediately in this type of mining.
7.	***STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:***		
	a) Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the plan periods: There is no separate of topsoil or overburden are removed.		
	b) Land chosen for disposal of waste with proposed justification	:	There is no any waste will be disposed from this lease area.
	c) Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Yearwise.	:	No stacked mineral or sub grade mineral dumps proposed.
8.	***USE OF MINERAL:***		
	a) Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated Ordinary Earth materials will be used transport to the customer.
	b) Indicate physical and chemical specifications stipulated by buyers	:	No mineral, Sub-grade, Rejects are process are involved.
	c) Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after exploited the Ordinary Earth will be directly loaded to the customer.
9.	***OTHERS***		
	Describe briefly the following a) Site services	:	Infrastructure required for such mines like semi sanitary facilities and first aid station, have been provide as per the

			Metalliferous Mines Regulations, 1961 as a welfare amenity for quarry laborers. All the quarry workers will be provided with safety helmets, ear muffs, Dust mask, reflector jackets and Safety Shoes as personal protective device as per the specification of Director of Mine Safety.

b) Employment potential:

The following man power is proposed for the Ordinary Earth quarrying to carry out the day-to-day quarrying activities, aimed at the proposed production target and also to comply with the statutory provisions of the Government norms.

1.	Skilled	Excavator operator	1
2.	Semi – skilled	Driver	4
3.	Unskilled	Cleaners	2
4.	Management & Supervisory staff		1Nos
		Total =	**8Nos**

10	**MINERAL PROCESSING/BENEFICIATIONS:**		
	a) If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	:	No processing/ beneficiations of the ore or minerals mined. The excavated Ordinary Earth materials will be used for transport to the customer.
	b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	:	No Waste shall be proposed.

	c) A flow sheet or schematic diagram of the processing procedure should be attached.	:	Not applicable
	d) Specify quantity and type of chemicals to be used in the processing plant.	:	Not applicable
	e) Specify quantity and type of chemicals to be stored on site / plant.	:	Not applicable
	f) Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.	:	Drinking & utilized water is 1.0 KLD, Dust suppression is 0.5KLD and Green Belt is 0.5KLD. Minimum quantity of water 2.0KLD per day has to be maintained. Drinking water will be brought from the authorized water suppliers and dust suppression, Green belt has got water tank.

PART – B

11.0 ENVIRONMENTAL MANAGEMENT PLAN :

a) **Attach a note on the status of baseline information with regard to the following**

11.1 It's a barren and with covered with clayey soil formation, does not sustain any type of vegetation. The present and proposed land use pattern is given as under

S. No	Land Use	Present Area (Hect)
1.	Under quarrying area	Nil
2.	Infrastructure	Nil
3.	Roads	Nil
4.	Unutilized area	1.93.5
5.	Green belt	Nil
6.	Drainage & settling tank	Nil
	Total	**1.93.5**

11.2	Water Regime	:	Water table in this area is noticed at a depth of 25m in summer and 20m in rainy season from general ground level. Drinking water will be brought from the authorized water suppliers and dust suppression, green belt has got water tank.
11.3	Flora and Fauna	:	There is no major flora found in this area. No other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.
11.4	Quality of air, ambient noise level and water	:	This eco-friendly quarrying operation does not involve any blasting and drilling methods; hence noise will be minimal and this is only due to the movement of excavator and tippers combination.
11.5	Climatic conditions	:	The area enjoys humid and tropical climate with hot summers, significant to slight winters and sensible to heavy rainfall. The normal annual rainfall over the area is 1230 mm. Temperature ranges between 40.6 to 19.3° C with piercing fall in night temperatures during monsoon season.

11.6	Human Settlement: The nearest villages are found in the buffer zone with population as per 2011 census.		

Village	Direction	Distance in Km	Population
Parankani	North	1.7km	1251
Ramanathapuram	Norteast	1.73km	3336
Kondalamkuppam	Southwest	0.98km	353
Thollamur	West	1.16km	1419

11.7	Public buildings, places of worship and monuments	:	No infrastructure like residential building, places of special interest like archeological monuments, etc., are found around 10km radius.
11.8	Attach plans showing the locations of sampling stations	:	The proposed Ambient air quality, Water quality Ambient noise level is periodically tested for one season around 1km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	:	The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

b) Attach an Environmental Impact Assessment Statement describing the impact of Mining and beneficiation on environment on the following over the next years (and upto conceptual plan period for 'A' category mines)

i) ***Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc:***

The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

S. No	Land Use	Area in use during the quarrying period (Hect)
1.	Under quarrying area	1.30.23
2.	Infrastructure	0.02.0
3.	Roads	0.03.0
4.	Un-utilized	Nil
5.	Green belt	0.50.44
6.	Drainage & Settling Tank	0.07.83
	Total	**1.93.5**

ii).	Air Quality		In this eco-friendly quarrying operation only, Excavator are proposed without drilling and blasting, hence the air quality will not affect due to the quarrying operation, water will be sprinkled in the haul roads periodically to suppress dust Ambient Air Quality monitoring will be carried out to check the Quality of Air in and around the quarry. During transportation the Ordinary Earth will be fully covered by Tarpaulin to prevent dust and spillage.
iii).	Water quality		The water quality will not be affected for this mining operation because the depth of the mining is only 2.0m below ground level. In the lease area there is no water bodies and also the mining plan prepared based on TNMMCR 1959.
iv).	Noise levels		This eco-friendly quarrying operation does not involve any blasting and drilling methods; hence noise will be minimal and this is only due to the movement of excavator and tippers combination.
v).	Vibration levels (due to blasting)		No Blasting
vi).	Water regime		The quarry operation does not intersect the water table as the approved depth of mining is 2.0m below ground level.
vii).	Socio-economics		1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.		There are no historical monuments, etc found around 10km radius.

c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

i).	Temporary storage and utilization of topsoil	:	No separate of topsoil removed and Ordinary Earth will be quarry right from surface level itself.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and up to conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries / pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water is given.	:	The present mining is proposed to an average depth of 2.0m below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The quarried-out land will be leveled and agricultural usage. The applicant ensures to level the floor of the area after quarrying.

iii). ***Programmed of afforestation, Year wise for the initial years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.***

Safety barrier, school and nearest panchayat roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan, Coconut and other regional trees will be planted in a phased manner as described below

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	5827	650	80%	@100 Rs Per sapling	65,000/-
	Nearby Village Road	--	200	80%		20,000/-
	Schools	--	100	80%		10,000/-
					Total	**95,000/-**

iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and up to conceptual plan period for 'A' category mines).	:	There is no other quarry waste removed. To remove Ordinary Earth only.

v).	Measures to control erosion / sedimentation of water courses.	:	There is no major dump are proposed.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses.
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	In this Eco-friendly quarrying operation only, Excavator are proposed without drilling and blasting, hence the air quality will not affect due to the quarrying operation, water will be sprinkled in the haul roads periodically to suppress dust.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

d). Monitoring schedules for different environmental components after the commencement of mining and other related activities. (For 'A' category mines only)

Not applicable. It is B2 category quarry

12.0 FINAL QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The present mining is proposed to an average depth of 2.0m below ground level. After completion of Ordinary Earth quarrying area will be utilized agricultural purposes.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. Green belt development at the rate of 950 trees will be proposed in this mining lease period like lease boundary, School, Haul Road and nearby village roads, etc.

12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	It is a patta land and loose soil. No mitigation measures to be undertaken.
12.4	Mine closure activity	:	The present mining is proposed to a depth of 2.0m below ground level. After completion of Ordinary Earth quarrying area will be utilized agricultural purposes.
12.5	Safety and security	:	Safety like helmet, safety shoes, Dust mask, etc have to be provided as per the circulars and amendments made for Mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Open cast mining method is adopted in this quarry. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine, etc., to give first aid treatment at the site and will arrange immediately.
12.7	Care and maintenance during temporary discontinuance	:	During temporary discontinuance the working place will be fenced completely and a board of discontinuance will be changed on the main entrance of the working place.
12.8	Economic repercussions of closure of quarry and man power entrenchments	:	The employment potential will be generated, general financial status and socio-economic conditions of approx. 8 labors will be improved.

12.9 Proposed Financial Estimate / Budget for (EMP) Environment Management:

A	**Fixed Asset Cost**:		
	1. Land Cost	:	Rs. 4,78,000/-
	2. Labours Shed (Temporary)		Rs. 15,000/-
	3. Sanitary Facility	:	Rs. 15,000/-
	4. Fencing	:	Rs. 2,50,000/-
	5. Other expenses	:	Rs. 10,000/-
	Total	:	**Rs. 7,68,000/-**
B	**B. Machinery cost**	:	**Rs. 4,00,000/-** (Hire Basis)
C	**Total Expenditure of EMP cost** (for two years)		
	1. Drinking Water Facility	:	Rs. 20,000/-
	2. Sanitary facility & Maintenance	:	Rs. 10,000/-
	3. Permanent water sprinkler	:	Rs. 30,000/-
	4. Afforestation and maintenance	:	Rs. 95,000/-
	5. Safety Kits	:	Rs. 10,000/-
	6. Provision of tyre washing facility	:	Nil
	7. Surface runoff management structures like garland drain, settling pond & Bund	:	Nil
	8. Blasting materials with blast mat cost	:	Nil
	9. Environment monitoring	:	Rs. 2,00,000/-
	Total	:	**Rs. 3,65,000/-**
D	**Total Project Cost (A+B)**	:	**Rs. 15,33,000/-**

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 Ordinary Earth quarry.

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

1. Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
2. Permission will be obtained from the District Mines Office to extract the Ordinary Earth only.
3. The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued on letter **Roc.No. A/G&M/93/2023 dated 09.10.2023**
4. The proposed quantity of Ordinary Earth is **22810m^3** up to a depth of 2.0m below ground level for two years period.

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17.0 CER Expenditure:

CER (Corporate Environment responsibility) will assure by the applicant at the time of appraisal before State Expert Appraisal Committee (SEAC) as per the office memorandum issued date 30th September, 2020 by Ministry of Environment, Forest and Climate Change Impact Assessment Division.

11 OCT 2023

Place: Dharmapuri, TN

Date: 10/10/23

Dr.S.KARUPPANNAN.M.Sc.,Ph.D.,
Qualified Person
GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 Certified Company
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705

This mining plan is approved based on the instructions and guidelines issued by the Commissioner of Geology and Mining, Chennai vide letter Rc.No.3868/MC/2012, dated: 19.11.2012 and based on incorporation of the conditions laid by the Deputy Director of Geology and Mining, Viluppuram in precise area communication letter Rc. No. MGM/93/2023 dated: 9/10/2023

Date: 11.10.2023

Deputy Director,
Geology and Mining,
Viluppuram.

11/10/23

11.10.23 11/10/23

ANNEXURE-I

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ந.க.எண். அ/புவி (ம) சுர/93/2023
நாள்: 09.10.2023

துணை இயக்குநர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை
விழுப்புரம்.

