

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT OF ORDINARY STONE AND GRAVEL QUARRY

(As per EIA Notification, 2006 dated 14.09.2006 and amendments)

Category-B1(Cluster)

PROJECT PROPONENT

Thiru. R. K. PANNEERSELVAM
S/o R.P. Kaliappan, No. 163,
Rengapalayam, Punnam Village
Aravakuruchi Taluk,
Karur District -639 136
Mobile No: 9442626411

PROJECT DETAILS

Extent Area : 0.88.0 Ha
S.F. No : 3/2
Village : Anjagoundanpatti
Taluk : Aravakuruchi
District : Karur

Terms of Reference

Lr. No: SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023.

EIA CONSULTANT



AADHI BOOMI MINING & ENVIRO TECH (P) LTD

(QCI/NABET Accredited EIA Organization)

3/216, K.S.V. Nagar, Narasothipatti, Alagapuram (PO),
Salem – 636004, Tamil Nadu

Website: www.abmenvirotec.com

Email: abmenvirotech@gmail.com/
suriyakumarsemban@gmail.com

Mob: 98427 29655



R.K. PANNEERSELVAM
S/o. R.P. Kaliappan
No. 163, Rengapalayam
Punnam Chatram, Punnam Village
Aravakuruchi Taluk
Karur District-639 136
Mobil No: 9442626411

Date:

To

District Environmental Engineer
Tamil Nadu Pollution Control Board (TNPCB),
No 26, Ramakrishnapuram West,
Karur District- 639 001

Sub: Submission of **Draft Environmental Impact Assessment Report** as per EIA Notification, 2006 dated 14.09.2006 and amendments for the Ordinary stone and gravel quarry located within cluster area over an extent of 0.88.0 Hectares in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu –reg.

Ref:

1. Ref: 1. MoEF&CCOM:F.No.L-11011/175/2018-IA-II(M), dated 12.12.2018
2. Lr.No.SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023 for PP 1
3. MOEF&CC SO 141 (E) dated 15.01.2016-Appendix XI

Dear Sir,

With reference to the above mentioned subject, we herewith submit the hard copy of **Draft Environmental Impact Assessment Report** as per the Terms of Reference vide Lr.No.SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023 with a Demand Draft of Rs. () in favour of DEE, TNPCB, Karur for your kind perusal. Hence, we kindly request you to process our application for Public Hearing as per EIA Notification, 2006 for obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu as early as possible.

Thanking You,

Yours faithfully,

R.K.PANNEERSELVAM
(Project Proponent)

Encl:

Draft EIA Report along with the soft copy.

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Thiru.R.K. PANNEERSELVAM,
S/o. R.P. Kaliappan,
No. 163, Rengapalayam,
Punnam Chatram, Punnam Village,
Aravakuruchi Taluk,
Karur District-639 136,
Mobil No: 9442626411

Undertaking by Project Proponent

I, **R.K.PANNEERSELVAM**, as **Project Proponent**, hereby give this undertaking to the effect that the conditions laid down in Terms of Reference vide Lr. No. SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023 for our Ordinary Stone and Gravel Quarry, in SF. No.3/2(P), over an extent of 0.88.00 Ha of Anjagoundanpatti village, Aravakuruchi Taluk, Karur District, Tamil Nadu, have been compiled with, and the data submitted and the information presented in this report are true to the best of my knowledge.

Signature and seal of the Project Proponent

Place : Salem

Date :

AADHI BOOMI MINING AND ENVIRO TECH (P) Ltd.

(NABET/QCI Accredited Organisation - 'A' Category)

ISO: 9001:2015 Certified Company

Call: 0427-2444297, +91 9842729655, +91 9443290855

Email: suriyakumarsemban@gmail.com, admin@abmenvirotec.com,Website: www.abmenvirotec.com**Declaration by the Head of the accredited consultant organization/authorized person**

I, **S.Suriyakumar**, Managing Director of Aadhi Boomi Mining & Enviro Tech (P) Ltd, hereby confirm that the Draft EIA Report has been prepared as per the conditions laid down in Terms of Reference vide Lr. No. SEIAA-TN/F.No.9586/SEAC/TOR- 1333/2022 dated 10.02.2023 for conducting Public Hearing and obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu for existing Ordinary Stone and Gravel Quarry of **Thiru R.K.PANNEERSELVAM**, located in Anjagoundanpatti village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

I also confirm that I shall be fully accountable for any mis-leading information mentioned in this statement.

Name : **Mr.S.Suriyakumar**

Signature : 

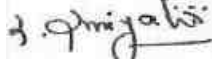
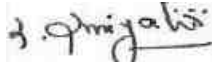
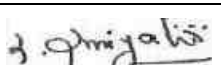
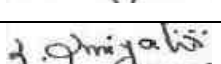
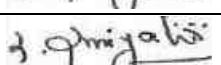




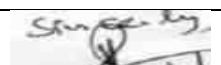

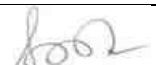
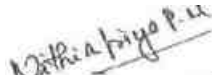
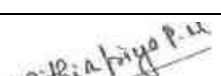
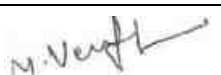
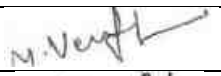
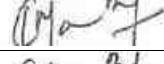
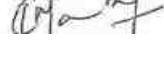
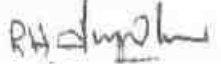
Designation : **Managing Director**

Name of the EIA Consultant Organization: **Aadhi Boomi Mining & Enviro Tech Private Limited.**


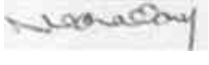


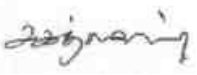
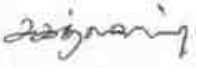
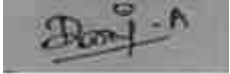



QCI/NABET Accredited Consultant, Certificate No: **NABET/EIA/2124/RA 0228.**

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
 Proponent: R.K.Panneerselvam, Ordinary Stone and Gravel Quarry, Karur District

DECLARATION OF EXPERTS - NABET

S. No	Name of the Expert	Category	Functional Areas	Signature
In-House Experts				
1.	Mr.S.Suriyakumar	A	EIA Co-ordinator	
		A	Solid and Hazardous Waste SHW*- HW* only	
		A	Risk Assessment and Hazard Management (RH)	
		A	Land Use (LU)	
		A	Soil Conservation (SC)	
2.	Mrs. S. Santhi	B	Land Use (LU)	
		B	Socio Economics (SE)	
3.	Mr.K.Thirumeni	B	EIA Co-ordinator - Building and Construction	
		B	EIA Co-ordinator - Highways	
		B	Land use (LU)	
4.	R.R Prakash Babu	B	Air Pollution, Monitoring, Prevention and Control (AP)	
		B	Noise and Vibration (NV)	
5.	Dr. Nithia Priya P.M	B	Air Pollution, Monitoring, Prevention and Control (AP)	
		B	Water Pollution Monitoring, Prevention and Control (WP)	
6.	Mr. M. Venkatesh Prabhu	B	Meteorology, Air Quality Modelling & Prediction (AQ)	
		B	Noise and Vibration (NV)	
7.	Mr. K. Manuraj	B	Geology (GEO)	
			Hydrogeology (HG)	
8.	V. Sudha	B	Ecology and Biodiversity	

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Empanelled Experts				
9.	Dr. Nallathambi Varadarajan	A	Geology (Geo)	
		A	Hydrology, ground water and water conservation (HG)	
10.	Bidisha Roy	B	Meteorology, Air Quality Modelling & Prediction (AQ)	Bidisha Roy
Team Member Involved in Report Preparation				
11.	Mrs. S. Sri Vidhya	Team Member	Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
			Meteorology, Air Quality Modelling & Prediction (AQ) under FAE - Mr. M. Venkatesh Prabhu	
12.	Mr. S. Sagath Srikrishnan	Team Member	Solid Hazardous Waste (SHW) under FAE Mr. Suriyakumar. S	
			Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
13.	Mrs. A. Nagadevi	Team Member	Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
			Ecology and Biodiversity (EB) under FAE – V. Sudha	
14.	Mr. A. Jagadeesh Kumar	Team Member	Noise and vibration under FAE - Mr. M. Venkatesh Prabhu	
			Meteorology, Air Quality Modelling & Prediction (AQ) under FAE - Mr. M. Venkatesh Prabhu	

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EIA Consultant: Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

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LIST OF ABBREVIATIONS AND ACRONYMS

AQI	-	Air Quality Index
AAQ	-	Ambient Air Quality
CPCB	-	Central Pollution Control Board
CAPEXIL	-	Chemical and Allied Export Promotion Council of India
CSR	-	Corporate Social Responsibility
DB	-	Decibel
DGM	-	Department of Geology and Mining
DGPS	-	Differential Global Positioning System
EC	-	Environment Clearance
EMP	-	Environment Management Plan
EIA	-	Environmental Impact Assessment
EMC	-	Environmental Management Cell
LEQ	-	Equivalent Noise Level
GOVT	-	Government of Tamil Nadu
GLC	-	Ground Level Concentration
HSE	-	Health, Safety and Environment
HA	-	Hectare
KLD	-	Kilo Liters Per -Day
KM	-	Kilo Meter
MOEF&CC	-	Ministry of Environment Forest and Climate Change
NH	-	National Highway
PH	-	Public Hearing
R&R	-	Rehabilitation & Resettlement
SEIS	-	Seismograph
SEIAA	-	State Environmental Impact Assessment Authority
SEAC	-	State Expert Appraisal Committee
SH	-	State Highway
SPM	-	Suspended Particulate Matter
TNPCB	-	Tamil Nadu Pollution Control Board
TOR	-	Terms of Reference
WQI	-	Water Quality Index

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Compliance of Standard ToR

S. No	ToR	Compliance
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification, 1994 came into force w.r.t. the highest production achieved prior to 1994.	<p>The lease deed was executed on 26.08.2022 and will expire on 27.08.2032 Refer Annexure-II.</p> <p>The details of production since inception of mining activity are mentioned in Chapter 2. Refer Table No 2.4 in Page No. 22.</p>
2	A copy of the document in support of the fact that the proponent is the rightful lease of the mine should be given.	<p>The lease was granted by the Dept. of Geology and Mining, Karur in favor of R.K.Panneerselvam (0.88.0 Ha) vide F. No. 60/Mines/2021 dated 26.08.2022 for the period of 10 years. Refer Annexure II.</p>
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc., and should be in the name of the lessee.	<p>Contents in all documents are synchronizing with one another in terms of mine lease area, production levels, waste generation, its management and quarrying technology.</p> <p>The Mining plan for Ordinary stone and gravel quarry of Thiru R.K. Panneerselvam for approved by the Deputy Director of Geology and Mining, Karur vide letter No. 60/Mines/2021 dated: 10.10.2022.</p>
4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ Toposheet; topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	<p>The area is bounded by northern latitude of 10° 44'25.88" N to 10° 44'28.69"N and eastern longitude of 77°57'20.81"E to 77°57'25.60"E.</p> <p>Toposheet No. 58F/14. Details are given in Page No. 4 of Chapter 1.</p> <p>Geomorphology & Geology of the area is given in Fig No 2.9. Refer Pg.No.24 of Chapter 2. Land Use details given in Table 3.31 pg. no.110 and also refer Fig No.3.32 pg.no.109. Land use within the lease area is mentioned in Table No 2.9 in Chapter 2. Refer Page No 28.</p>
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area,	<p>Survey of India Toposheet No. 58F/14 in 1:50,000 scale indicating physical features of geological map of the area,</p>

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	geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	geomorphology of land forms of the area, existing minerals and quarrying history of the area, important water bodies, streams and rivers and soil characteristics is given in Fig 1.1, 1.2, 3.35, 3.37 and Refer Page 5, 6, 115 and 117 respectively.
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The details of land proposed for mining activities are given in Table No 2.9 of Chapter 2. Refer Page No: 28.
7	It should be clearly stated whether the proponent company has a well laid down Environment policy approved by its Board of Directors? If so, it may be spelt out in the EIA report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the Environment or forest norms/ conditions? The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/ violations of Environmental norms to the Board of Directors of the company and /or Shareholders or Stakeholders at large, may also be detailed in the EIA Report.	The proponents Thiru R.K.Panneerselvam are very much conscious of complying with the Environmental Regulations with systematic mining. The proponent will comply with the EC conditions and Consent to Operate issued by the TNPCB with stipulated time.
8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	The quarry safety pertaining to the failure of pit slope in open cast quarrying is described in Table 7.1, Page No.169. Safety for blasting is given under Table 10.1: in Page 181. General safeguard measures are given in Chapter 4.
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/ lease period.	The study area of the fresh mining project comprises of 10km zone around the mining Lease boundary has been prepared. Data like reserves, waste generation up to life of mine have been incorporated in Chapter 2 of the EIA report.

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10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area, parks, migratory routes of fauna, water bodies, human settlements, other existing mines/ industrial activity and other ecological features are shown in delineating forest area, agricultural land, grazing land, wildlife sanctuary and national parks. Land use plan of the mine lease area is given in Page No. 28, Table No.2.9.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Details of the dump design area given in Chapter 2. The mining operation will not disturb/relocate any villages and hence R & R plan not required. Refer Chapter 7, Clause 7.3, and Page No. 171.
12	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not applicable. The mining area does not involve any forest land. Refer Table 2.3 Pg No.16.
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not applicable. The mining area does not involve any forest land. Refer Table 2.3 Pg No.16.
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable
15	The vegetation in the RF / PF areas in the	The details of reserve forest located within

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	study area, with necessary details, should be given.	study area of 10km radius are given in chapter 2. Refer Table No 2.3 in Page No 16. The details of flora within the study area are given detail in Chapter 3.
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Eco biodiversity (EB) study has been done for the project which details the impact on surrounding wildlife and mitigation measures are discussed and given in Chapter-4, Clause 4.10, Pg. No. 148-154.
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There is no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors and Tiger/Elephant Reserves within the 10 km radius of the mining lease area. Refer Page No. Refer table 2.3 in page no 16.
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease) shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Details of Flora and Fauna found in the study area are given in Chapter 3 (Pg. No 80-93) in the EIA Report. No scheduled list of fauna is found in this study area.

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19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	The project site is neither falling under 'Aravalli range' not it is located in proximity to area declared as Critically Polluted Area.
20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable. Bay of Bengal is located 105km away from the lease area towards the E side Refer Page No. 16, Table 2.3. Hence the project does not attract the C.R.Z. Notification.
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	The fresh ordinary stone quarry project does not involve any kind of displacement of the population since the mining will be concentrated only in the quarry area. Hence, Rehabilitation of settlement is not anticipated under this project as it is not required (Refer Chapter 7, Clause 7.3, and Page No. 171). The Socio-Economic study detailed in included in Clause 3.10 of Chapter 3, Page No 94-105.
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB	Monitoring data for a period of three months (March 2022– May 2022) on Air quality, Water quality, Noise level, Soil, Flora and Fauna in the core and buffer zones is collected and complied data wise

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	<p>Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<p>in the EIA report in Chapter 3.</p>
23	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p>	<p>Air quality modeling carried out for prediction of impact of the project on the air quality of the area, which is included in Chapter 4, Clause 4.1, Pg. No 119-140. Wind Rose Pattern is shown in fig. 3.1, Pg. 43 of chapter 3.</p>
24	<p>The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.</p>	<p>The water requirement for the Project is 3.5 KLD; the details are given in Chapter – 2, Pg No.39. A detailed water balance is shown in Fig 4.6 of Chapter 4, Page no.141</p>
25	<p>Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.</p>	<p>The rough stone quarry project requires water for drinking, dust suppression and plantation. Drinking water is obtained from Mineral water industries. For Dust suppression, Green belt and other uses water will be obtained from ordinary water vendors through water tank. There is no extraction of ground water within lease</p>

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		area for the quarry activity. So no clearance from the Competent Authority is required.
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	At the end of the project the quarried out pit will be used as Water storage pond. It will increase the agricultural activity in the surrounding villages. The rainwater harvesting and rate of evaporation is given in Chapter 7. Refer Clause 7.4, page no.172.
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	The impacts of the project on the water quality are assessed and necessary safe guard measures will be provided. Refer Chapter 4.
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	The mining operation will not intersect the ground water table. Schematic representation is shown in Page No: 143, Refer Fig.4.7. The depth of mining is 33m bgl whereas the depth of water table is 36m bgl. So No NOC is required from CGWA for the proposed project. However detailed Hydro geological study has been carried out and incorporated in Chapter 3 of Clause 3.7, Pg. No: 64.
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	There is no stream crossing inside the mining lease area and hence there is no need of modification/diversion.
30	Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	Elevation of the quarry area is 180m above MSL. The mining operation will be at a maximum depth of 33m. The ground water table is at 36m bgl from the surface in the adjacent tube well, and mine workings are above groundwater table. Refer fig 4.8 in page no.144.
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a	Phase-wise plan of plantation and Compensatory Afforestation and the plant

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	<p>tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.</p>	<p>species selected for green belt. The proposed afforestation plan is given in table 4.30 of chapter 4. Refer page 155.</p>
32	<p>Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.</p>	<p>The transportation of minerals will be carried out through the existing roadways during day work hours only with no increase in the existing traffic pattern (Refer Chapter 2, Fig No: 2.5, Page No.18).</p>
33	<p>Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.</p>	<p>Details of the onsite shelter and facilities to be provided to the mine workers are discussed in Chapter 2.</p>
34	<p>Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.</p>	<p>Conceptual mining plan is given in Chapter 2. Refer Fig 2.14 in Page No.38.</p>
35	<p>Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical</p>	<p>Occupational Health impacts of the Project are detailed in EIA report in Chapter 4, Page 157.</p>

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	examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	All control measure for public health implications, air emission, noise control, and waste management will be duly considered as per norms and the remedial measures are detailed along with budgetary allocation in Chapter 10, Pg. No: 180-186.
37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Details of community welfare activities to be done for the local community along with proposed budget have been incorporated in EIA Report in Chapter 8, Pg. No: 175-178).
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Environmental Management Plan (EMP) for the proposed quarry project has been prepared and incorporated in Chapter 10.
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	To be conducted in public hearing.
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation pending against the project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost – 11 L EMP cost- 4L Refer Chapter 2, Clause 2.14, Page No. 40.
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A detailed Risk and Disaster Management Plan has been prepared and detailed in Chapter 7. (Pg. No: 168-174).
43	Benefits of the Project if implemented shall	Project Benefits have been detailed in

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	clearly indicate environmental, social, economic, employment potential, etc.	Chapter 8. (Pg. No: 175-178).
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General Points to be followed as per ToR

44	ToR	Compliance
a)	Executive Summary of the EIA/EMP Report	Executive Summary is furnished separately and given in Chapter 11.
b)	All documents to be properly referenced with index and continuous page numbering.	Yes, all documents are properly referenced with index and continuous page numbering.
c)	Where data are presented in the report especially in Tables, the period in which the data were collected and the sources should be indicated.	Yes. The data Collection period and sources are mentioned in table in EIA report.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.	The Baseline Monitoring Report with all analytical reports done by a MoEF&CC/NABL accredited laboratory is enclosed with the EIA Report.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	The documents are provided in English
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Yes, Environmental appraisal of mining projects also submitted along with the EIA report.
g)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should also be followed.	Yes, we followed the instructions for the proponents and consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4 th August, 2009 while preparing EIA report.
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and	No changes have been made in draft EIA report. The details given in ToR application and in this report are same.

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	content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	
i)	As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified Report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project by the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not Applicable
j)	The EIA Report should also include (i) Surface plan of the area indicating contours of main topographic features, drainage and mining area. (ii) Geological maps and sections. (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	The details given in draft EIA Report

Compliance of conditions mentioned in TOR letter by SEAC

S. No	ToR	Compliance
1	The structure within the radius of (i) 50 m, (ii) 100m, (iii) 200m and (iv) 300m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds and etc.,	The details of nearest habitation are given in Table No 2.3 in Chapter 2. Refer Page no 16.
2	The study on impact of the dust and other environmental impacts due to proposed quarrying operations on the Rose flowers being cultivated through greenhouse nearby.	There is no any greenhouse cultivation in the lease area.
3	The proponent shall furnish photographs of greenbelt, fencing and garland drain around the boundary of the proposed quarry.	The fencing and green belt development along the periphery is under process. The photographs will be attached in final EIA Report.
4	The proponent shall furnish a revised EMP budget for entire life of proposed mining.	Yes, Assistant Director, Department of Mining and Geology, Karur

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5	The revised and corrected version of the Production & Development plan shall be produced with showing the safety beam width of 2m is maintained for the bench height of 2m distinctly in the gravel formation and it shall be duly signed by the concerned QP & approved by the concerned AD (Geology & Mining).	Yes, incorporated in the revised and corrected version of the Production & Development plan shall be produced with showing the safety beam width of 2m is maintained for the bench height of 2m distinctly in the gravel formation and it shall be duly signed by the concerned QP & approved by the concerned AD.
6	The EIA report shall spell out the possible amalgamation activities to be proposed in the existing cluster area and implications due to the amalgamation.	Yes, EIA report shall spell out the possible amalgamation activities to be proposed in the existing cluster area and implications due to the amalgamation
7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining plan, the project proponent (pp) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease during the time of appraisal for obtaining the EC.	The action plan for realignment of bench signed by Asst. Director of Geology and Mining will be attached in the EIA report.
8	The Proponent shall submit a conceptual 'Slope Stability plan, indicating the mitigating measures for the proposed quarry during the appraisal while obtaining the EC, as the depth of the proposed quarry working is extended beyond 30 m below ground level	The ultimate depth of the proposed projects is 19 to 33m bgl. So the 'Slope Stability plan' for the proposed project is under preparation.
9	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, I/II Class mines manager appointed by the proponent.	Agreed. The affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961.
10	The PP shall present a conceptual design for carrying out only controlled blasting Operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.	As it is rough stone quarry, blasting will be carried out to remove blocks from the parent rock by forming crack. Adequate Blast shield or blast mats will be provided wherever necessary for fly rock protection during blasting, thus to prevent the accident on the nearest farms.

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11	The ELA coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the state with video and photographic evidences.	The drone survey will be conducted for this project. The video and photographs handover to SEIAA Meeting.
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines. a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? b. Quantity of minerals mined out. c. Highest production achieved in any one year d. Detail of approved depth of mining. e. Actual depth of the mining achieved earlier. f. Name of the person already mined in that leases area. g. If EC and CTO already obtained, the copy of the same shall be submitted. h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	This fresh lease area
13	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	The Toposheet showing location of the lease area is attached in Chapter 1. Refer fig 1.2 in Page No.6. The geology and geomorphology of the 10km radius of proposed area is given in Chapter 2. Refer Fig No 2.9 in Page No 24. The land use/land cover image is given Chapter 3. Refer Page No 109.
14	The PP shall carry out Drone video survey covering the cluster. Greenbelt fencing etc.,	The drone video, fencing and green belt development along the periphery is under process. The photographs will be attached in final EIA Report..
15	The pp shall furnish the revised manpower including the statutory required	Yes, furnish the revised manpower including the statutory required under the provisions of

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	under the provisions of the MMR 1961 for the proposed quarry based on the volume of rock handled & area of excavation.	the MMR 1961
16	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees and safety distance between the adjacent quarry and water bodies nearby provided as per the approved mining plan.	The fencing and green belt development along the periphery is under process. The photographs will be attached in final EIA Report.
17	The project proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, and proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	The details of reserves, production capacity and methodology are given in Chapter – 2. Refer page 32. The impacts on surrounding environment due to mining activity are given in Chapter 4.
18	The Project Proponent shall provide the organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act, 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The employment potential of proposed project is given in Chapter 2. Refer Page No 39.
19	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells' and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD/TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be	The hydro geology study has been conducted within the study area of project site. Refer in Chapter 3. The details of water bodies in the study area are given chapter 2. Refer page no 16. The depth of water table identified by Geo resistivity survey is 36m bgl whereas the proposed depth of mining is 33m bgl. Therefore the mining activity will not intersect ground water table.