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - விழுப்புரம் மாவட்டம் - வானூர் வட்டம் - கொண்டலாங்குப்பம் கிராமம் - பட்டா புல எண்கள். 71/2 (0.93.5) மற்றும் 88/1 (1.00.0) ஆகியவற்றின் மொத்த பரப்பு 1.93.5 ஹெக்டேர் ஹெக்டேர் பரப்பளவில் இரண்டாண்டுகளுக்கு சாதாரண மண் குவாரி குத்தகை உரிமம் வேண்டி திரு.S.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவர் விண்ணப்பம் செய்தது - புல எண்கள். 71/2 (0.93.5) மற்றும் 88/1 (1.00.0) ஆகியவற்றின் மொத்த பரப்பு 1.93.5 ஹெக்டேரில் குவாரி குத்தகை உரிமம் வழங்க பரிந்துரை செய்து அறிக்கை வரப்பெற்றுள்ளது - தகுதியான நிலப்பரப்பாக கருதி ஏற்பளிக்கப்பட்ட சுரங்க திட்டம் மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய இசைவிணை பெற்று சமர்பிக்கக் கோருதல் - தொடர்பாக.

பார்வை:
1. திரு.S.வசந்தராஜ் த/பெ.செல்வராஜ்,நெ.477, M.G.ரோடு, ராமகிருஷ்ணா நகர், முத்தியால்பேட்டை, புதுச்சேரி என்பவரது விண்ணப்பம் நாள். 24.07.2023.
2. விழுப்புரம் வருவாய் கோட்டாட்சியர் கடித எண். ந.க.அ4/3257/2023, நாள்: 10.09.2023.
3. விழுப்புரம் மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர் அவர்களின் புலத்தணிக்கை அறிக்கை நாள்: 06.10.2023.
4. The Principal, Government College of Engineering, Dharmapuri – 636 704 letter No.:GCE/DP1/CIVIL/SOIL/2023/C- 181 Dated 09.10.2023.

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புதுச்சேரி, முத்தியால்பேட்டை, ராமகிருஷ்ணா நகர், நெ.477, M.G.ரோடு, திரு.S.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவர் வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், பட்டா புல எண்கள். 71/2 (0.93.5) மற்றும் 88/1 (1.00.0) ஆகியவற்றின் மொத்த பரப்பு 1.93.5 ஹெக்டேர் பரப்பளவில் மூன்றாண்டுகளுக்கு சாதாரண மண் வெட்டியெடுக்க குவாரி குத்தகை அனுமதி கோரி பார்வையில் கண்ட விண்ணப்பத்தினை சமர்ப்பித்துள்ளார்.

மேற்படி விண்ணப்பம் தொடர்பாக, விழுப்புரம் வருவாய் கோட்டாட்சியர் மற்றும் உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, விழுப்புரம் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு விழுப்புரம் மாவட்டம், வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், புல எண்கள். 71/2 (0.93.5) மற்றும் 88/1 (1.00.0) ஆகியவற்றின் மொத்த பரப்பு 1.93.5 ஹெக்டேர் பட்டா நிலத்தில் திரு.S.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவருக்கு சாதாரண மண் குவாரி உரிமம் வழங்க கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

i. விண்ணப்ப புலங்களின் அருகிலுள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளியும், அருகிலுள்ள அரசு புறம்போக்கு நிலங்களுக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளியும் விட்டு குவாரி பணி செய்ய வேண்டும்.

ii. குவாரிப்பணி மேற்கொள்ளும் போது அருகிலுள்ள பட்டா நிலங்கள் மற்றும் அரசு புறம்போக்கு நிலங்கள் மற்றும் ஓடைக்கு எவ்வித இடையூறும் இல்லாமல் குவாரிப்பணி செய்ய வேண்டும்.

iii. குவாரி குத்தகை வழங்கும் முன்பு விண்ணப்பித்துள்ள இடத்தினை சுற்றி கம்பி வேலி அமைத்து DGPS சர்வே பணி மேற்கொண்டு அதன் அறிக்கையை சமர்பிக்க வேண்டும்.

iv. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி-41ன்படி தகுதிவாய்ந்த நபரால் சுரங்க திட்டம் தயார் செய்து துணை இயக்குநர் அவர்களின் ஒப்புதல் பெறவேண்டும்.

v. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி-42ன்படி மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்திடமிருந்து சுற்றுச்சூழல் சான்று பெற்று சமர்பிக்கப்படவேண்டும்.

பார்வை 4-ல் காணும் தருமபுரி அரசு பொறியியல் கல்லூரி, பேராசிரியர் அவர்களின் அறிக்கையில் மேற்படி புலத்தில் இருந்து எடுக்கப்பட்ட மண்ணினை பகுப்பாய்வு செய்யப்பட்டு அறிக்கை பெறப்பட்டுள்ளது.

எனவே, விழுப்புரம் வருவாய் கோட்டாட்சியர் மற்றும் உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, விழுப்புரம் ஆகியோரின் பரிந்துரை மற்றும் நிபந்தனைகளின் அடிப்படையில், விழுப்புரம் மாவட்டம், வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், புல எண்கள். 71/2 (0.93.5) மற்றும் 88/1 (1.00.0) ஆகியவற்றின் மொத்த பரப்பு 1.93.5 ஹெக்டேர் பரப்பில் 1959-ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண்.19-ன்படி மேற்கண்ட நிபந்தனைகளுக்குட்பட்டு 2 (இரண்டு) வருட காலத்திற்கு திரு.S.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவருக்கு சாதாரண மண் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.

அதனடிப்படையில், தமிழ்நாடு சிறு கனிம சலுகை விதிகள்-1959 விதி எண். 41-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கத் திட்டத்தினை தகுதிவாய்ந்த நபர் (QP) மூலமாக கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு தயாரித்து அதனை 90 தினங்களுக்குள் துணை இயக்குநர் (புவியியல் மற்றும் சுரங்கத்துறை) அவர்களின் பரிசீலனைக்கு சமர்ப்பிக்குமாறு விண்ணப்பதாரர் கேட்டுக்கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-ன் படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

i. விண்ணப்ப புலங்களின் அருகிலுள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளியும், அருகிலுள்ள அரசு புறம்போக்கு நிலங்களுக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளியும் விட்டு குவாரி பணி செய்ய வேண்டும்.

ii. குவாரிப்பணி மேற்கொள்ளும் போது அருகிலுள்ள பட்டா நிலங்கள் மற்றும் அரசு புறம்போக்கு நிலங்கள் மற்றும் ஓடைக்கு எவ்வித இடையூறும் இல்லாமல் குவாரிப்பணி செய்ய வேண்டும்.

iii. குவாரி குத்தகை வழங்கும் முன்பு விண்ணப்பித்துள்ள இடத்தினை சுற்றி கம்பி வேலி அமைத்து DGPS சர்வே பணி மேற்கொண்டு அதன் அறிக்கையை சமர்பிக்க வேண்டும்.

09/10/18

துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
விழுப்புரம்.

பெறுநர்
திரு.S.வசந்தராஜ்,
த/பெ.செல்வராஜ்,
நெ.477, M.G.ரோடு,
ராமகிருஷ்ணா நகர்,
முத்தியால்பேட்டை,
புதுச்சேரி.

09/10/18

நகல்:-
1. மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம், சென்னை.
2. ஆணையர், புவியியல் மற்றும் சுரங்கத்துறை, கிண்டி, சென்னை.

ANNEXURE - II

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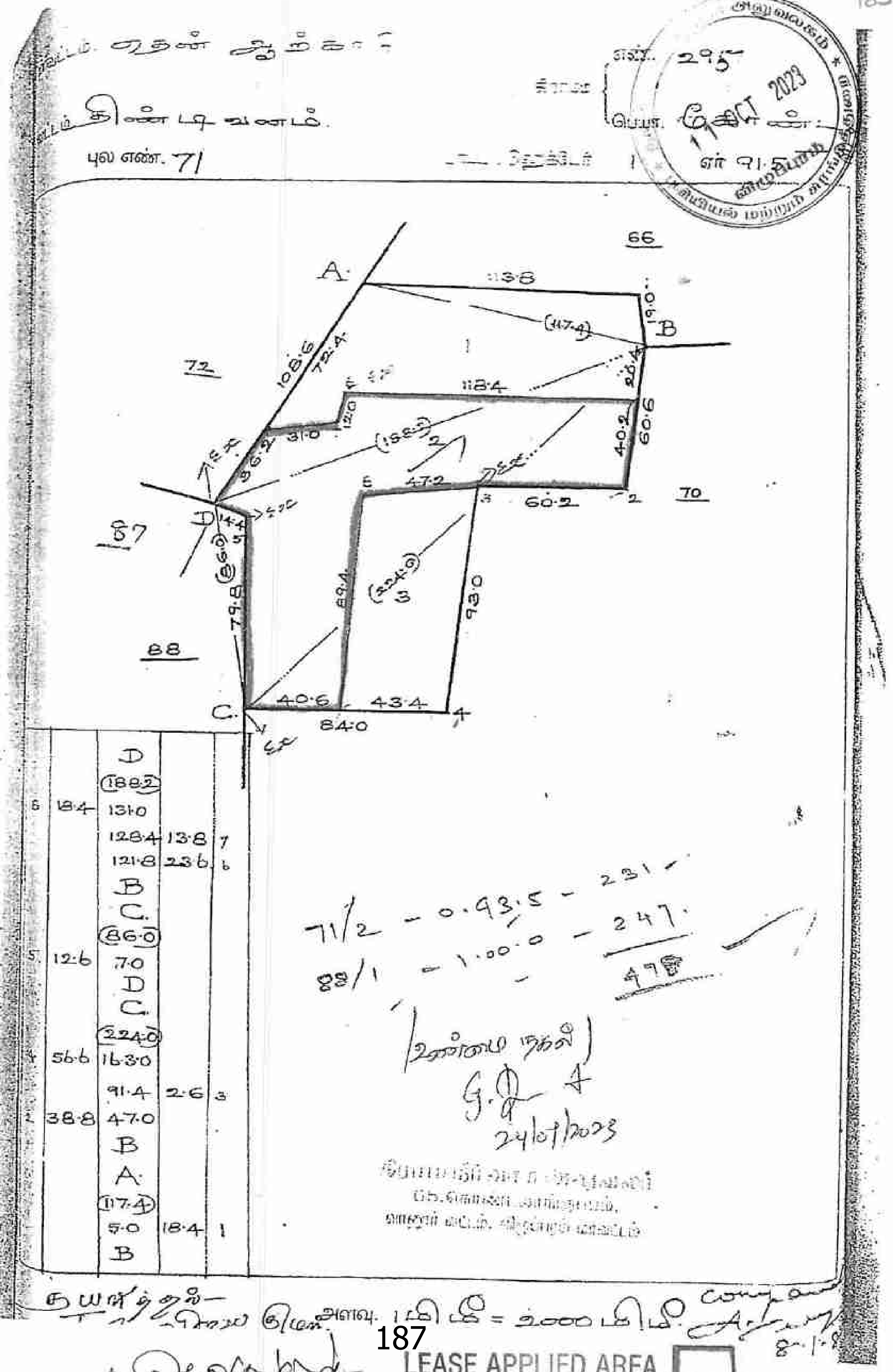

LEASE APPLIED AREA

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மாவட்டம். தென் ஆற்காடு

வட்டம். திண்டிவனம்.