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	provided.	
20	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality' air quality' soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data for the environmental and ecological parameters were collected. Refer Chapter 3.
21	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	The anticipated cumulative impact on various environments such as air, water, soil and noise etc due to proposed mining activity are given in Chapter 4 with appropriate mitigation measures. The environmental management plan is given in Chapter 10.
22	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) is submitted.	The studies on rain water harvesting are given in Chapter 7. Refer Page No 172-173.
23	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	The land use/land covers of 10km radius of proposed mining lease area are given in Chapter 3. Refer Fig No 3.32 in Page No 109.
24	Details of the land for storage of overburden/waste Dumps (or) Rejects outside the such as extent of land area, distance from mine lease, its land use, R&R issues, mine lease, if any, should be provided.	Not applicable. All waste and rejects shall be dumped within the lease area of 0.88.0 Ha of R.K.Panneerselvam.
25	Proximity to Areas declared as 'critically polluted' (or) the project areas which attracts the court restrictions for mining operations, should also be indicated and	No. There is no boundary of critically polluted area found within 10km radius proposed mining lease area.

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	where so required clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	
26	Description of water conservation measures proposed to be adopted given. Details of rainwater harvesting proposed in the project, if any, should be provided.	At the end of mining, the quarried out pit will be used for storing rain water which will enhance agricultural activity around the lease area. The rain harvesting plan is given detail in Chapter 7. Refer Page No 172and 173.
27	Impact on local transport infrastructure due to the project should be indicated.	No. The existing roads are available to withstand the traffic generated due to proposed project. Refer Fig No.2.5 in Page no 18 of Chapter 2.
28	A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	Only trees such as Neem trees, coconut trees, palm trees, Pungamin tree, Guava tree, Teak tree are found within 500m radius.
29	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	The mine closure plan for the proposed project is included in the EIA report. Refer fig 2.14 in chapter 2. Page no 38
30	Public Hearing points raised and commitments of the project proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.	To be conducted in public hearing.
31	The public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	After completing public hearing shall be published in one major National daily and one most circulated vernacular daily.
32	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.	Yes, when conducted public hearing shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
33	As a part of the study of flora and fauna	Agreed. The EIA coordinator will educate

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	around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	the local students on the importance of preserving local flora and fauna.
34	The purpose of Green belt around the project is to capture the fugitive emissions' carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the Appendix-I in consultation with the DFO, state Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	Agreed. In consultation with the DFO, State Agriculture University, the green belt will be made around the boundary of lease area to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated
35	Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site-specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.	Agreed. Taller/one year old Saplings will be planted as per the advice of local forest authorities/botanist/ Horticulturist with regard to site specific choices.
36	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The Disaster management Plan has been prepared and included in the EIA report. Refer Chapter 7.
37	A Risk Assessment and Management plan shall be prepared and included in the EIA/EMP report for the complete life of the proposed quarry (or) till the end of the lease period.	Risk Assessment and management Plan has been prepared and included in the EIA report. Refer Clause 7.2 in Page No 168 of Chapter 7.
38	Occupational Health impacts of the	An occupational Health impact of the Project

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	project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area.	has been anticipated and the appropriate mitigation measures are given in Chapter 4 of EIA report.
39	Public health implications of the project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Yes it is given in EIA report in chapter -4.
40	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The study on Socio-economic for the proposed project is mentioned in Clause 3.10 of Chapter 3. Refer Page No 94 of EIA report.
41	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	Nil
42	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.,	The benefits of the proposed project are given detail in Chapter 8. Refer Page No 175-178.
43	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCCB.	NA. It is proposed for new quarry
44	The PP shall prepare the EMP for the	The EMP for the proposed project is

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	entire life/lease of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	mentioned in Chapter 10 along with EMP cost. The affidavit stating to abide the EMP for the entire life of mine will be attached in the EIA report.
45	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of these Terms of conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Agreed.

Compliance of conditions mentioned in TOR letter by SEIAA

Compliance of Annexure 'B'

S. No	CONDITIONS	COMPLIANCE
Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as member including the existing as well as proposed quarry.	Agreed. The Cluster Management Committee will be formed as per SEAC guidance.
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.,	Agreed. After forming CMC, the all the members will implement environment management plan effectively. Effective plan has been given in Chapter – 4.
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.	Agreed. The List of members of the committee formed will be submitted to AD/Mines before the commencing the quarry activity.
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.	Certified Blaster will be engaged for blasting having adequate knowledge in Environmental safety aspects. Plan will be included in the EIA report. The usage of haul roads by the individual quarry is attached in EIA report. Refer Fig No 2.5 in page No 18 of Chapter 2.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially	Risk Management is elaborated in Chapter 7 of the EIA report

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	during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	Agreed. The CMC will form Environmental Policy to practice sustainable mining in a scientific and systematic manner. The same shall be displayed within the cluster area.
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.	The conceptual plan for the quarry area 0.88.0 Ha is attached in the EIA report. After forming CMC, the restoration strategy of individual quarry will be submitted to AD Mines, Karur.
8	The committee shall furnish the Emergency Management plan within the cluster.	Agreed. After forming CMC, the committee will furnish the Emergency Management plan to AD Mines, Karur.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Occupational safety and Health care of the workers are included in Chapter – 4 in the EIA report.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	Agreed. After forming CMC, the committee will furnish the action plan to achieve sustainable development goals with reference to water, sanitation & safety to AD Mines, Karur.
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	Agreed. After forming CMC, the committee will furnish fire safety and evacuation plan to AD Mines, Karur.
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 & bio-diversity. b) Climate change leading to Droughts, Floods etc.	Impact on Soil Health, biodiversity, carbon emission and impact on water environment including aquatic ecosystem and on agricultural environment are discussed in detail in Chapter 4.

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	<p>c) Pollution leading to release of Greenhouse gases (CHG), rise in Temperature, & Livelihood of the local people.</p> <p>d) Possibilities of water contamination and impact on aquatic ecosystem health.</p> <p>e) Agriculture, Forestry & Traditional practices.</p> <p>f) Hydrothermal/Geothermal effect due to destruction in the Environment.</p> <p>g) Bio-geochemical processes and its foot prints including environmental stress.</p> <p>h) Sediment geochemistry in the surface streams.</p>	
Agriculture & Agri - Biodiversity		
13	Impact on surrounding agricultural fields around the proposed mining area.	The impact on surrounding agricultural fields is given in chapter 4.
14	Impact on soil flora & vegetation around the project site.	The impact on ecology and biodiversity including soil flora & vegetation around the project site is mentioned in Chapter 4. Refer page 148.
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 the EMP.	As it is existing rough stone quarry there is no trees or plants in quarry area. However PP planted Neem trees along the boundary of mining lease area. There are only few numbers of Neem trees, coconut trees, palm trees, <i>Prosopis juliflora</i> are found within 500m radius buffer zone. It will not be disturbed during quarrying activity.
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 impact on ecology and biodiversity including the soil micro flora, fauna and soil seed banks around the project site is mentioned in Chapter 4. Refer page 148.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	At the end of mining, the quarried out pit will be used as water storage pond which improves the agricultural activity in the buffer zone. The afforestation plan for five years is given in Chapter 4. Refer table 4.30 in page 155.
18	The project proponent shall study and	Anticipated impact on Agriculture,

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Proponent: R.K.Panneerselvam, Ordinary Stone and Gravel Quarry, Karur District

	furnish the impact of project on plantations in adjoining patta lands, horticulture, Agriculture and livestock.	Horticulture and livestock is given Chapter 4. Refer Clause 4.14 in page 159.
Forests		
19	The project proponent shall detailed study on impact of mining on reserve forests free ranging wildlife.	There is No reserve forests located within 10km radius of the project site. There are no wildlife sanctuaries within 10km radius. Refer Table 2.3 in Page No 16 of Chapter 2.
20	The Environmental Impact Assessment should study on impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	There is no endangered species found within 10km radius study area.
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	As it is existing rough stone quarry, no trees and shrubs are present in the quarry area.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	There are no protected areas, National Parks, Corridors and Wildlife pathways within 10km radius of the project site. There is no reserve forest located within 10km radius. The impact on reserve forest is given in Chapter 4.
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 1km (radius) so as to assess the impacts on the nearby water bodies 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.	The hydro geology study has been conducted within the study area of project site. Refer Page No 64 in Chapter 3. The details of water bodies in the study area are given chapter 2. Refer page no 16. The depth of water table identified by Geo resistivity survey is 36m bgl whereas the proposed depth of mining is 19 and 33m bgl. Therefore the mining activity will not intersect ground water table.
24	Erosion Control measures.	To control the erosion, the tree sapling will be planted along the mining lease boundary. Garland drainage will be developed around the dump to control the washout of dump due to

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		hydrostatic pressure.
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.	The impact of mining on the nearby villages and water bodies are given detail in chapter 4.
26	The Project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	The detailed study of impact on fish habitation and food WEB/ food chain in the water body and reservoir is given in Chapter 4. Refer table 4.29, page 151.
27	The Project Proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The detailed impact studies are given in Chapter 4.
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 site possible land form changes visual and aesthetic impacts.	The study and the impact on aquatic plants and animals in water bodies are mentioned in Chapter 4. There are no caves, heritage site, and archaeological site found within 10km radius of project site.
29	The terms of reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact study on soil health and erosion is given in Clause 4.7 in Chapter 4. Refer page 147. The soil physical, chemical components and microbial components are given in Chapter 3.
30	The Environmental Impact Assessment should study on wet lands, water bodies, rivers, streams, lakes and farmer sites.	The impact study on surface water bodies and agricultural land is given in chapter 4.
Energy		
31	The measures taken to control Noise, Air, Dust control and steps adopted to efficiently utilise the energy shall be furnished.	The mitigation measure for air pollution and noise pollution is given in chapter 4.
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 due to proposed mining activity and its mitigation measures are given in Chapter 4. Refer in page 133.

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33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The carbon emission due to proposed mining activity and its mitigation measures are given in Chapter 4. Refer clause 4.2 in page 133.
Mine closure plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued is given in Chapter 2.
EMP		
35	Detailed Environmental Management Plan along with adaption, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed environmental management plan is given in Chapter 10, pg. No. 181.
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.	<p>The environmental management plan is given chapter 10. The cost for green belt development is mentioned in table 10.2 in Chapter 10. Refer Page No 186.</p> <p>Budget for mine closure plan is given in Table 10.3 in Page No 186 of Chapter 10.</p> <p>The disaster management plan is given in Chapter 7. Refer page no 169.</p>
Risk Assessment		
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of mining.	Disaster management plan is given in Chapter 7, pg. No. 169.
Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	Details are furnished in Table 7.1 in chapter 7, pg. No. 169.
Others		
39	The project proponent shall furnish VAO	The letter regarding approved habitations,

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	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.	schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake, pond, tank within 300m radius has been obtained from VAO.
40	As per the MoEF&CC office memorandum F.No22-65/2017-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.	No need for public hearing in this project. The Final EIA Report prepared part of the Environment Management Plan.
41	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecological risks and impacts of plastic & micro plastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The study on pollution due to plastic and micro plastic and its ecological risk is mentioned in Chapter 7. Refer Clause 7.5 in Page no 173 and 174.

CHAPTER – 1: INTRODUCTION

1.1 Purpose of the Report

The Applicant, Thiru. R. K. Panneerselvam have applied for grant of permission for quarrying Ordinary stone and gravel quarry over an extent of 0.88.0 hectares in S.F.N: 3/2 located in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for a period of Ten years and 5 years (From the date of execution).

The Assistant Director, Department of Geology and Mining, Karur has directed the applicant, Thiru. R. K. Panneerselvam, S/o Thiru. R. P. Kaliappan, to get mining plan is approved vide letter No. Rc.No.60/Mines/2021, dated 10.10.2022 obtain Environmental clearance from the State Environment Impact Assessment Authority (SEIAA) as per the EIA Notification, 2006 and its amendments for grant of quarrying lease to Ordinary stone and gravel quarry in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for the period of Ten years (From the date of execution).

The mining plan for Ordinary stone and gravel quarry of the applicant has been prepared as per the Assistant Director's Precise area communication letter under Rule 41& 42 of Tamil Nadu Minor Minerals Concession Rules, 1959 for quarrying Ordinary stone and gravel and it has been approved by Assistant Director, Department of Geology and Mining, Karur.

As per the cluster letter issued by Assistant Director, Department of Geology and Mining, Karur vide Rc.No.60/Mines/2021, dated 31.10.2022 for Thiru. R. K. Panneerselvam (0.88.0 Ha) the lease area of above said two 6 applicants comes in cluster of 500m radius. The total area of cluster is 10.74.25 Ha. The extents of lease area of all individual as per cluster letter are given below.

Proposed Quarries

1. Thiru. R. K. Panneerselvam – 0.88.0 Ha
2. Thiru. P.Prabhakaran – 0.70.93 Ha
3. Thiru. M.K.Kungumaraj – 3.00.0 Ha

Existing Quarries

1. Thiru. R. K. Panneerselvam – 1.59.32 Ha
2. Thiru. D. Sivajeeeganesan – 3.41.0Ha

Abandoned Quarries

1. Thiru.K. Palanisamy – 1.15.0 H

As the projects comes under B1(cluster) category, the applicants made TOR application individually the Ordinary PARIVESH website for carrying out EIA Studies for obtaining Environmental clearance. The details are given in below table 1.1.

Table No. 1.1: Details on Terms of Reference

S. No	Name of Proponent	ToR Application No	SEAC and SEIAA Meeting No	TOR letter No
1.	R. K. Panneerselvam	SIA/TN/MIN/406 955/2022 Dated 19.11.2022	346 th SEAC meeting, dated 12.01.2023	Lr.No.SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023

In TOR letters, it is mentioned that public hearing needs to be conducted for the proposed Ordinary stone and gravel quarry of project proponent for obtaining EC. As per MOEF&CC SO 141 (E) dated 15.01.2016-Appendix XI, there shall be one public consultation for entire cluster after which the final Environmental Impact Assessment Report or Environmental Management Plan report for the cluster shall be prepared. Based on the OM issued by MOEF & CC, the Draft EIA/EMP report has been prepared for the one quarry in the cluster of 10.74.25 Ha for conducting public hearing. The points raised in the public hearing and the commitments of the project proponent will be given detail in the Final EIA Report which will be submitted to SEAC/SEIAA, TN for obtaining environmental clearance.

1.2. Identification of Project and Project Proponent

Table No. 1.2: Details on Project and Project Proponent

A. Proposed Projects to Conduct Public Hearing	
1. Thiru.R.K. Panneerselvam	
Particulars	Details
Address of the Project Proponent	R.K. Panneerselvam S/o. Thiru. R.P. Kaliappan, No. 163, Rengapalayam, Punnamchatram, Punnam Village, Aravakuruchi Taluk, Karur District-639 136, Mobil No: 9442626411 Email id: rkpanneer@gmail.com
Lease Area	0.88.0 Ha (Patta Land)
Site Location	S.F.No: 3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

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Geographical Co-ordinates	Latitude: 10° 44'25.88" N to 10° 44'28.69"N Longitude: 77°57'20.81"E to 77°57'25.60"E.
Toposheet No.	58F/14
Elevation	Elevation of the area is 180m above MSL.
Precise Area Communication	Roc.No.60/Mines/2021, dated 26.08.2022
Period of Lease	10 years from the date of execution.
Mining Plan Approval Details	Mining plan approved by AD, Dept of Geology and Mining Vide Roc.No.60/Mines/2021, dated 10.10.2022
AD Cluster letter	Rc.No.60/Mines/2021, dated 31.10.2022
C. Existing Quarries	
1. Thiru. R. K. Panneerselvam	
Lease Area	1.59.32Ha
Site Location	S.F. No: 2/4B, 3/3(P), 3/4, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
2. Thiru. D. Sivajeeganesan	
Lease Area	3.41.0 Ha
Site Location	S.F. No: 27/2, 28, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
D. Abandoned Quarry	
1. Thiru. K. Palanisamy	
Lease Area	1.15.0 Ha
Site Location	S.F. No: 2/3, 2/4A, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

Table No. 1.3: Land Particulars

1. Thiru.R.K. Panneerselvam					
District & State	Taluk	Village	S.F.No.	Area (Ha)	Ownership/ Occupancy
Karur & Tamil Nadu	Aravakuruchi	Anjagoundanpatti	3/2	0.88.0.Ha	Patta land
Total				0.88.0.Ha	

1.3. Brief Description of the Project

1.3.1. Nature and Size of the Project

Open cast - Mechanized mining shall be adopted to raise the production in this area and transportation of ore and waste. The excavated Ordinary stone is used for building's basement stones and also used for crushing units and other infrastructure development work in and around the district.

For R.K. Panneerselvam Ordinary stone and gravel quarry, Geological resources of Ordinary stone and gravel is estimated as 89291m³ and mineable reserves is estimated at 54378m³ @ 95% up to depth 33m and 12672 m³ of gravel up to the depth of 3m leaving necessary safety distance from the lease boundary. Production Schedule is proposed as 35283m³ @ 95% of Ordinary stone for five years and 12672m³ of Gravel for one year and average production is 7057m³ per annum as per approved mining plan.

1.3.2. Location of the Project

The proposed sites are accessible from Karur. By travelling NH -44 from Karur via Dindigul we can reach Aravakurichi at the distance of 29.8 km. Further travel for 6 km, there is village road on left side. We can reach Thirukooranam village then 2km reach the site. There is an approach road located nearby the site on the Southwest side for transport of materials. Survey of India Toposheet No. 58F/14. The location map is given in fig 1.1. The latitude and longitude of four lease areas are given in below table

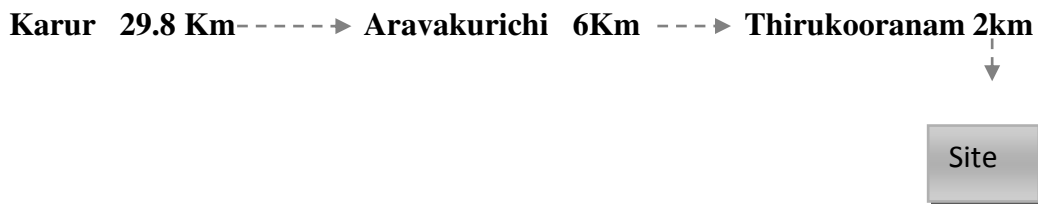


Table No.1.4: Latitude and Longitude of two proposed quarry

S. No	Project Site	Latitude	Longitude
1	R.K.Panneerselvam - 0.88.0 Ha	10° 44'25.88"N to 10° 44'28.69"N	77°57'20.81"E to 77°57'25.60"E

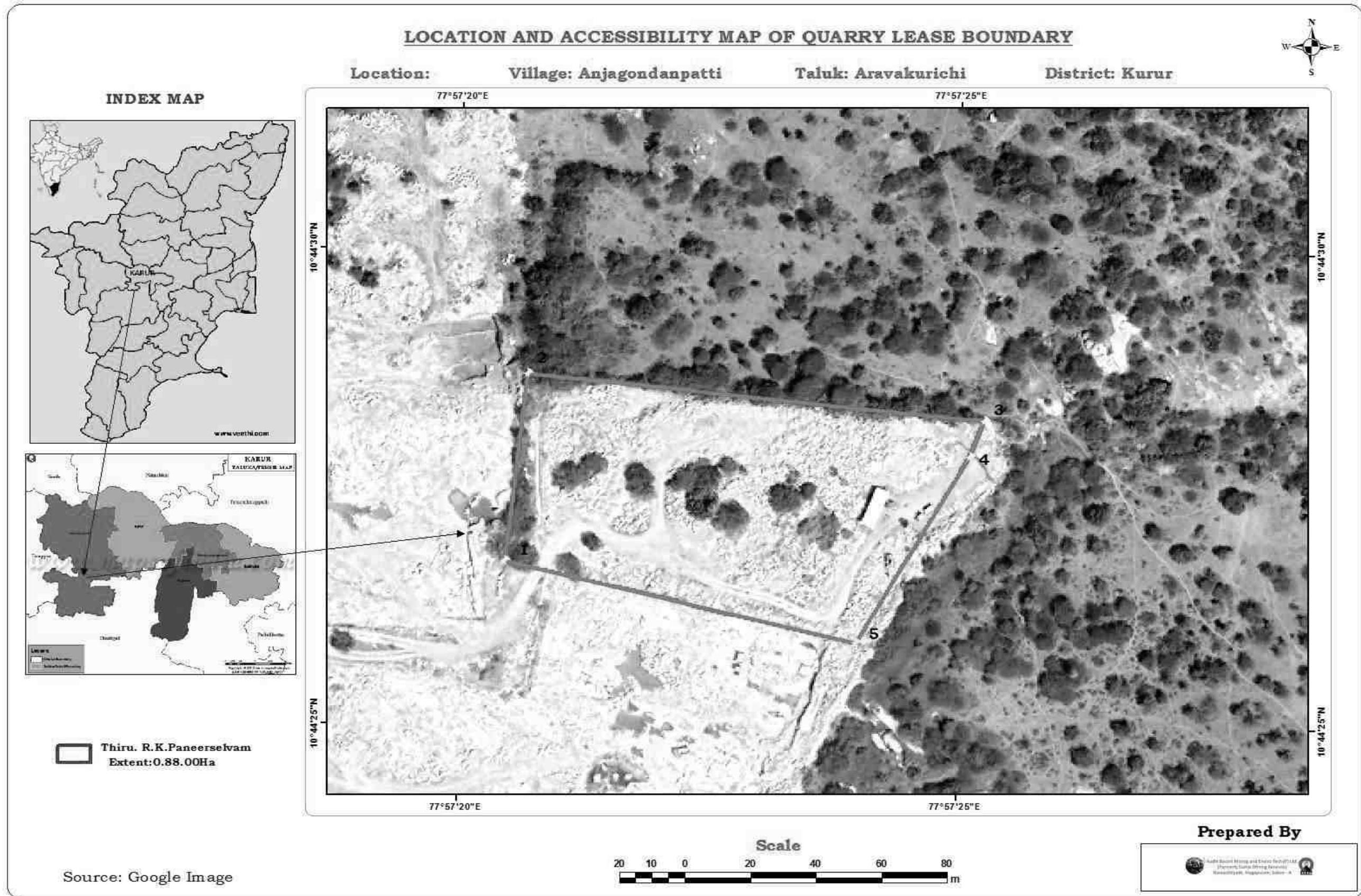


Fig No. 1.1: Showing Location and route map for proposed Ordinary stone and gravel quarry