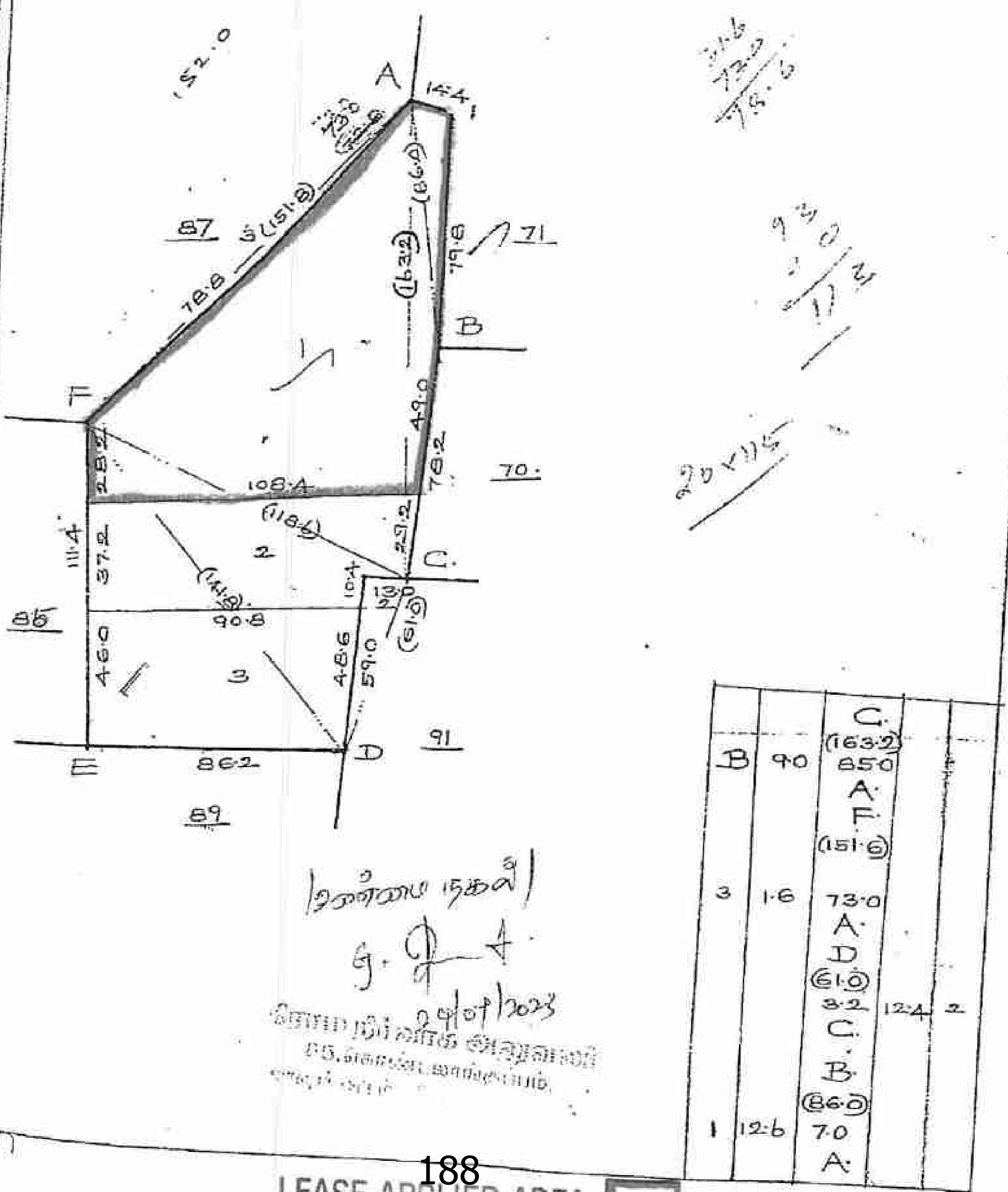
புல எண். 88.

அளவைப்படிவ. எண் 23

11 OCT 2023

கிராமம் { எண். 295 ; பெயர். ...

பரப்பு : ஹெக்டேர் 1 ... ஏர். 820.



LEASE APPLIED AREA

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ANNEXURE - III

11 OCT 2023

அ-பதிவேடு விவரங்கள்

மாவட்டம் : விழுப்புரம்

வட்டம் : வானூர்

கிராமம் : கொண்டாலங்குப்பம்

1. புல எண்	**71**	9. மண் வயனமும் ரகமும்	**8 - 5**
2. உட்பிரிவு எண்	**2**	10. மண் தரம்	**8**
3. பழைய புல உட்பிரிவு எண்	**71-2**	11. தீர்வை (ரூ - ஹெ)	**2.00**
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	**0 - 93.50**
5. அரசு / ரயத்துவாரி	**ரயத்துவாரி**	13. மொத்த தீர்வை (ரூ - பை)	**1.87**
6. நிலத்தின் வகை	**புஞ்சை**	14. பட்டா எண்	**572**
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	**1.வசந்தராஜ்**

குறிப்பு 1:

1.	மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **http://eservices.tn.gov.in** என்ற இணைய தளத்தில் **80544** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

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அ-பதிவேடு விவரங்கள்

மாவட்டம் : விழுப்புரம்

வட்டம் : வானூர்

கிராமம் : கொண்டாலங்குப்பம்

1. புல எண்	88	9. மண் வயனமும் ரகமும்	8 - 5
2. உட்பிரிவு எண்	1	10. மண் தரம்	8
3. பழைய புல உட்பிரிவு எண்	87-1	11. தீர்வை (ரூ - ஹெ)	2.00
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	1 - 0.0
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	2.00
6. நிலத்தின் வகை	புஞ்சை	14. பட்டா எண்	572
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	1.வசந்தராஜ்

குறிப்பு 1:

	1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **http://eservices.tn.gov.in** என்ற இணைய தளத்தில் **90544** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

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ANNEXURE-17

11 OCT 2023

தமிழக அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : விழுப்புரம் வட்டம் : வானூர்

வருவாய் கிராமம் : கொண்டாலங்குப்பம் பிட்டா எண் : 572

உரிமையாளர்கள் பெயர்

1. செல்வராஜ் மகன் வசந்தராஜ்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
71	2	0 - 93.50	1.87	--	--	--	--	2023/0103/07/340418---- 20-07-2023
88	1	1 - 0.0	2.00	--	--	--	--	2023/0103/07/340418---- 20-07-2023
		1 - 93.50	3.87					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **07/02/065/00572/60544** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 16-10-2023 அன்று 05:40:41 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

ANNEXURE-V

11 OCT 2023

DEPARTMENT OF TECHNICAL EDUCATION, TAMIL NADU

GOVERNMENT COLLEGE OF ENGINEERING, DHARMAPURI- 636 704

From

The Principal,
Government College of Engineering,
Dharmapuri – 636 704.

To

Tmt.N.Vijayalakshmi, M.Sc.,
Deputy Director,
Geology and Mining,
Viluppuram.

Lr. No.: GCE / DPI / CIVIL / SOIL / 2023/ C – 181 Dated: 09.10.2023

Madam,

Sub.: Index Properties and composition of the soil samples – Report forwarded – Regarding

Ref.: Letter No.: B/G&M/93/2023 Dated: 06.10.2023

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With reference to the letter cited above, the laboratory tests were carried out on the given soil samples and the test report is enclosed for kind perusal.

Department of Civil Engineering
Dharmapuri-636 704
Government College of Engineering

for Principal

Dr. V. RAJKUMAR, M.E., Ph.D.,
Professor & Head,
Department of Civil Engineering,
Government College of Engineering,
Dharmapuri-636 704.

Enclosure: Soil Test Report (01 Page)

09/10/23

DEPARTMENT OF TECHNICAL EDUCATION – TAMIL NADU
GOVERNMENT COLLEGE OF ENGINEERING – DHARMAPURI
DEPARTMENT OF CIVIL ENGINEERING
SOIL MECHANICS LABORATORY

CONSULTANCY REPORT

Lr. No. : GCE / DPI / CIVIL / SOIL / 2023/ C – 181 Dated: 09.10.2023

Nature of test : Index Properties and composition of the soil samples.

Details of soil sample received : Three soil samples (Sample No.:01 to 03) collected from Thiru.S.Vasantharaj, S/o. Selvaraj, over an extent of 1.93.5 hectares of Patta land in Survey Field No.71/2 and 88/1 of Kondalangkuppam Village, Vanur Taluk, Viluppuram District.

---------- o0o ----------

Test Results

S.No	Description of Sample	Sieve Analysis			Atterberg's Limits		Organic Content (%)	Free Swell Index in (%)
		Gravel (%)	Sand (%)	Silt + Clay (%)	Plastic Limit (%)	Liquid Limit (%)		
1	Sample No.: 01	0.00	17.80	82.20	28	33	Nil	03

IS classification of the soil as per IS 1498 (1970): **Low Compressible Silt (ML)**

S.No	Description of Sample	Sieve Analysis			Atterberg's Limits		Organic Content (%)	Free Swell Index in (%)
		Gravel (%)	Sand (%)	Silt + Clay (%)	Plastic Limit (%)	Liquid Limit (%)		
1	Sample No.: 02	0.00	16.10	83.90	25	32	Nil	04

IS classification of the soil as per IS 1498 (1970): **Low Compressible Silt (ML)**

Department of Civil Engineering
Dharmapuri-636 704
Government College of Engineering

Kindly Note: Any correction in the certificate not attested by the concerned authority shall invalidate this certificate

S.No	Description of Sample	Sieve Analysis			Atterberg's Limits		Organic Content (%)	Free Swell Index in (%)
		Gravel (%)	Sand (%)	Silt + Clay (%)	Plastic Limit (%)	Liquid Limit (%)		
1	Sample No.: 03	0.00	15.50	84.50	29	33	Nil	04

IS classification of the soil as per IS 1498 (1970): **Low Compressible Silt (ML)**

Inference:

As per the above laboratory test results obtained for the three soil samples (Sample No.:01 to 03) collected from Thiru.S.Vasantharaj, S/o. Selvaraj, over an extent of 1.93.5 hectares of Patta land in Survey Field No.71/2 and 88/1 of Kondalangkuppam Village, Vanur Taluk, Viluppuram District, it is inferred that the soil samples are **Low Compressible Silt (ML).**

Department of Civil Engineering
Dharmapuri-636 704
Government College of Engineering

09/10/23

Professor and Head of the Department

Dr. V. RAJKUMAR, M.E.,Ph.D.,
Professor & Head,
Department of Civil Engineering,
Government College of Engineering,
Dharmapuri-636 704.