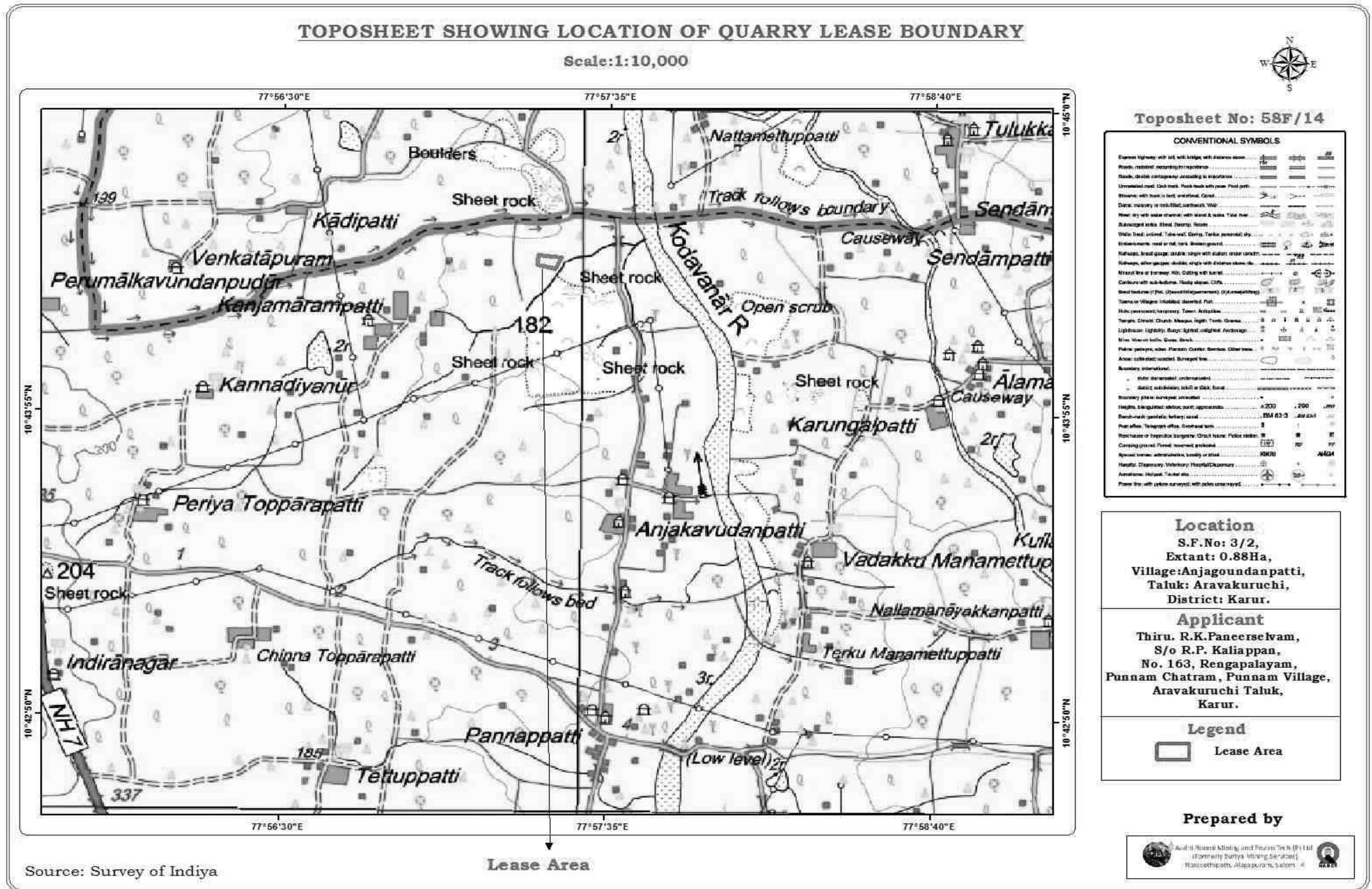


Fig No. 1.2: Toposheet showing Location of the proposed Ordinary stone and gravel quarry



Fig No. 1.3: Google Earth Image showing 300m and 500m radius around the proposed Ordinary stone and gravel quarry

1.4. Scope of the Project

The proposal for Environment clearance for ordinary stone and gravel quarry of Thiru. R. K. Panneerselvam, S/o R. P. Kaliappan require draft Environmental Impact Assessment (EIA) study to be carried out as per Standard, Specific and additional TOR specified by the SEAC. Based on the documents furnished for TOR, the Committee observed that the project falls under the category B1(Cluster) and schedule 1(a) of the EIA Notification, 2006 as the cluster area is greater than 5 Ha and less than 250 Ha. This is primarily to ascertain the potential impacts of the mining activity on environmental components, prediction and evaluation of environmental impacts to delineate Environment Management Plan.

The EIA/EMP report also includes an independent chapter prepared by an Accredited Consultant. The collection and analysis of air, water and soil sample required for preparation of EIA report data will be done by an Environmental Laboratory duly notified under the Environment (Protection) Act, 1986, accredited by NABET/NABL.

The scope of the study includes a detailed characterization of the environment in an area of 10km radius from the mine lease Area. The EIA covers one season baseline environmental data, as per the standard generic model given by the MoEF&CC, New Delhi.

In order to assess the likely impacts arising out of this project on the surrounding environment and evaluating the quantum of likely negative impacts, if any, from this mine, the proponent has selected Aadhi Boomi Mining and Enviro Tech Pvt. Ltd., Salem as their EIA consultant for this project. ABM prepared an Environmental Impact Assessment (EIA) report and made an effective Environment management Plan (EMP) for various environmental components likely to be affected.

The scope covers all the conditions along with the specific and additional TOR prescribed by SEAC/SEIAA, Tamil Nadu vide Lr.No.SEIAA-TN/F.No.9586/SEAC/TOR-1333/2022 dated 10.02.2023

1.5 Methodology of EIA Study

The EIA study includes detailed baseline data generation and characterization of existing status of environment in an area of 10km radius with the project as its centre for various environmental components viz. air, noise, water, land, geo-hydrology, Noise & Vibration, biological and socio-economic components and other parameters of interest. The envisaged scope of EIA is as follows:

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- To assess the present status of air, biota, water, land, biological and socio-economic components of environment within 10km radius of study area from the project site.
- To identify and quantify the significant positive and negative impacts due to various mining operation in various components of the environment the Ordinary identification and prediction of impacts
- To identify the impact and description of the impact with quantitative and qualitative data
- To prepare a detailed Environment Management Plan for implementation of mitigate measures
- To suggest a monitoring program to evaluate the effectiveness of mitigate measures
- Post-project environmental quality monitoring program to be followed

The baseline monitoring study has been carried out during the 1st March 2022 to 31st May 2022 for various environmental components so as to assess the anticipated impact on the environment and suggest suitable mitigation measures for likely adverse impacts due to the project. Environmental attributes, source and frequency of monitoring are outlined in table 1.5.

Table No. 1.5: Environment Attributes

S. No	Attributes	Parameters	Source and Frequency
1	Meteorology	Temperature, Wind Speed, Wind Direction, Rain fall, Relative Humidity,	Secondary sources of IMD station, Karur. Hourly recorded data for the period of 3 months.
2	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x	8 hour samples twice in a week for three months at 5 locations.
3	Water Quality	Physical, Chemical and Biological parameters	Grab sampling at 3 locations once during study period.
4	Noise levels	Noise levels in dB(A)	At 5 locations data monitored once in a Month for three months for 24 hours during EIA study.
5	Soil Characteristics	Physical and Chemical parameters	Once at 3 locations during study period
6	Hydrogeology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected the Ordinary field investigation devices once in a study.
7	Land use	Existing land use for different categories	Based on Survey of India Toposheet and Google Earth imagery
8	Ecology and Biodiversity	Existing terrestrial flora and fauna within 10Km radius	Field observation and utilization of Secondary data.

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9	Socio–Economic aspects	Socio–economic and demographic characteristics, worker characteristics	Based on collection of primary data the Ordinary questionnaire analyses and utilization of Secondary data from census records (2001 –2011), statistical hand books, toposheets, health records and relevant official records.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances if any	Based on the findings of risk associated with explosives, landslides, slips and fire/explosion during blasting etc..,

The impacts of the project activities on environmental components can be quantified the ordinary EIA studies within the impact zone of the project activities. The results of EIA studies form the basis for the preparation of a viable EMP for mitigation of the adverse impacts.

CHAPTER – 2: PROJECT DESCRIPTION

2.1. Need for the Project

The Applicant, Thiru. R. K. Panneerselvam, S/o R. P. Kaliappan a have applied for grant of permission for quarrying Ordinary stone and gravel quarry in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu for a period of 10 years and Five years (From the date of execution). The mining plan for ordinary stone and gravel quarry of the applicant has been prepared as per the Assistant Director’s Precise area communication letter under Rule 41& 42 of Tamil Nadu Minor Minerals Concession Rules, 1959 for quarrying ordinary stone and gravel and it has been approved by Assistant Director, Department of Geology and Mining, Karur.

Ordinary stone is one of the important materials for the building construction. The ordinary stone is used as both as coarse aggregate and fine aggregate after the proper sizing of stone. The coarse and fine aggregate are essential for preparing concrete which is used in foundation, beam, column, roof slab work of the buildings. The infrastructure is the sign of development of nation. So it is very need to excavate the ordinary stone for economic and infrastructure development of our nation.

2.2 Demand – Supply Gap

The coarse and fine aggregate are the basic raw material for the building construction and the road formation. It takes place in all villages, towns, cities and metropolitan cities. There is great demand in availability of ordinary stone. So it is necessary to fulfill the demand by starting the proposed ordinary stone and gravel quarry.

2.3 Location

The area is represented by Survey of India Toposheet No. 58 F/14. The lease boundary with Geo Co-ordinates is shown in fig 2.1. The latitude and longitude of lease areas are given in below table 2.1.

Table No. 2.1: Latitude and longitude of two proposed quarry

S. No	Project Site	Latitude	Longitude
1	R.K.Panneerselvam – 0.88.0 Ha	10° 44'25.88”N to 10° 44’28.69”N	77°57'20.81"E to 77°57'25.60"E

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Latitude and Longitude of all boundary Pillars of lease area are given in below table 2.2.

Table No. 2.2: Co-ordinates of lease Boundary Pillars

R.K. Panneerselvam Ordinary Stone and Gravel Quarry		
P. No	Latitude	Longitude
1	10°44'26.72"N	77°57'20.81"E
2	10°44'28.69"N	77°57'21.03"E
3	10°44'28.22"N	77°57'25.60"E
4	10°44'27.84"N	77°57'25.45"E
5	10°44'25.88"N	77°57'24.33"E

- No Trees will be uprooted due to this quarrying operation.
- The existing road from the main road to quarry is in good condition and the same will be maintained and utilized for transportation of ordinary stone and gravel quarry.
- There will be no Export of this quarrying ordinary stone

DRAFT EIA/EMP REPORT FOR CLUSTER OF FOUR QUARRIES
 Cluster Area: 10.74.25 Ha, Ordinary Stone and Gravel Quarry, Karur District

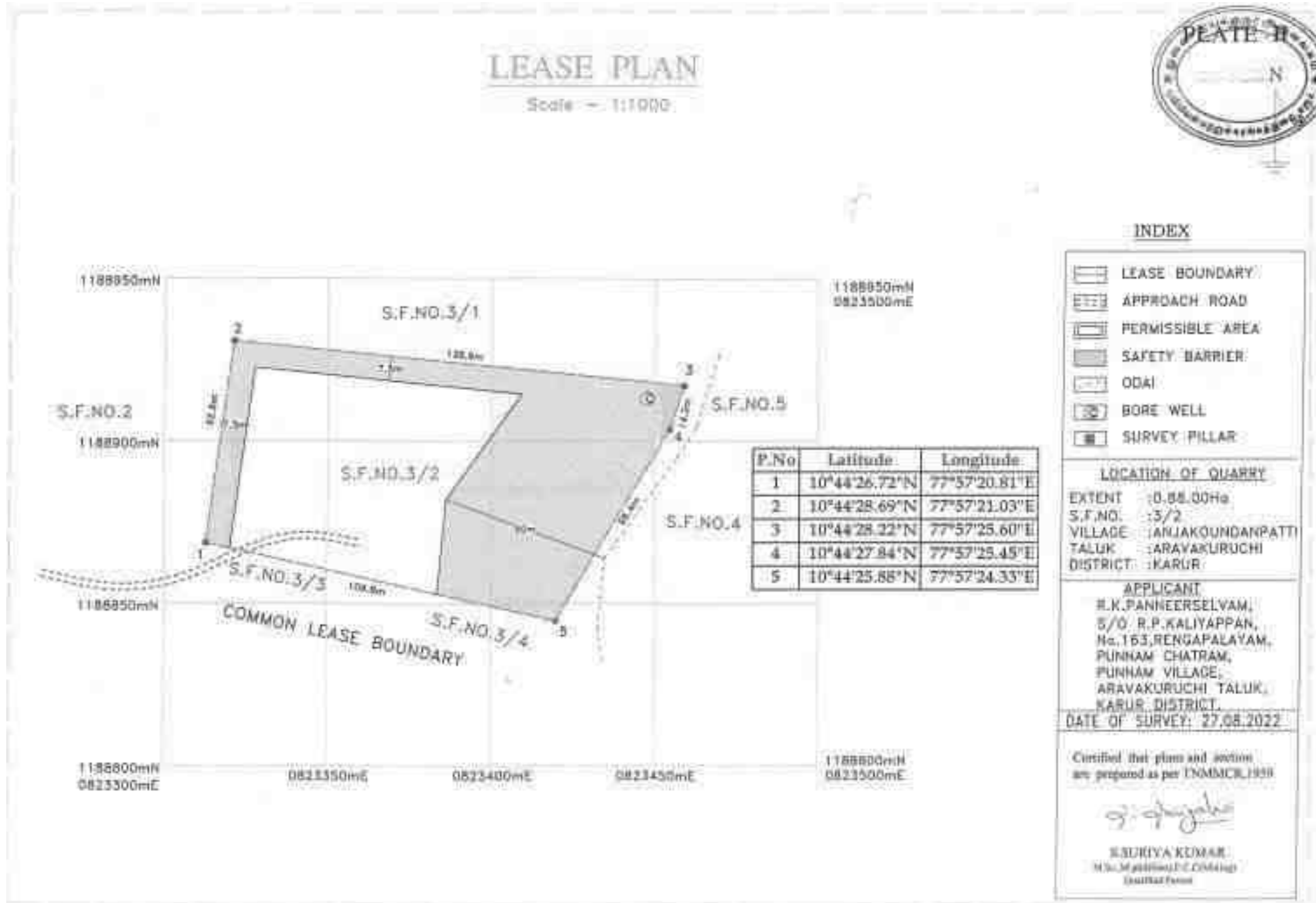


Fig No.2.1: Lease Plan of R.K. Panneerselvam, Ordinary stone and gravel quarry

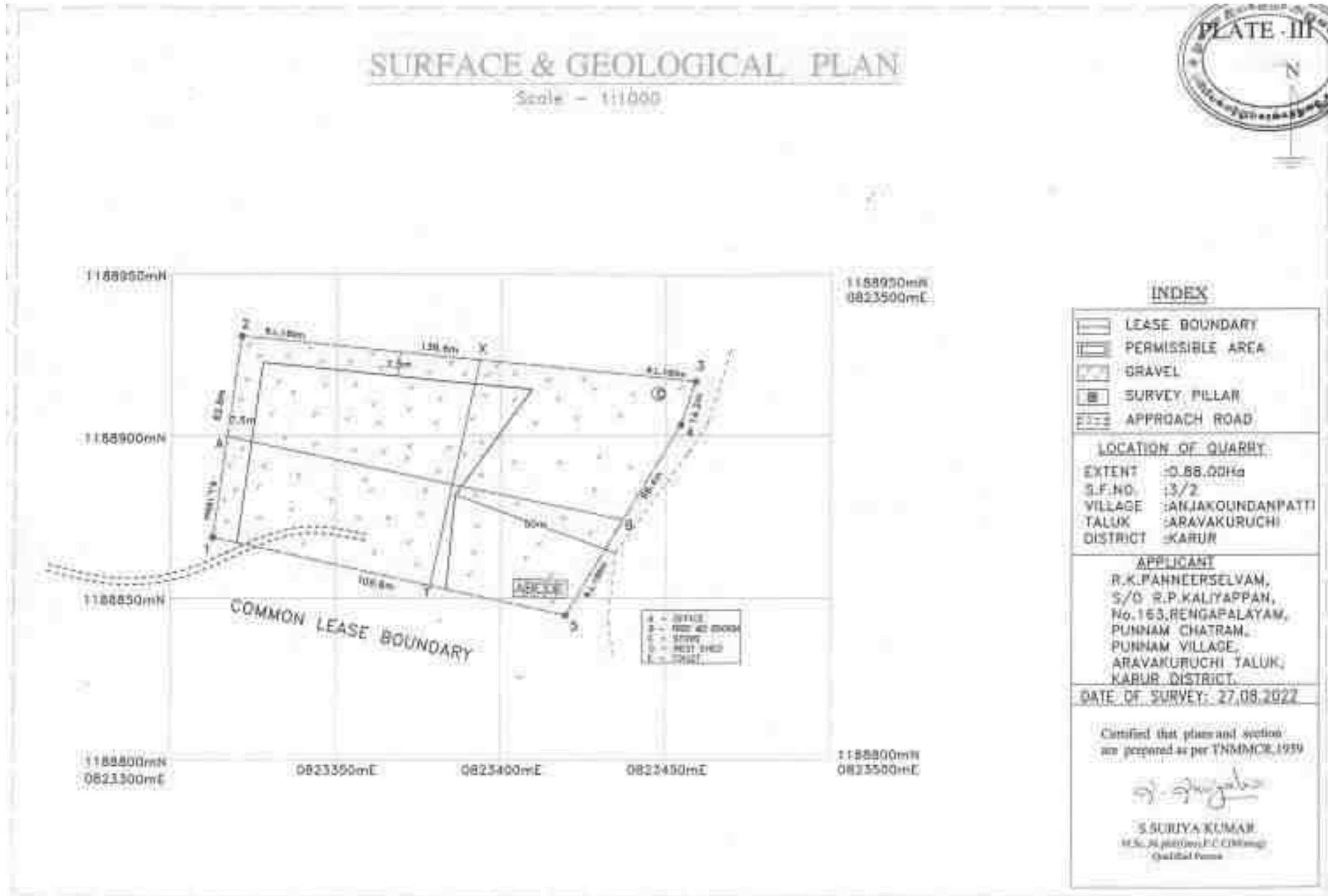


Fig No.2.2: Surface Plan of R.K. Panneerselvam, Ordinary stone and gravel quarry

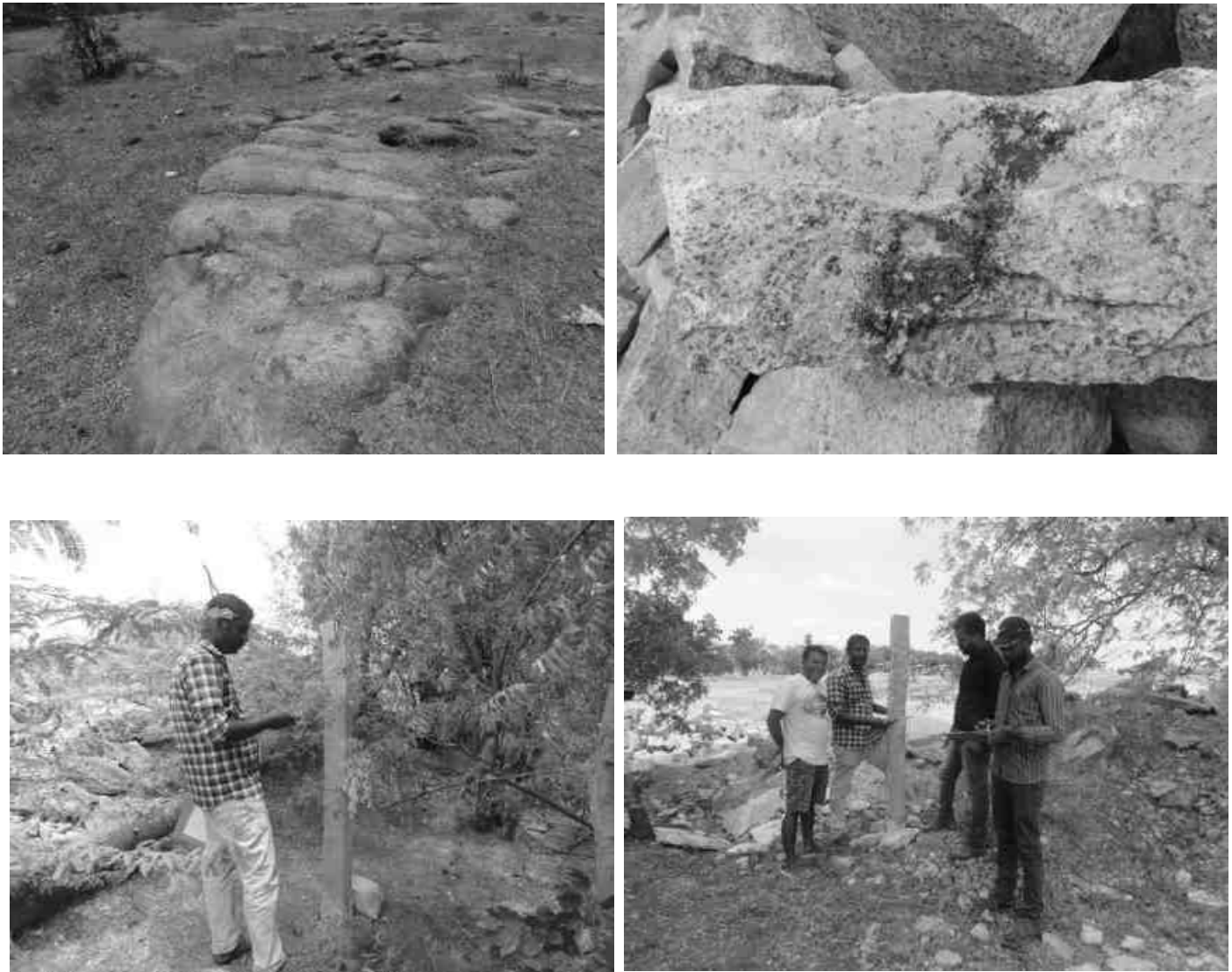


Fig No. 2.3: Photograph shows general view of lease area of R.K. Panneerselvam and GPS reading on lease boundary pillars.

Table No. 2.3: Environmental Settings

Accessibility																									
Nearest Village	Anjagoundanpatti Village <ul style="list-style-type: none"> • For Lease Area of R.K. Panneerselvam – 1.8km – SE 																								
Nearest Settlement	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">S. No</th> <th style="width: 35%;">Village Name</th> <th style="width: 25%;">Total population as per 2011 census</th> <th style="width: 35%;">Distance with Direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Anjagoundanpatti</td> <td style="text-align: center;">220</td> <td>1.8-SE</td> </tr> <tr> <td style="text-align: center;">2</td> <td>E Alamarathupatti</td> <td style="text-align: center;">3113</td> <td>1.5 km-NE</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Thirukooranam</td> <td style="text-align: center;">6487</td> <td>1.6 km -N</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Seethapatti</td> <td style="text-align: center;">364</td> <td>1.5 km- NW</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Senthampatti</td> <td style="text-align: center;">1628</td> <td>3.9 km - E</td> </tr> </tbody> </table>	S. No	Village Name	Total population as per 2011 census	Distance with Direction	1	Anjagoundanpatti	220	1.8-SE	2	E Alamarathupatti	3113	1.5 km-NE	3	Thirukooranam	6487	1.6 km -N	4	Seethapatti	364	1.5 km- NW	5	Senthampatti	1628	3.9 km - E
S. No	Village Name	Total population as per 2011 census	Distance with Direction																						
1	Anjagoundanpatti	220	1.8-SE																						
2	E Alamarathupatti	3113	1.5 km-NE																						
3	Thirukooranam	6487	1.6 km -N																						
4	Seethapatti	364	1.5 km- NW																						
5	Senthampatti	1628	3.9 km - E																						
Nearest Town	Aravakurichi – 6.0 km -NW																								
Nearest Railway station	Palayam – 20 km -E																								
Nearest Airport	Tiruchirappalli International Airport – 82 km - E																								
Environmental Sensitiveness																									
Interstate Boundary	Tamil Nadu –Kerala Interstate boundary – 93 km (W)																								
Coastal Zone	Bay of Bengal – 155km –E																								
Reserve Forest	<ol style="list-style-type: none"> 1. Rengamalai Reserve Forest– 10 km 2. Vadamalai Reserve Forest – 1.5 km The proposed projects site does not attract Forest Conservation Act, 1980.																								
Wildlife sanctuary	Nil within 10km radius. The Proposed projects site does not the Wildlife (Protection) Act, 1972.																								
Water bodies	<ol style="list-style-type: none"> 1. Godavanar River – 700m – E 2. Godavanar Check dam – 750m – NE 3. Alamarathupatti lake – 1.6km – NE 4. Small odai – 1.3km – NE 5. Amaravathi river – 8.4km – NW 6. Nanganji River – 5.2km – W 7. A lake near ponnambatti – 5.00km -N 																								
Defense Installations	Nil within 10km radius																								
Critically Polluted area	Nil within 10km radius																								
Seismic zone	Zone-III, Moderate damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002																								