Kindly Note: Any correction in the certificate not attested by the concerned authority will invalidate this certificate

ANNEXURE - VI

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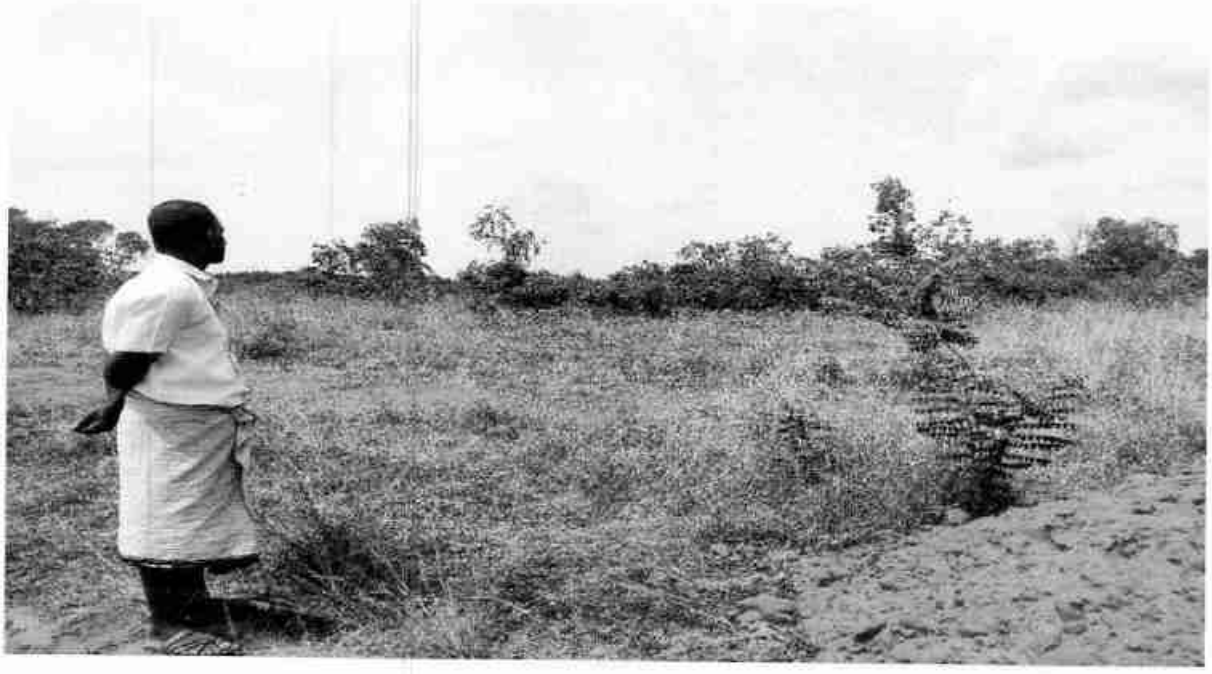
PHOTOCOPY OF THE APPLIED LEASE AREA

Field photos in respect of Ordinary Earth in Patta land lease area belongs to Mr.S.Vasantharaj, at Tamil Nadu State, Viluppuram District, Vanur Taluk, Kondalankuppam Village in S.F.No : 71/2 & 88/1 an extent of 1.93.5Hect.



ANNEXURE - VII

201

இந்திய தனிப்பட்ட அடையாள ஆணைய அரசு

இந்திய அரசாங்கம்
Unique Identification Authority of India
Government of India

பதிவு அடையாளம் / Enrollment No.: 0134/11100/26316

To
வசந்தராஜ்
Vasantharaj
C/O Selvaraj
477 MG Road
Ramakrishna Nagar
Muthialpet
Muthialpet
Puducherry Taluk Puducherry
Puducherry 605003
9786035757

22/05/2014

1540296948

ME540296948FH

உங்கள் ஆதார் எண் / Your Aadhaar No. :

5379 9266 8583

எனது ஆதார், எனது அடையாளம்

இந்திய அரசாங்கம்
Government of India

வசந்தராஜ்
Vasantharaj
பிறந்த நாள் / DOB : 20/04/1983
ஆண்பால் / Male

5379 9266 8583

எனது ஆதார், எனது அடையாளம்

ANNEXURE - VIII
203

Reg. No. 03BBB1007
Col Code 013 /106

பெரியார் பல்கலைக்கழகம்
Periyar University

அறிவியல் புலம்
FACULTY OF SCIENCE

பெரியார் பல்கலைக்கழக ஆட்சிக்குழு **2005** ஆம் ஆண்டு ஏப்ரல் மாதம் நடந்த **பயன்பாட்டு புவியமைப்பியல்** தேர்வில் **S கருப்பண்ணன்** என்பவர் **தனிச்சிறப்புடன் முதல் வகுப்பில்** தேர்ச்சி பெற்றார் என்று தக்க தேர்வாளர்கள் சான்றளித்தபடி **அறிவியல் நிறைஞர்** என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினையுடன் வழங்குகிறது.

The Syndicate of the **Periyar University** *hereby makes known that* **KARUPPANNAN S** *has been admitted to the* **DEGREE OF MASTER OF SCIENCE** *in* **APPLIED GEOLOGY**

he /she having been certified by duly appointed Examiners to be qualified to receive the same and was placed in the **FIRST CLASS WITH DISTINCTION** *at the Examination held in* **APR-2005**

Given under the seal of this university

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IAC. No. 142 / TNGST. No. 2702141
CST. No. 704829 / SLM / Dt. 7-4-99

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BALAJI MINES

Proprietor : E. SANTHARAMAN,
PURITY LIME STONE SUPPLIERS,
5/88, CHINNAGOLLAPATTI, KANNANKURICHI P. O.,
SALEM-636 008. Tamil Nadu.

Mines : Devar Malai Village, Kulithalai Tk., KARUR Dt. (Via) Karur to Palayam.

Date 15-10-2010

EXPERIENCE CERTIFICATE

I E.SANTHARAMAN being the Managing Director of BALAJI MINES do hereby certify that Thiru. S.KARUPPANNAN, son of T.SUNDARAM (Whose signature is appended) worked as a Geologist in Balaji Mine, Devar malai village, kulithalai Taluk, Karur District, from 01.06.2005 to 10.10.2010. During his term of work aforesaid, he has obtained practical experience as detailed overleaf. The duties connected with his work have involved his continuous attendance at the mine, and have been efficiently performed by him.

I believe him to be of good character and a fit and proper person to be examined for Certificate of Competency.

E. Santharaman

(Signature with date and official Seal)

TIN No:33852702141
CST No:704829 / 7-4-99
BALAJI MINES
5/88, Chinnagollapatty,
Kannankurichi (P.O), SALEM-8.

(Signature of Candidate)

207

K.P.RAMAN
Cell : 94876 33359

K.P.LAKSHMANAN
Cell : 94432 64075
04348-244321

SRI RAMAJAYAM
GRANITES

731, Krishnagiri Main Road, Opp. E.B.Office, MATHUR - 635 203
email : sriramajayamgranites@gmail.com

11 OCT

Date : 11.10

EXPERIENCE CERTIFICATE

This is to certify that **Mr.Karuppannan Sundaram** has been worked as a **"Senior Geologist"** in our company from **11th October 2010 to 11th October 2011.** During this period, he has been involved in the Quality Control for Granite block extraction from quarry. Involvement of his work is highly appreciated and have been efficiently worked in our company. The duties connected with his work have been continuous attendance at the quarry.

I wish him all the best in all his future endeavors.

For SRI RAMAJEYAM GRANITES

K.P.

Proprietor

11/10/2011

/Attested/
18/11/2020

DEPUTY DIRECTOR
DEPARTMENT OF GEOLOGY AND MINING
DHARMAPURI

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83579497
فاكس: 83471592

Date: October 13th 2013

CERTIFICATION

TO WHOM IT MAY CONCERN

This is to certify that **Mr. KARUPPANNAN SUNDARAM (PASS PORT NO: G0050390)** has being working in Golden Arrow Co. Ltd. As a Senior Geologist from **14th October 2011 to 13th October 2013.**

In this period he was done in the following disciplines:

1. Exploration of gold and associate metals
2. Detail Geological Mapping.
3. Geochemical sampling
4. Trenching
5. Core Drilling sampling and analysis
6. Feasibility report, quarterly report and annual report preparation
7. Design the mine plan

During this period we found him enthusiastic and having strong knowledge in earth science field. Based on which we are confident that he can take up challenging tasks, in this field successfully.

We wish him all best in all his future endeavors.

13/10/2013

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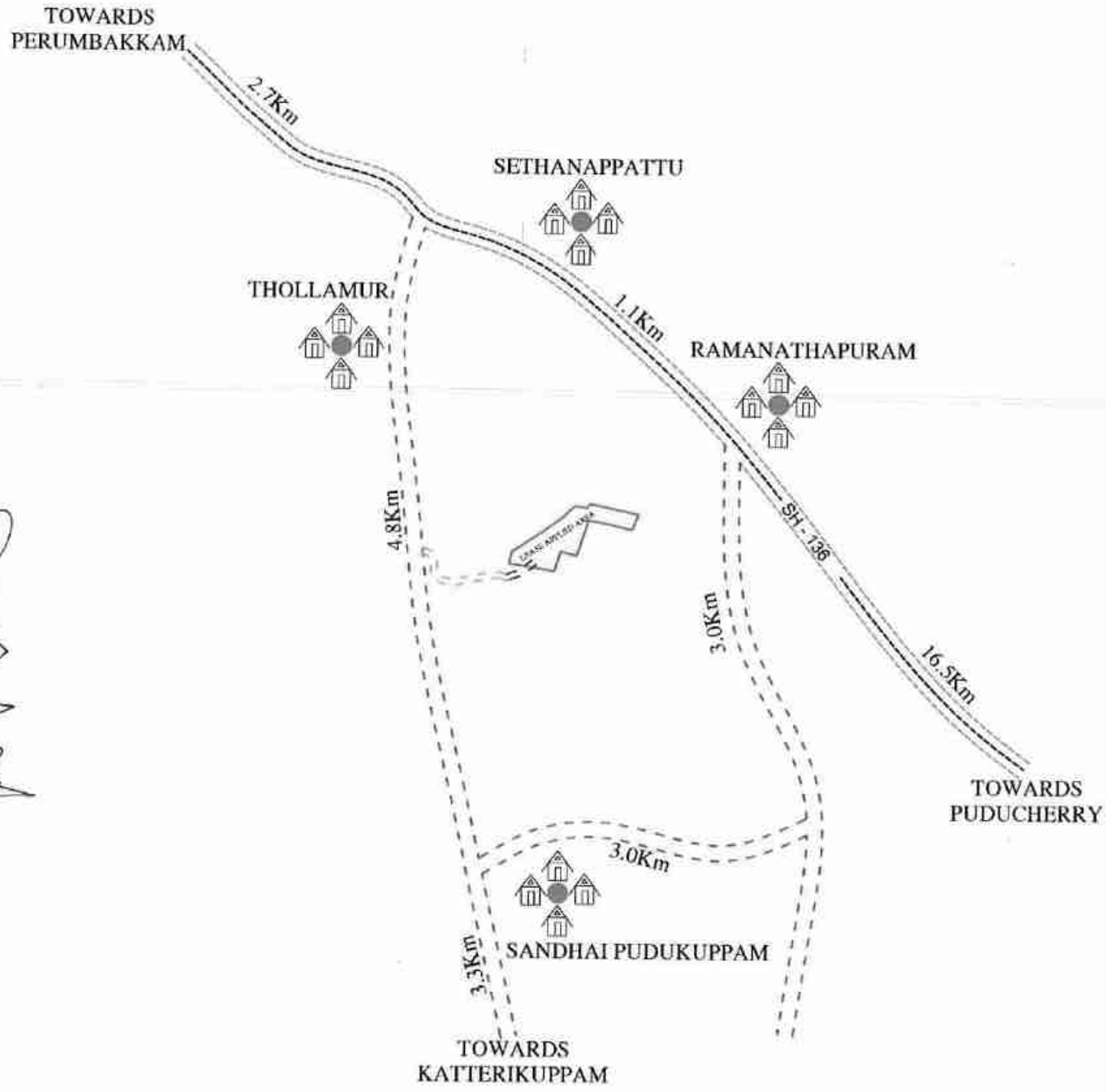