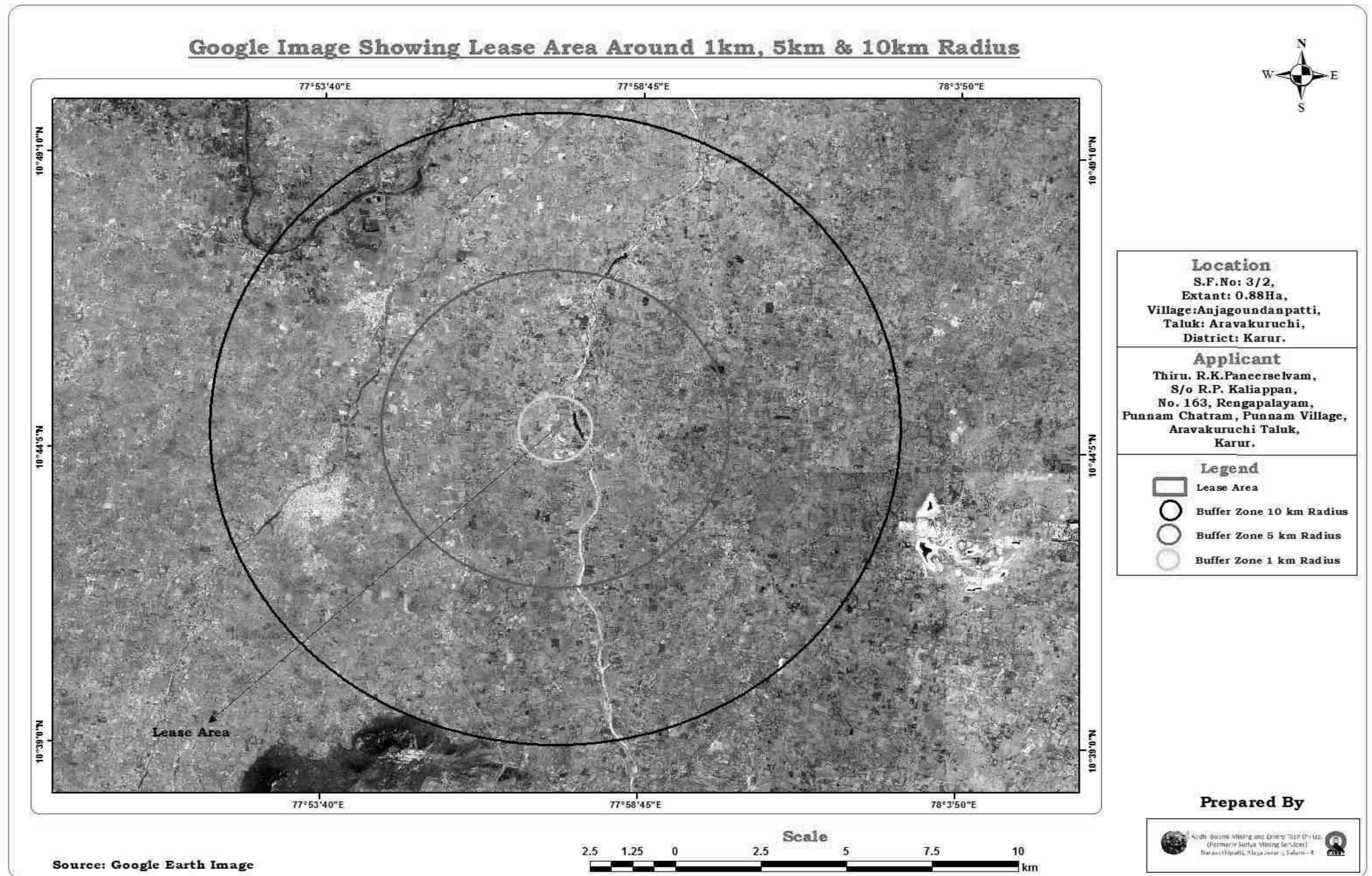


Fig No. 2.4: Google Earth Image showing 1km, 5km, 10 km radius around the proposed ordinary stone and gravel quarry

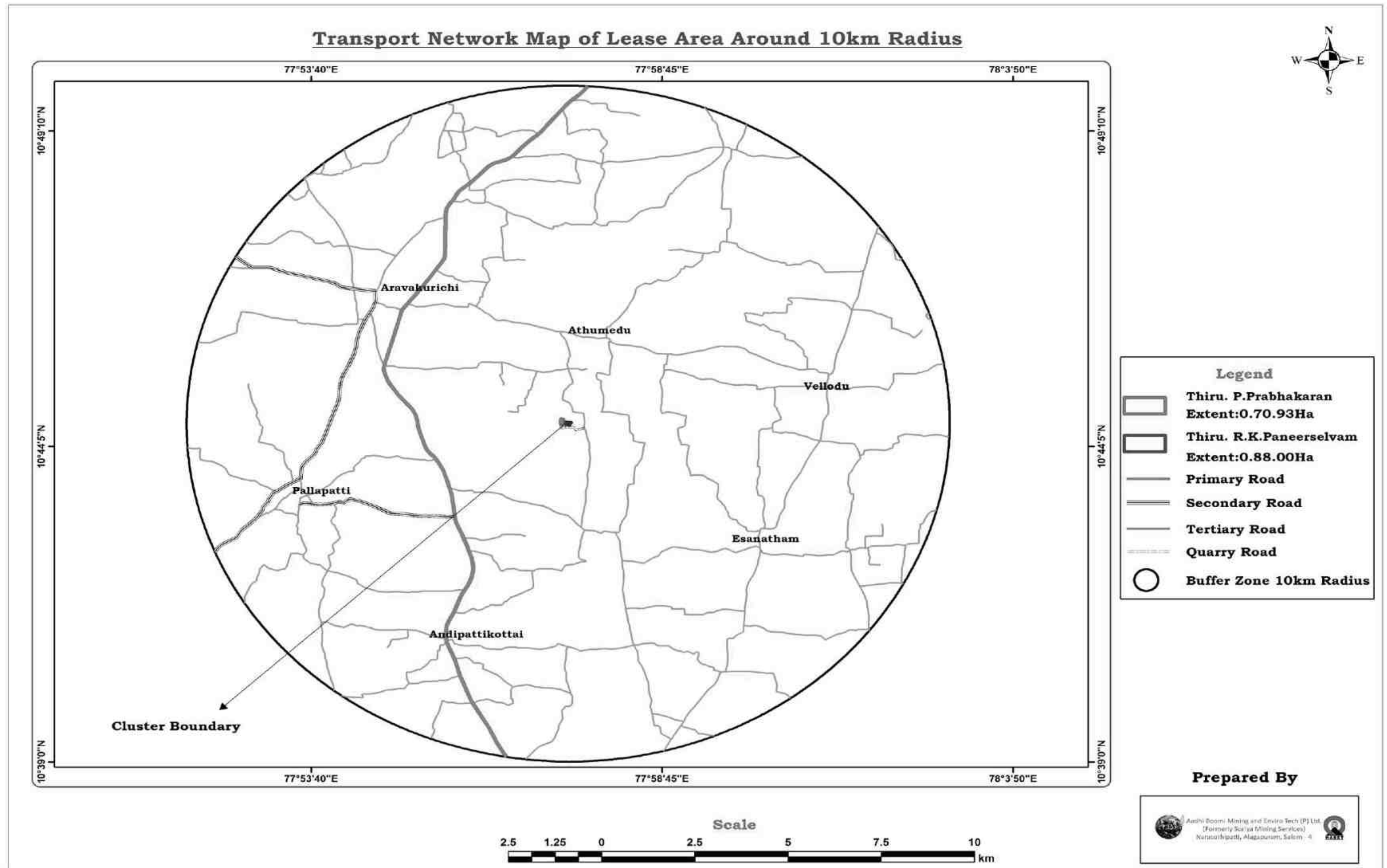


Fig No. 2.5: Image showing Transport Network of 10 km radius around the proposed ordinary stone and gravel quarry

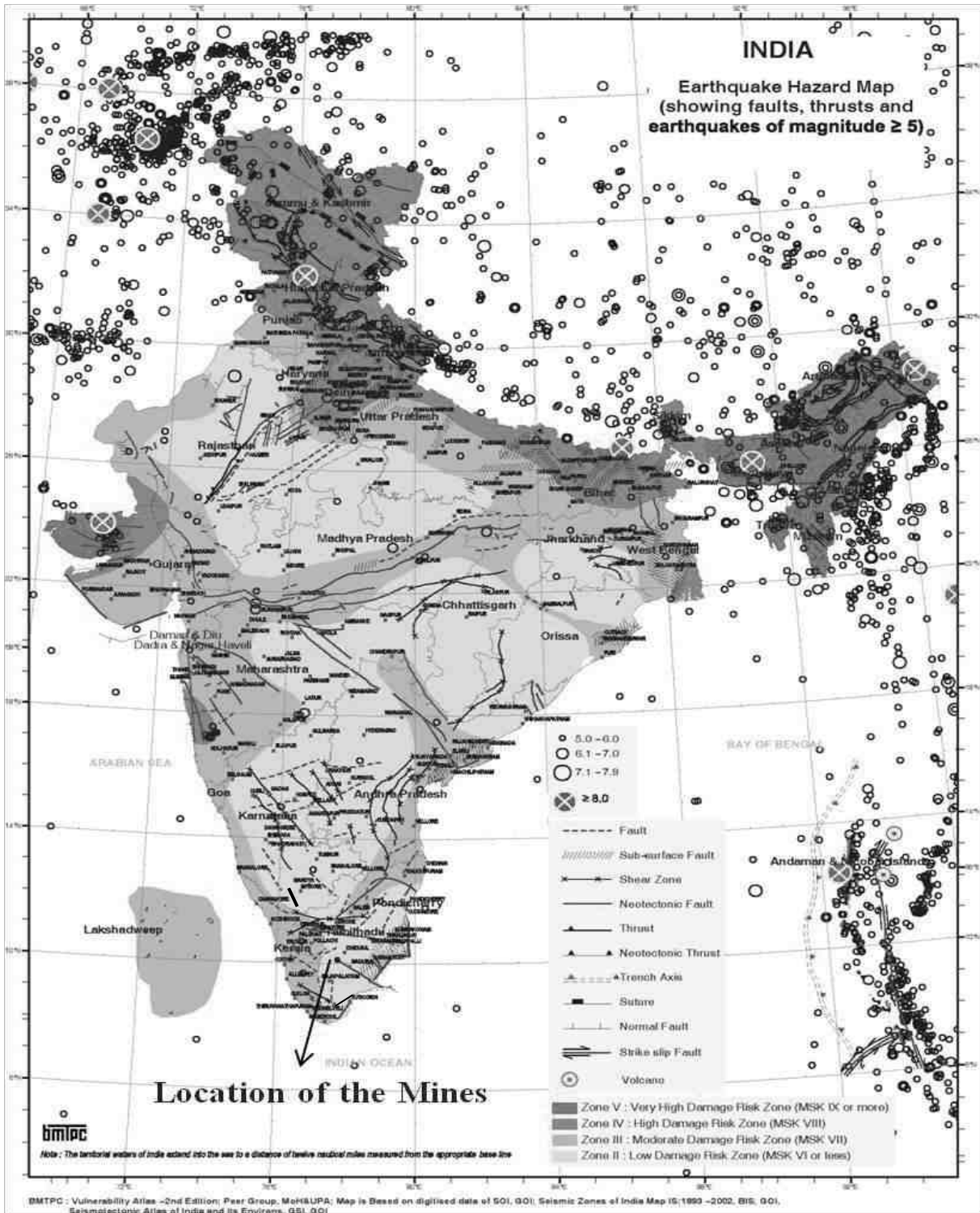


Fig No. 2.6: Earthquake Hazard Map

The cluster area falls under Zone-II, Low damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002.