N

PLATE NO-I

APPLICANT:

Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S	: 71/2 & 88/1
EXTENT	: 1.93.5Hect
VILLAGE	: KONDALANKUPPAM
TALUK	: VANUR
DISTRICT	: VILUPPURAM

INDEX

- MINE LEASE AREA
- APPROACH ROAD
- VILLAGE & CARD ROAD
- MDR - 136 ROAD
- HABITATIONS

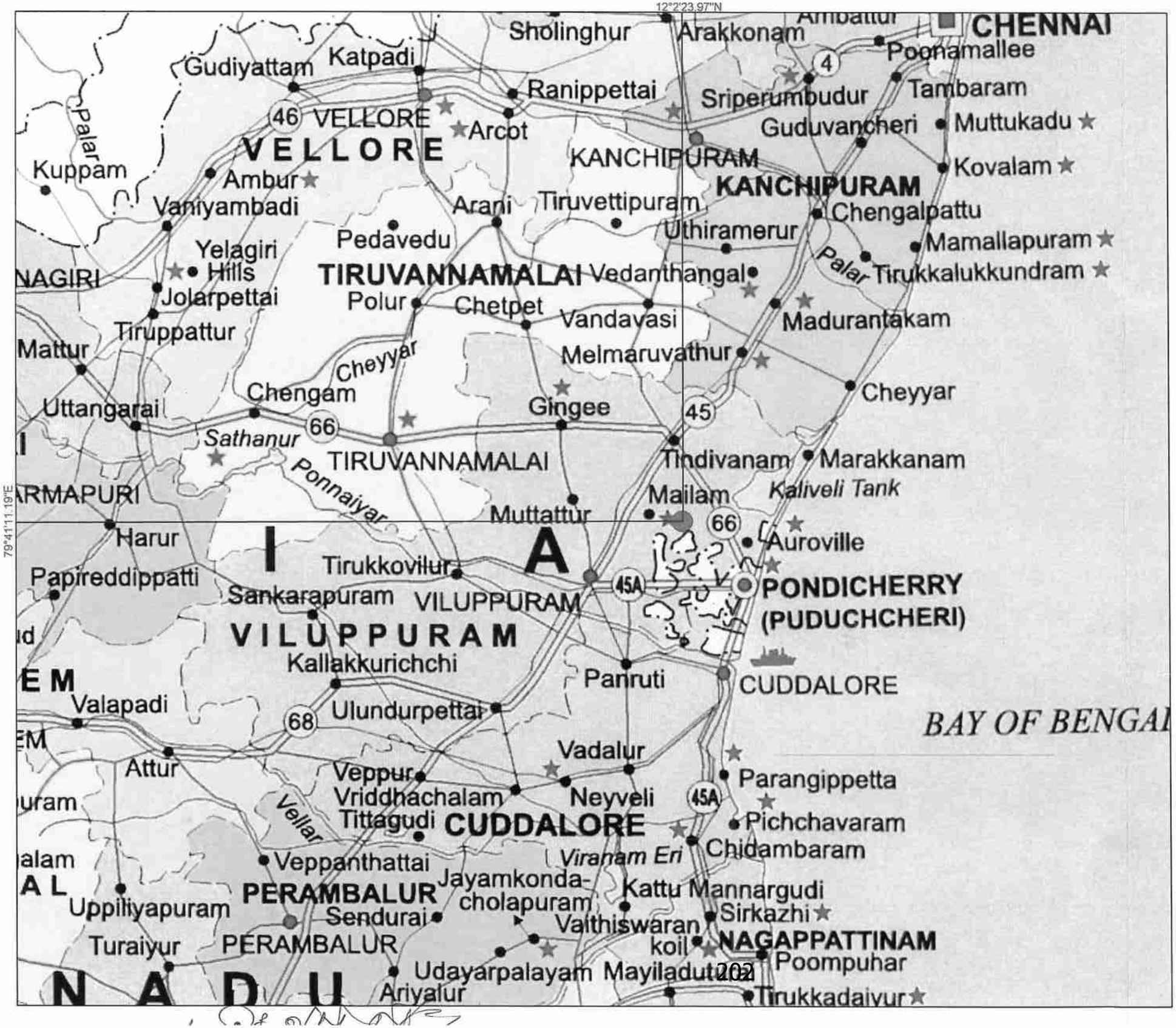
KEY MAP

Not to Scale

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE.

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



N

PLATE NO-IA

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S	: 71/2 & 88/1
EXTENT	: 1.93.5Hect
VILLAGE	: KONDALANKUPPAM
TALUK	: VANUR
DISTRICT	: VILUPPURAM

INDEX

MINE LEASE AREA :

TOPO SHEET NO : 57-P/12

LATITUDE : 12°2'18.66"N to 12°2'23.97"N

LONGITUDE : 79°41'11.19"E to 79°41'21.41"E

LOCATION PLAN
NOT TO SCALE

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.

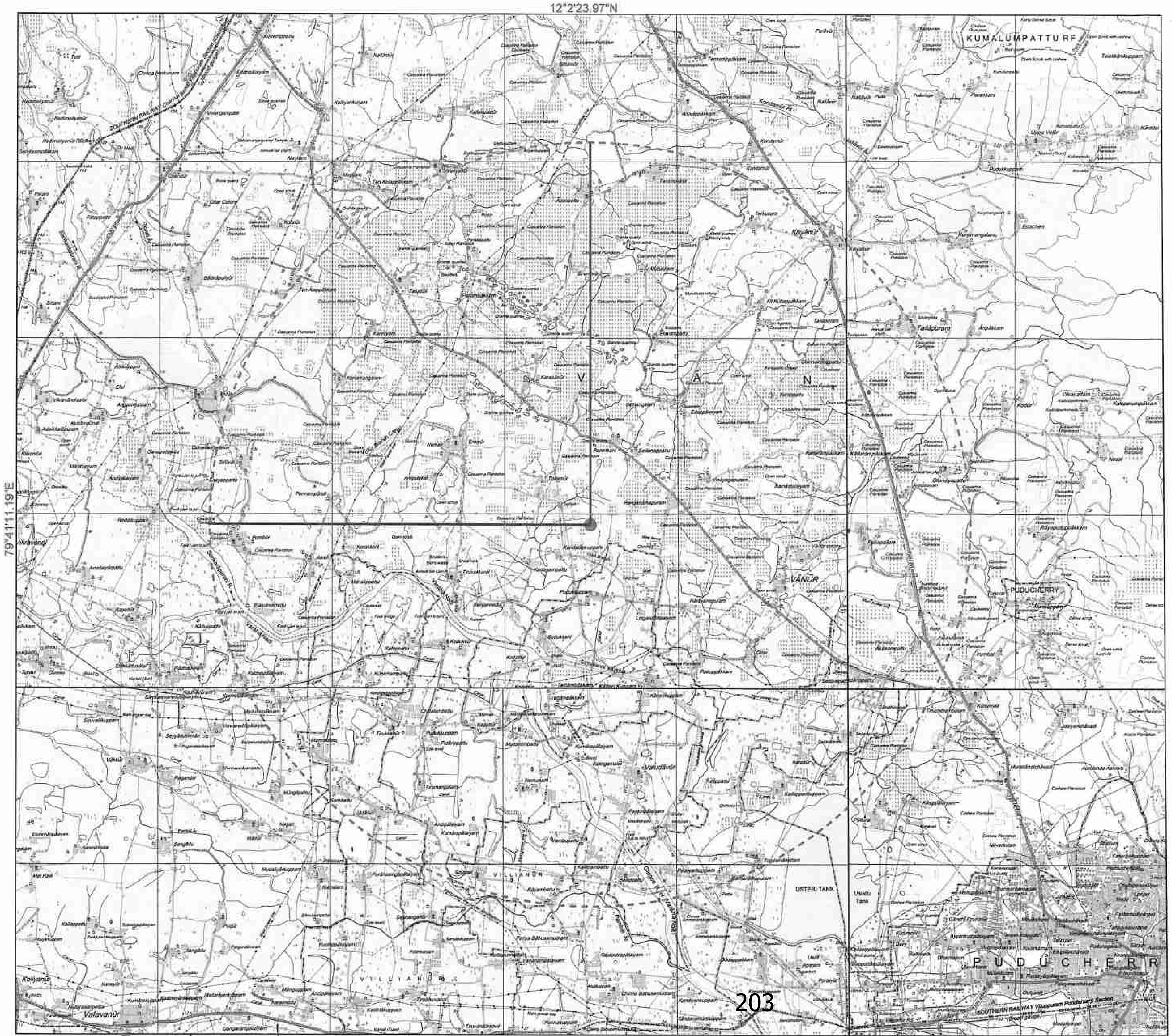


PLATE NO-IB

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

TOPO SHEET NO : 57-P/12

LATITUDE : 12°2'18.66"N to 12°2'23.97"N

LONGITUDE : 79°41'11.19"E to 79°41'21.41"E

MINE LEASE AREA

10KM RADIUS

TOPOSHEET MAP
SCALE- 1:1,00,000

Prepared By:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

12°2'23.97"N

Towards
Thollamur

79°41'11.19"E

Towards

PLATE NO-IC

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S	: 71/2 & 88/1
EXTENT	: 1.93.5Hect
VILLAGE	: KONDALANKUPPAM
TALUK	: VANUR
DISTRICT	: VILUPPURAM

INDEX

MINE LEASE AREA	
APPROACH ROAD	
VILLAGE ROAD	
CART ROAD	
100m RADIUS	
200m RADIUS	
300m RADIUS	
400m RADIUS	
500m RADIUS	

TOPO SHEET NO : 57-P/12

LATITUDE : 12°2'18.66"N to 12°2'23.97"N

LONGITUDE : 79°41'11.19"E to 79°41'21.41"E

SATELITE IMAGERY MAP

SCALE– 1:5000

Prepared By:

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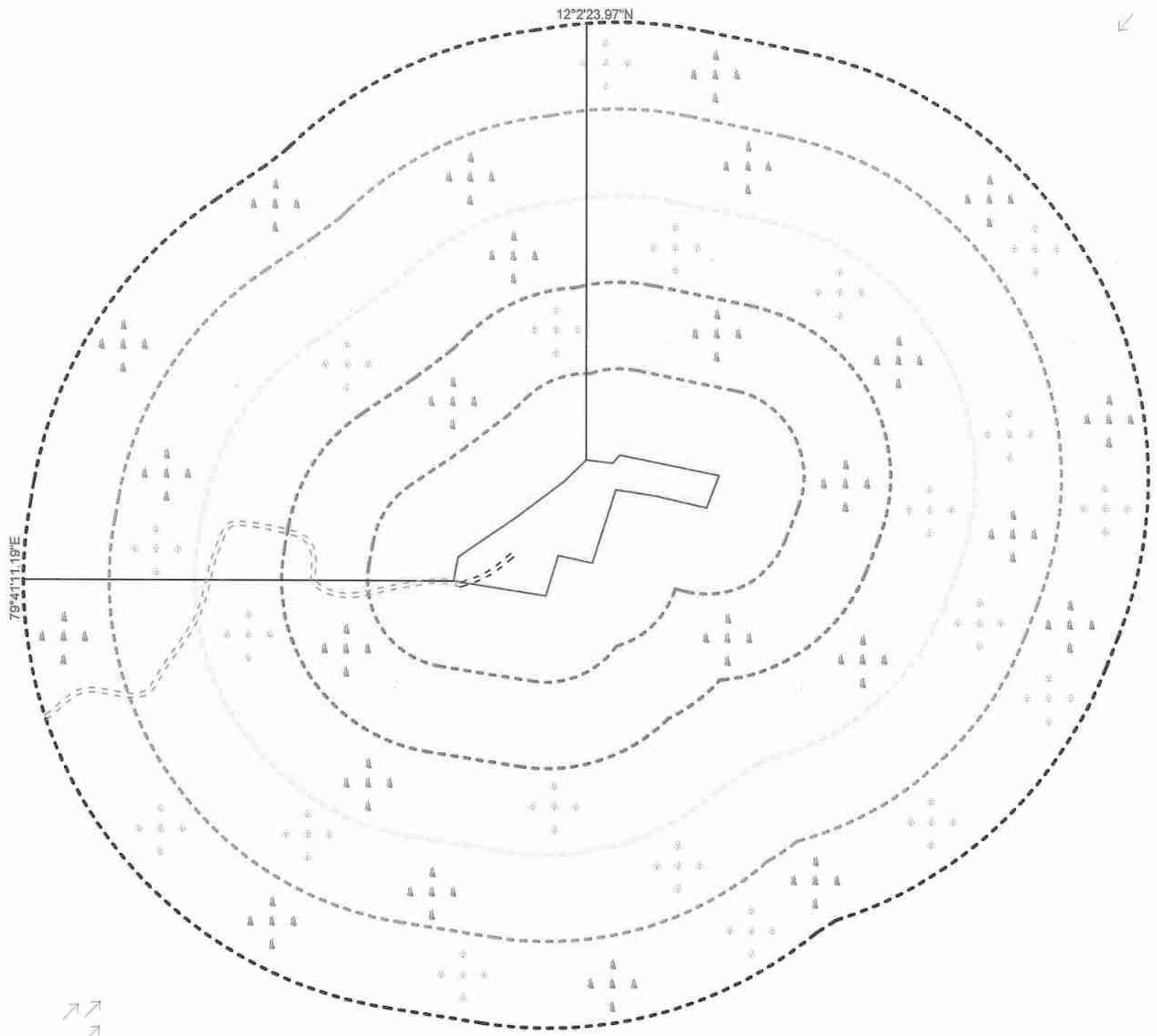
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

OCTOBER TO DECEMBER



JULY TO SEPTEMBER

PLATE NO-ID

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

INDEX

MINE LEASE AREA
APPROACH ROAD
CART ROAD
100m RADIUS
200m RADIUS
300m RADIUS
400m RADIUS
500m RADIUS
TREE & SHRUBS

TOPO SHEET NO : 57-P/12

LATITUDE : 12°2'18.66"N to 12°2'23.97"N

LONGITUDE : 79°41'11.19"E to 79°41'21.41"E

EVIRONMENTAL PLAN

SCALE– 1:5000

Prepared By:

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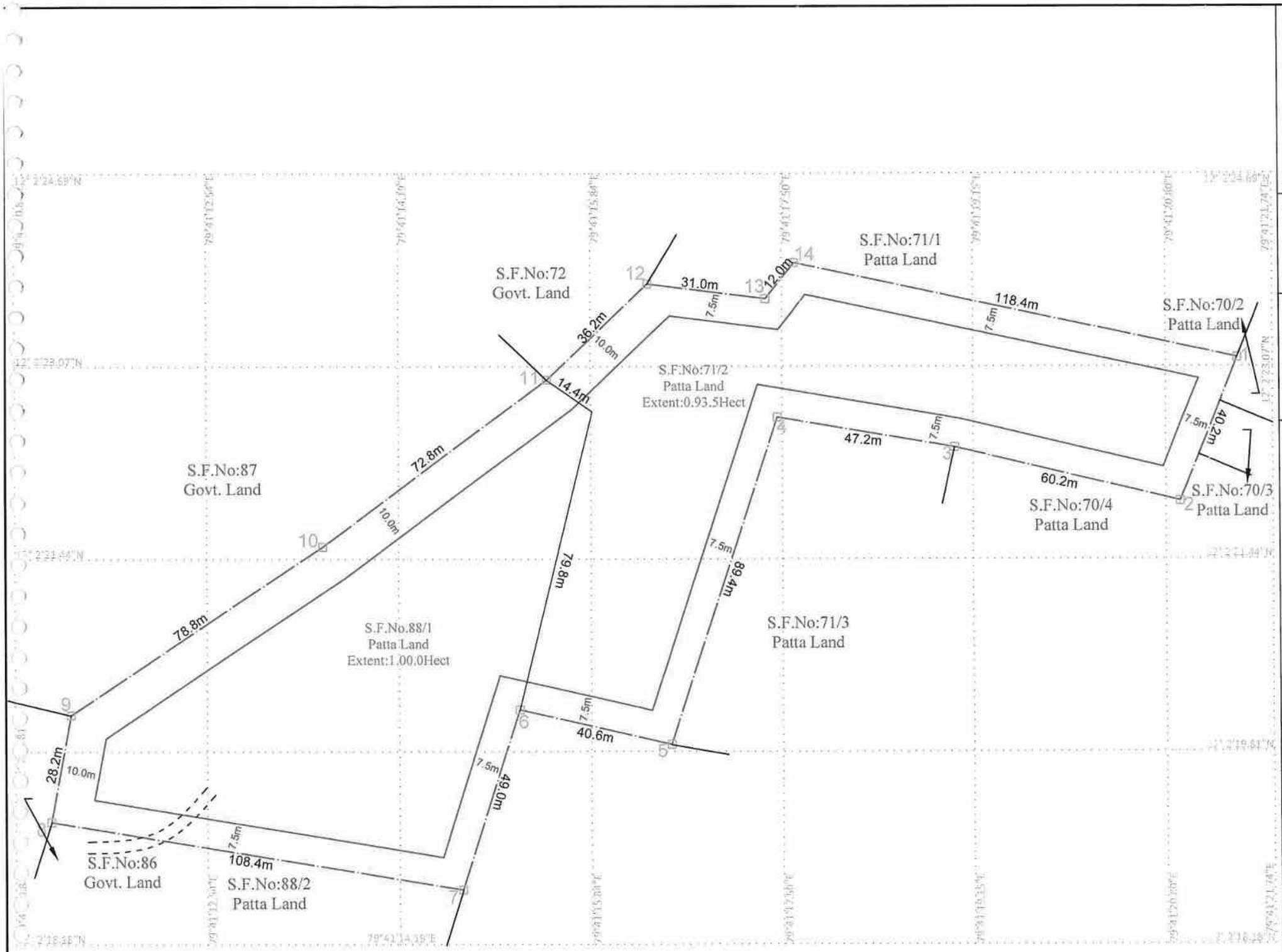
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



N

PLATE NO-II

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

PILLAR ID	LATITUDE	LONGITUDE
1	12° 2'23.19"N	79°41'21.41"E
2	12° 2'21.98"N	79°41'20.91"E
3	12° 2'22.42"N	79°41'18.97"E
4	12° 2'22.67"N	79°41'17.43"E
5	12° 2'19.90"N	79°41'16.53"E
6	12° 2'20.18"N	79°41'15.22"E
7	12° 2'18.66"N	79°41'14.74"E
8	12° 2'19.22"N	79°41'11.19"E
9	12° 2'20.12"N	79°41'11.36"E
10	12° 2'21.56"N	79°41'13.52"E
11	12° 2'22.97"N	79°41'15.45"E
12	12° 2'23.79"N	79°41'16.31"E
13	12° 2'23.67"N	79°41'17.33"E
14	12° 2'23.97"N	79°41'17.58"E

INDEX

MINE LEASE AREA
SAFETY BOUNDARY
APPROACH ROAD
BOUNDARY PILLAR STONE

MINE LEASE PLAN

PLAN-1:1000

PREPARED BY:

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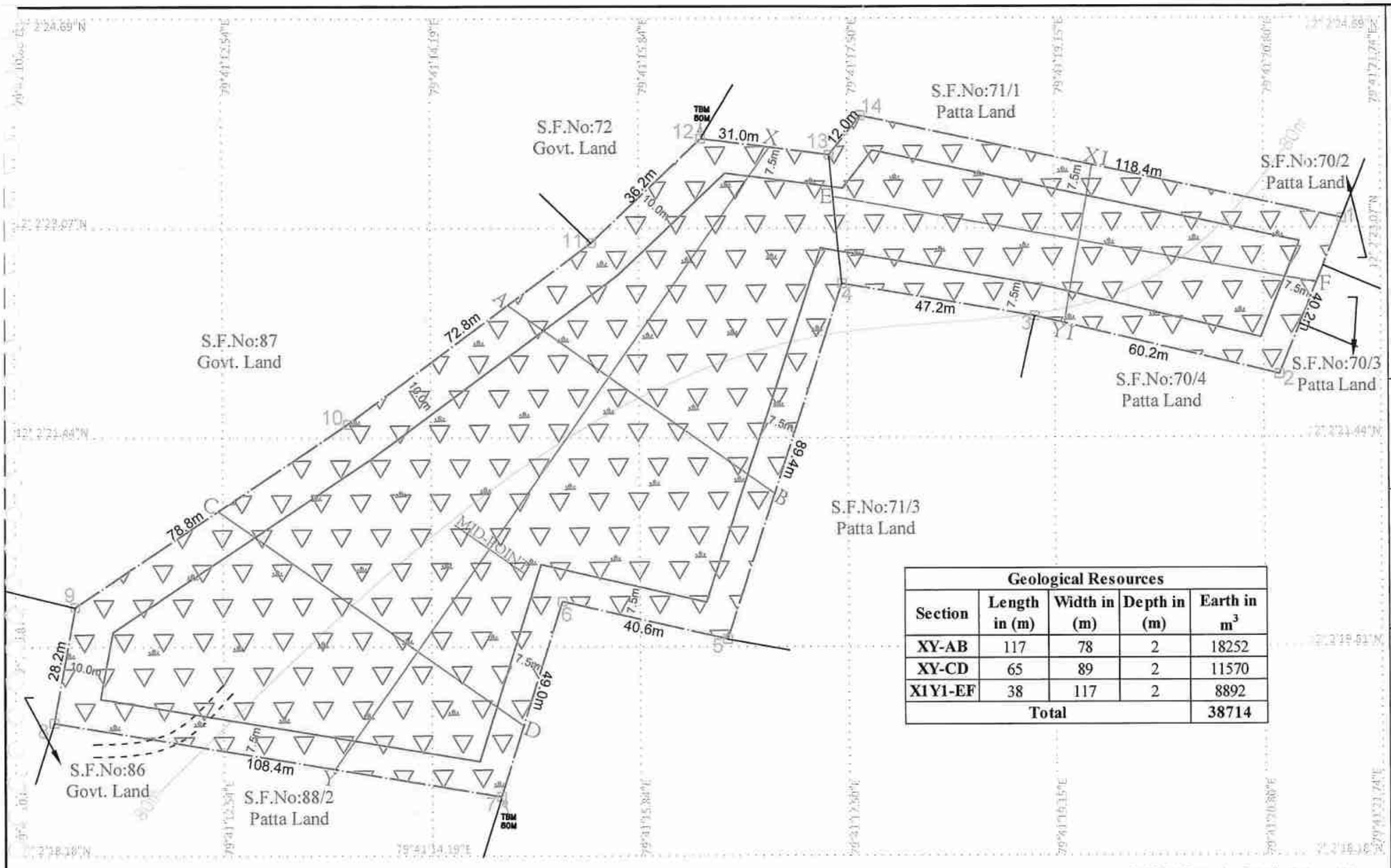
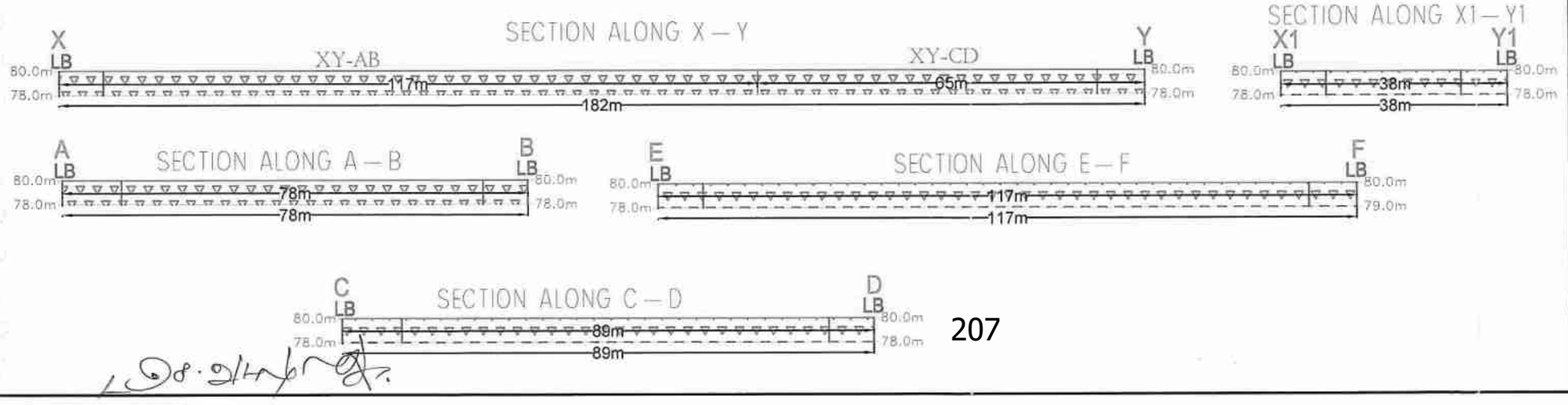
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



Geological Resources				
Section	Length in (m)	Width in (m)	Depth in (m)	Earth in m^3
XY-AB	117	78	2	18252
XY-CD	65	89	2	11570
X1Y1-EF	38	117	2	8892
Total				38714



N

PLATE NO-III

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:
S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- BOUNDARY PILLAR STONE
- ORDINARY EARTH
- TEMPORARY BENCH MARK
- CONTOUR
- SHRUBS

SURFACE, GEOLOGICAL PLAN AND SECTIONS
SCALE: PLAN-1:1000
SECTION SCALE: HORIZONTAL–1:800
VERTICAL – 1:400

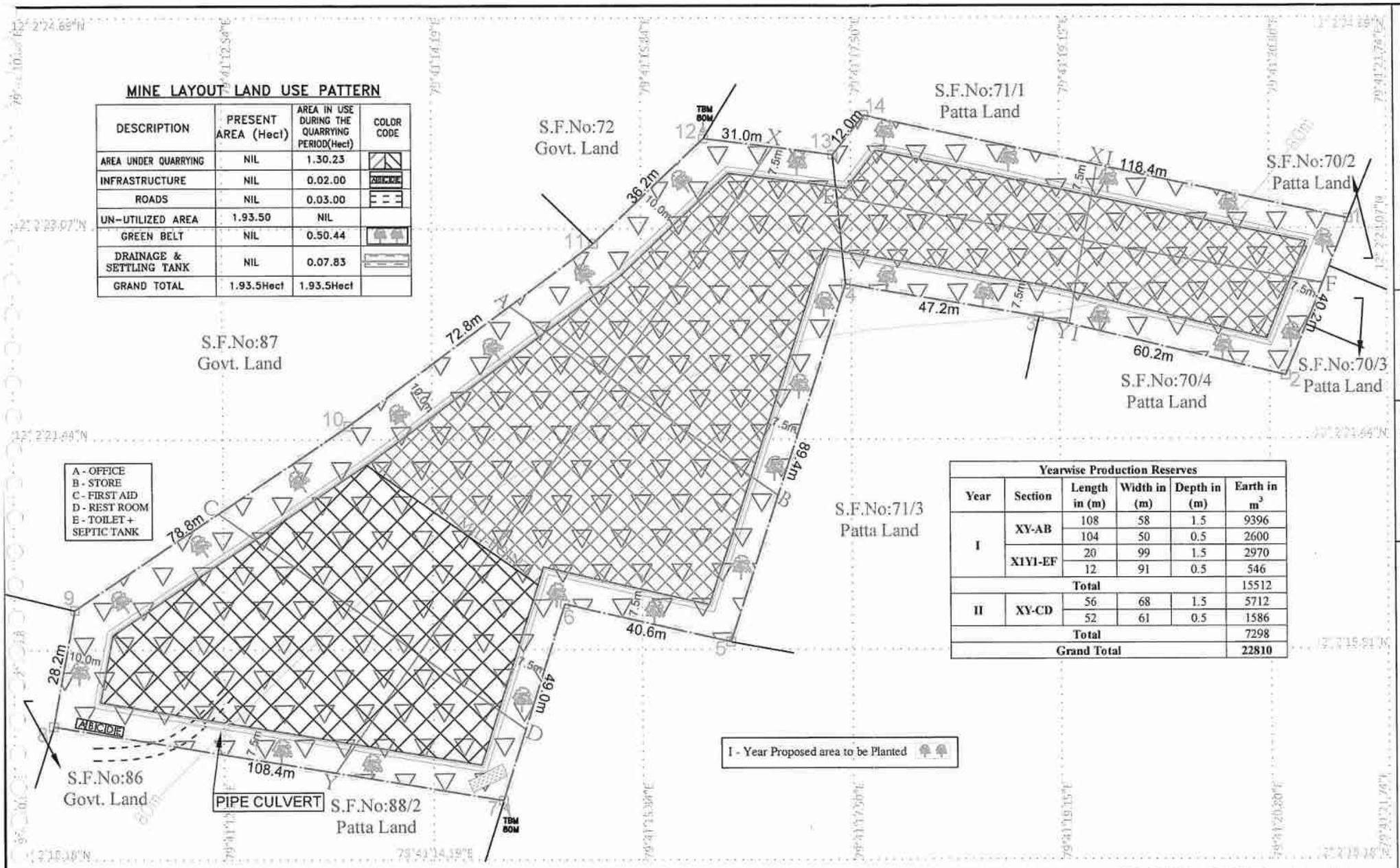
PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	1.30.23	
INFRASTRUCTURE	NIL	0.02.00	
ROADS	NIL	0.03.00	
UN-UTILIZED AREA	1.93.50	NIL	
GREEN BELT	NIL	0.50.44	
DRAINAGE & SETTLING TANK	NIL	0.07.83	
GRAND TOTAL	1.93.5Hect	1.93.5Hect	

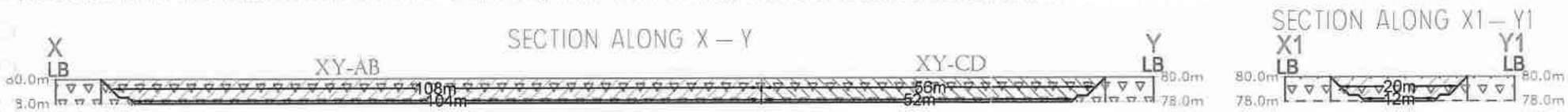


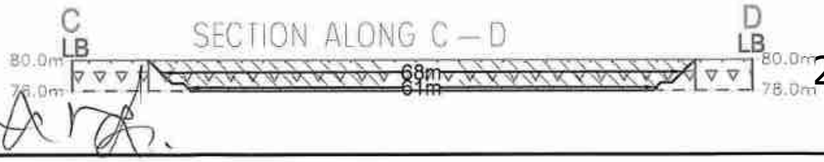
A - OFFICE
B - STORE
C - FIRST AID
D - REST ROOM
E - TOILET + SEPTIC TANK

Yearwise Production Reserves

Year	Section	Length in (m)	Width in (m)	Depth in (m)	Earth in m^3
I	XY-AB	108	58	1.5	9396
		104	50	0.5	2600
	X1Y1-EF	20	99	1.5	2970
		12	91	0.5	546
Total					15512
II	XY-CD	56	68	1.5	5712
		52	61	0.5	1586
Total					7298
Grand Total					22810

I - Year Proposed area to be Planted





I - Year Proposed area to be Quarried
II - Year Proposed area to be Quarried

PLATE NO-IV

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- BOUNDARY PILLAR STONE
- ORDINARY EARTH
- TEMPORARY BENCH MARK
- CONTOUR
- SHRUBS
- PROPOSED BENCH
- DRAINAGE & SETTLING TANK
- FENCING

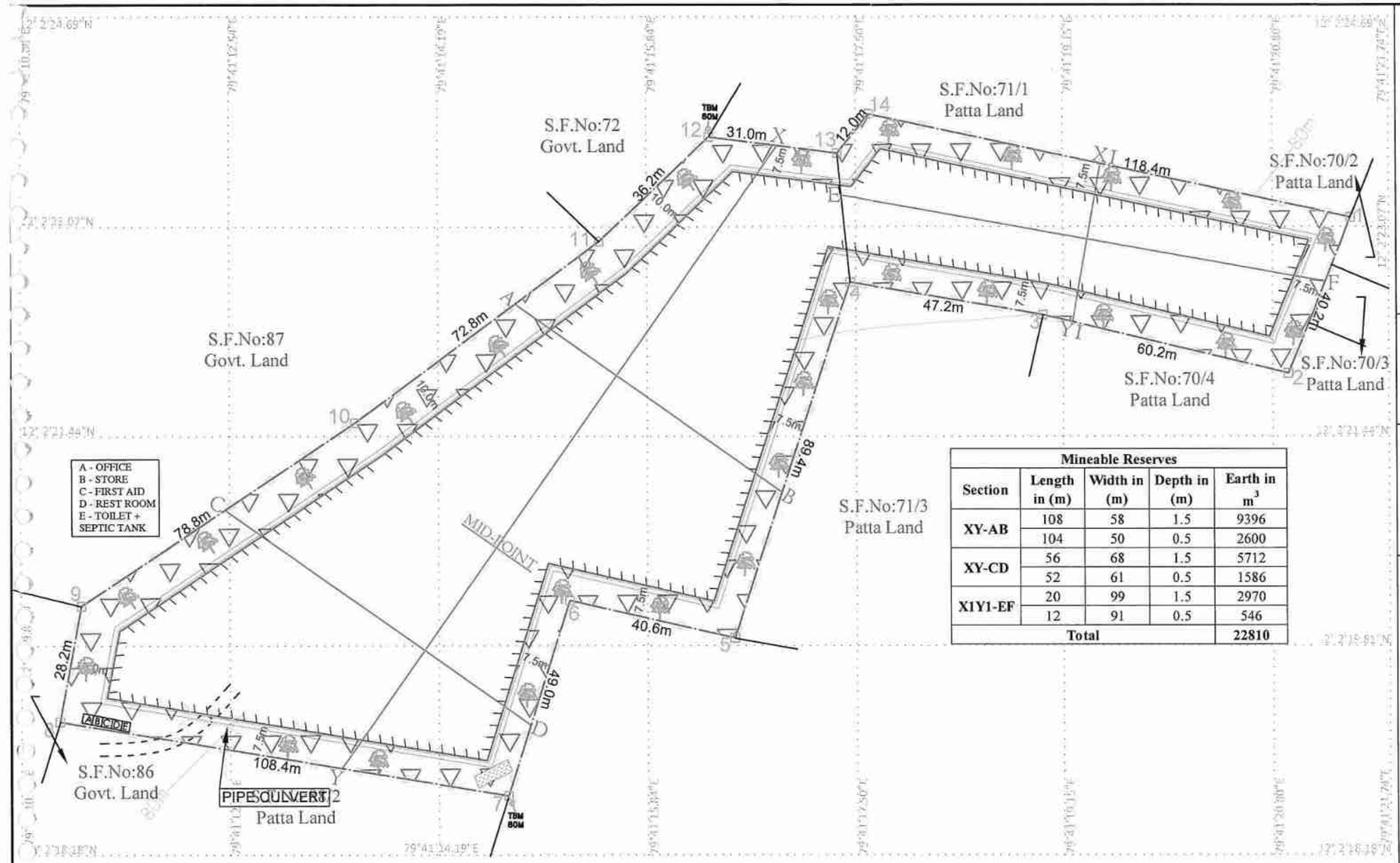
YEARWISE DEVELOPMENT, PRODUCTION PLAN & SECTIONS

PLAN SCALE-1:1000
SECTION SCALE- HORIZONTAL-1:800, VERTICAL - 1:400

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON



Mineable Reserves				
Section	Length in (m)	Width in (m)	Depth in (m)	Earth in m^3
XY-AB	108	58	1.5	9396
	104	50	0.5	2600
XY-CD	56	68	1.5	5712
	52	61	0.5	1586
X1Y1-EF	20	99	1.5	2970
	12	91	0.5	546
Total				22810

I - Year Proposed area to be Planted

PLATE NO-V

APPLICANT:
Mr.S.VASANTHARAJ,
S/O.SELVARAJ,
No.477 MG ROAD, RAMAKRISHNA NAGAR
MUTHIALPET,
PUDUCHERRY-605003.

LEASE APPLIED AREA:

S.F.NO'S : 71/2 & 88/1
EXTENT : 1.93.5Hect
VILLAGE : KONDALANKUPPAM
TALUK : VANUR
DISTRICT : VILUPPURAM

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- BOUNDARY PILLAR STONE
- ORDINARY EARTH
- TEMPORARY BENCH MARK
- CONTOUR
- SHRUBS
- ULTIMATE BENCH
- DRAINAGE & SETTLING TANK
- FENCING

MINE CLOSURE PLAN & SECTIONS

PLAN SCALE-1:1000
SECTION SCALE- HORIZONTAL-1:800, VERTICAL - 1:400

PREPARED BY:

I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
QUALIFIED PERSON

வானூர் வட்டம், கொண்டலாங்குப்பம் கிராம நிர்வாக அலுவலர் மற்றும் கிராம உதவியாளர் கொடுத்துக்கொண்ட வாக்குமூலம்:-

ஆஜர்.

விழுப்புரம் மாவட்டம், வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், பட்டா புல எண்கள் 71/2 -0.93.5 மற்றும் 88/1- 1.00.0-ன் மொத்த பரப்பு 1.93.5 ஹெக்டேரில் 3 ஆண்டுகளுக்கு செம்மண் குவாரி குத்தகை அனுமதி கோரி புதுச்சேரியைச் சேர்ந்த திரு.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவர் செம்மண் வெட்டியெடுக்க குவாரி குத்தகை அனுமதி கோரியது தொடர்பாக நெமிலி குறுவட்ட வருவாய் ஆய்வாளரின் விசாரணை என்பதை தெரிந்துகொண்டேன்.

வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமத்தில் கீழ்க்கண்ட விவரப்படி உள்ள பட்டா புன்செய் நிலங்களில் மூன்றாண்டுகளுக்கு செம்மண் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் கோரி புதுச்சேரியைச் சேர்ந்த திரு.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவர் விண்ணப்பித்துக் கொண்டுள்ளார். மனுதாரர் குத்தகை உரிமம் கோரியுள்ள புலன்கள் விவரம் பின்வருமாறு.

வ. எண்.	புலஎண்	வகைபாடு	பட்டா எண்	மொத்த விஸ்தீரணம் (ஹெக்டேர்)
1.	71/2	புன்செய்	572	0.93.5
2.	88/1	புன்செய்	572	1.00.0
மொத்தம்				1.93.5

மேற்காணும் புலன்கள் யாவும் ஒருங்கிணைந்து ஒரே புலமாக உள்ளது. குவாரி உரிமம் கோரியுள்ள வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், பட்டா புல எண்கள் 71/2 -0.93.5 மற்றும் 88/1- 1.00.0-ன் மொத்த பரப்பு 1.93.5 ஹெக்டர் புன்செய் நிலங்கள் கொண்டலாங்குப்பம் கிராம கணக்கில் பட்டா எண்.572-ல் திரு.வசந்தராஜ் த/பெ.செல்வராஜ் என்பவர் பெயரில் தூக்கலாகியுள்ளது.

மேற்படி புலன்கள் யாவும் மனுதாரரது அனுபவத்தில் இருந்து வருகிறது. இப்புலங்களில் வில்லங்கம் ஏதுமில்லை. மேற்படி புலன் குவாரி பள்ளம் மற்றும் கரம்பாக உள்ளது. மேற்காணும் புலங்களின் அருகே 300 மீட்டர் தொலைவிற்குள் குடியிருப்புகள் ஏதுமில்லை. உத்தேச புலன்களில் கிணறுகள், கல் கட்டடங்கள், புராதான சின்னங்கள், சுடுகாடு ஏதுமில்லை. உயர் அழுத்தம் மற்றும் தாழ்வழுத்த மின்கம்பிகள், தொலைபேசி கம்பங்கள் ஏதும் 50 மீட்டர் தொலைவிற்குள் செல்லவில்லை. இங்கு செம்மண் குவாரி பணி செய்ய ஆட்சேபனை குறித்து கிராமத்தில் விளம்பரம் செய்யப்பட்டதில், ஆட்சேபணை ஏதும் வரப்பெறவில்லை. செம்மண் குவாரி குத்தகை உரிமம் வழங்கப்படவுள்ள இடத்தில் செம்மண் எடுத்துச் செல்ல மேற்படி கிராம எல்லையில் பட்டா புல எண்கள்.87/- அ. புறம்போக்கு வண்டிப்பாதை, 86/- அ. புறம்போக்கு வண்டிப்பாதை, 84/2 ர.புஞ்சை, 84/1 ர.புஞ்சை, 75/- அ.புறம்போக்கு ஓடை, 81/5

அ.புறம்போக்கு மயானம் வழியாக தொள்ளமூர்-புதுக்குப்பம் சாலையை அடைய பாதை வசதி (அணுகு சாலை) உள்ளது பட்டா இடம் மற்றும் அரசு புறம்போக்கு இடமாகும்.

உத்தேச புலத்திற்கு சுக்குபந்தி விவரம்:

1.புலஎண்: 71/2 - 0.93.5 ஹெக்டர்

வடக்கு: புல எண்.71/1 - ர.புஞ்சை பட்டா நிலம்.

தெற்கு: புல எண்.70/7A - ர.புஞ்சை பட்டா நிலம்.
புல எண்.71/3 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.70/4 - ர்.புஞ்சை பட்டா நிலம்.

கிழக்கு: புல எண்.70/2 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.70/3 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.70/4 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.71/3 - ர.புஞ்சை பட்டா நிலம்.

மேற்கு: புல எண்.88/1 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.72/- - அரசு புறம்போக்கு வண்டிப்பாதை

2.புலஎண்: 88/1 - 1.00.0 ஹெக்டர்

வடக்கு: புல எண்.87/- அரசு புறம்போக்கு வண்டிப்பாதை
புல் எண்.71/2 ர.புஞ்சை பட்டா நிலம்.

தெற்கு: புல எண்.88/2 - ர.புஞ்சை பட்டா நிலம்.

கிழக்கு: புல எண்.71/2 - ர.புஞ்சை பட்டா நிலம்.
புல எண்.70/7A - ர.புஞ்சை பட்டா நிலம்.

மேற்கு: புல எண்.85/3 - ர.புஞ்சை பட்டா நிலம்.

மனுதாரர் நன்னடத்தையுள்ளவர். சிவில் / கிரிமினல் வழக்குகளில் சம்மந்தப்படவில்லை மனுதாருக்கு இத்தொழிலில் முன் அனுபவம் உள்ளது. உத்தேச புலத்திற்கு செல்ல பாதைவசத் உள்ளது. மேற்காணும் புலங்களில் 1.93.5 ஹெக்டேர் பரப்பளவில் செம்மண் வெட்டியெடுக்க மனுதாரர் 3 ஆண்டுகளுக்கு அனுமதி கோரியுள்ளார். மனுதாரர் அரசுக்கு செலுத்த வேண்டிய நிலுவை ஏதுமில்லை என்றும், மேற்படி விதிகளின்கீழ் குற்றம் புரியவோ, தண்டனை பெறவோ இல்லை என்றும் தெரிவித்துள்ளார்.

விழுப்புரம் மாவட்டம், வானூர் வட்டம், கொண்டலாங்குப்பம் கிராமம், பட்டா புல எண்கள் 71/2 -0.93.5 மற்றும் 88/1- 1.00.0-ன் மொத்த பரப்பு 1.93.5 ஹெக்டேரில் 3 ஆண்டுகளுக்கு செம்மண் குவாரி குத்தகை உரிமம் வழங்கலாம் என்பதை பணிவுடன் தெரிவித்துக்கொள்கிறேன்.

24/10/2023

கிராம நிர்வாக அலுவலர்
55.கொண்டலாங்குப்பம்,
வானூர் வட்டம், விழுப்புரம் மாவட்டம்

भारतीय गुणवत्ता परिषद्
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National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, 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 and underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

Issue Date
Feb 19, 2024

Valid up to
Dec 31, 2026

Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0319

Prof (Dr) Varinder S Kanwar
(CEO NABET)

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