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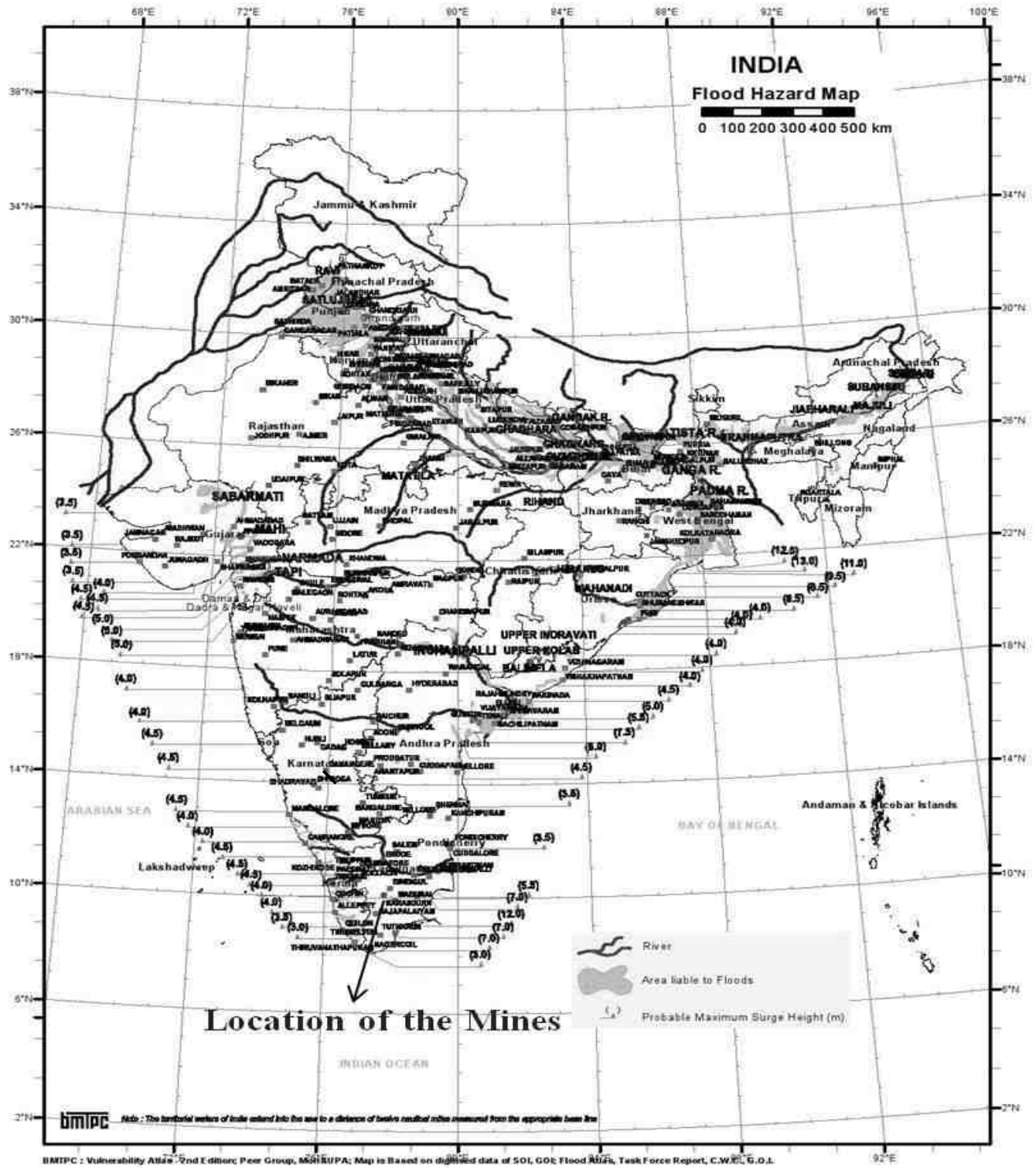


Fig No. 2.7: Flood Hazard Map

The cluster area falls under Probable Maximum Surge Height of 5m.

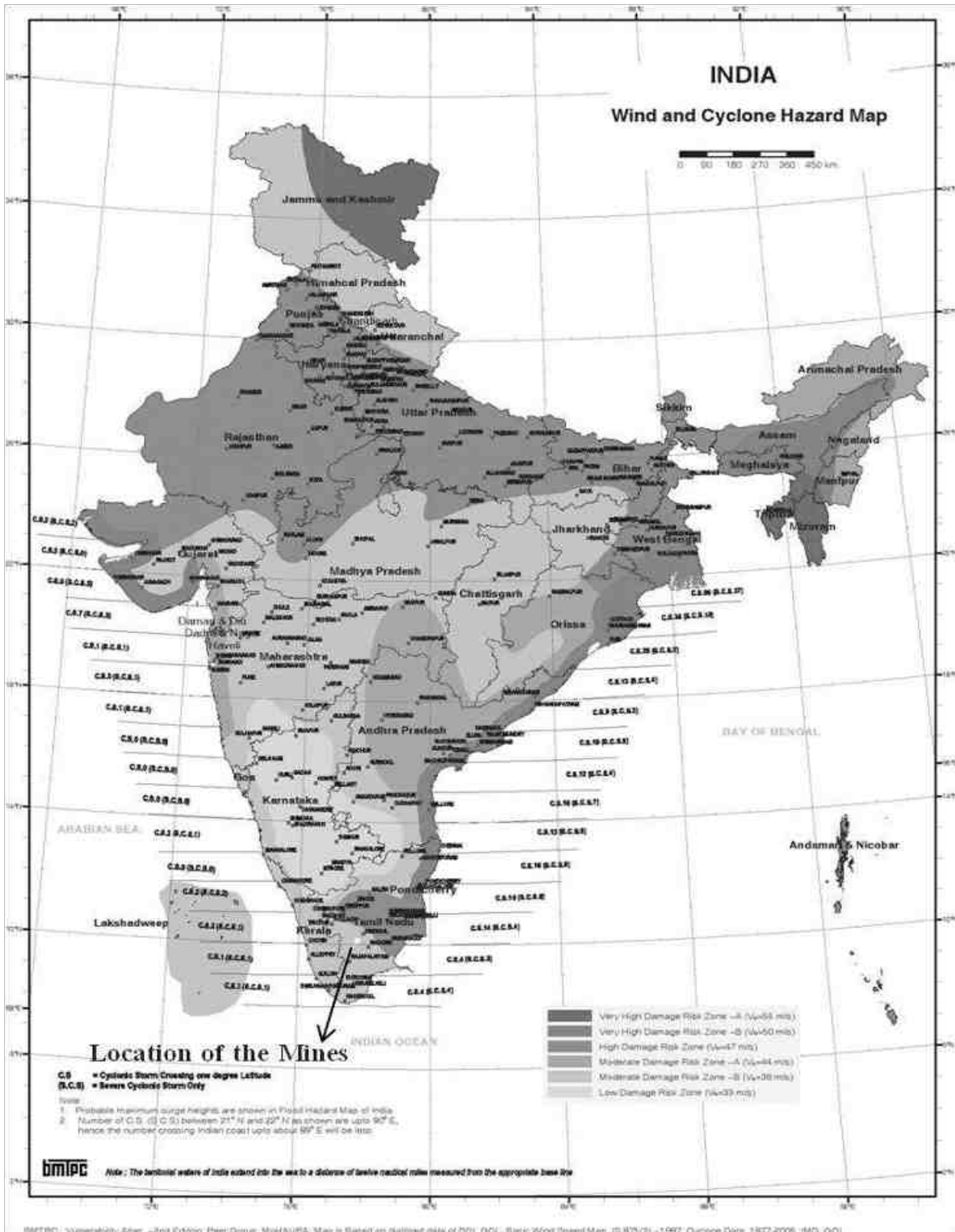


Fig No. 2.8: Winds and Cyclone Hazard Map

The cluster area falls under Moderate Damage Risk Zone-B ($V_b = 33$ m/s).

2.4 Size or Magnitude of Operation

Table No. 2.4: Mining Details

R.K. Panneerselvam Ordinary Stone and Gravel Quarry	
Method of Mining	Open cast -Mechanized method of mining
Geological resources (95%)	89291 m ³
Mineable reserves (95%)	54378m ³ @ 95% up to depth 33m and 12672m ³ of gravel up to a depth of 3m after leaving necessary safety distance from the lease boundary.
Production (95%)	Ordinary stone – 35283m ³ for five years or 7057 m ³ PA
Top soil	Gravel – 12672m ³
Ore: Waste ratio	1: 0.52
Depth of Mining	33m bgl
Water Table	36 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years (From the date of execution)
Project Cost	Rs 11.0 Lakhs
EMP Cost	Rs 4.00 lakhs
CER Cost	Rs.5 lakhs

2.5 Proposed schedule for approval and implementation

The proposed activity will be commenced only after obtaining Environment Clearance from SEAC/SEIAA, Tamil Nadu and CTE/CTO from TNPCB and other necessary clearance from concerned departments.

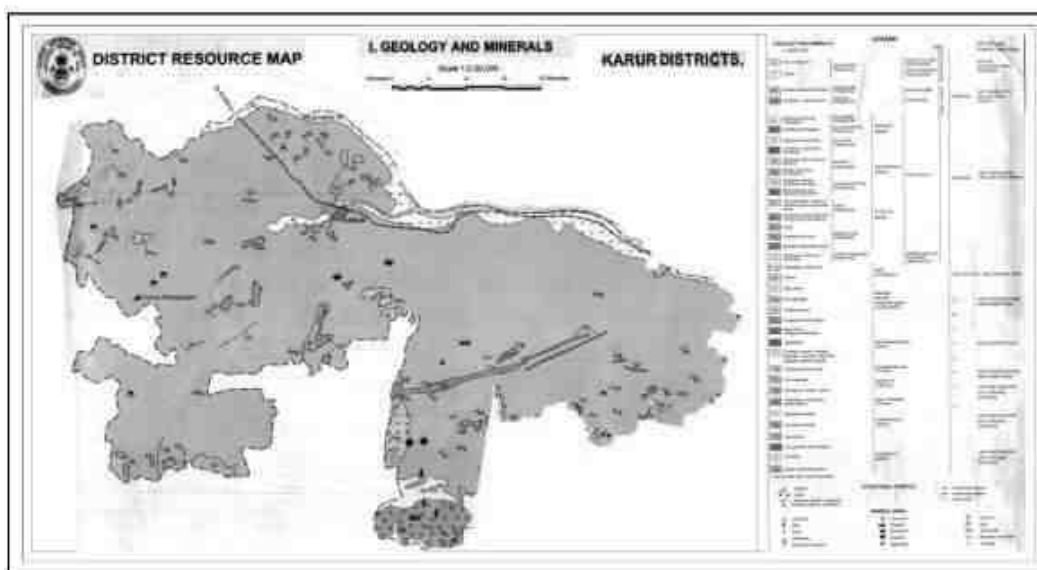
2.6 Technology and process description

2.6.1 Regional Geology

Geologically, the entire district can be classified into hard rock and sedimentary formations. Hard rock Formation: More than 90 percent of the district is underlain by hard rock of Archaean age. The gneissic type of Formation is the major formation among the various types of hard rocks. Charnockite occurs in this district as pockets in Karur and Aravakurichi taluks. Which are transported sediments by river are found one other side of Cauvery River in Karur, Krishnarayapuram and Kulithalai blocks. These formations are overlying the hard rock.

The entire area of the district is a pediplain. The Rangamalai hills and Kadavur hills occurring in the southern side of the district constitutes the remnants of the much denuded Eastern Ghats and rise to heights of over 1031m above mean sea level. The district general

slopes gently towards north east and forms a vast stretch of plain country till the eastern boarder of the district. There are numerous small residual hills represented by Ayyarmalai, Thanthonimalai and Velayuthampalayam hills. The general elevation of the area is ranging between 100 m and 200 m above mean sea level. The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Structural hill, 2) Pediments, 3) Shallow Pediments, 4) Buried Pediments and 5) Alluvial plain



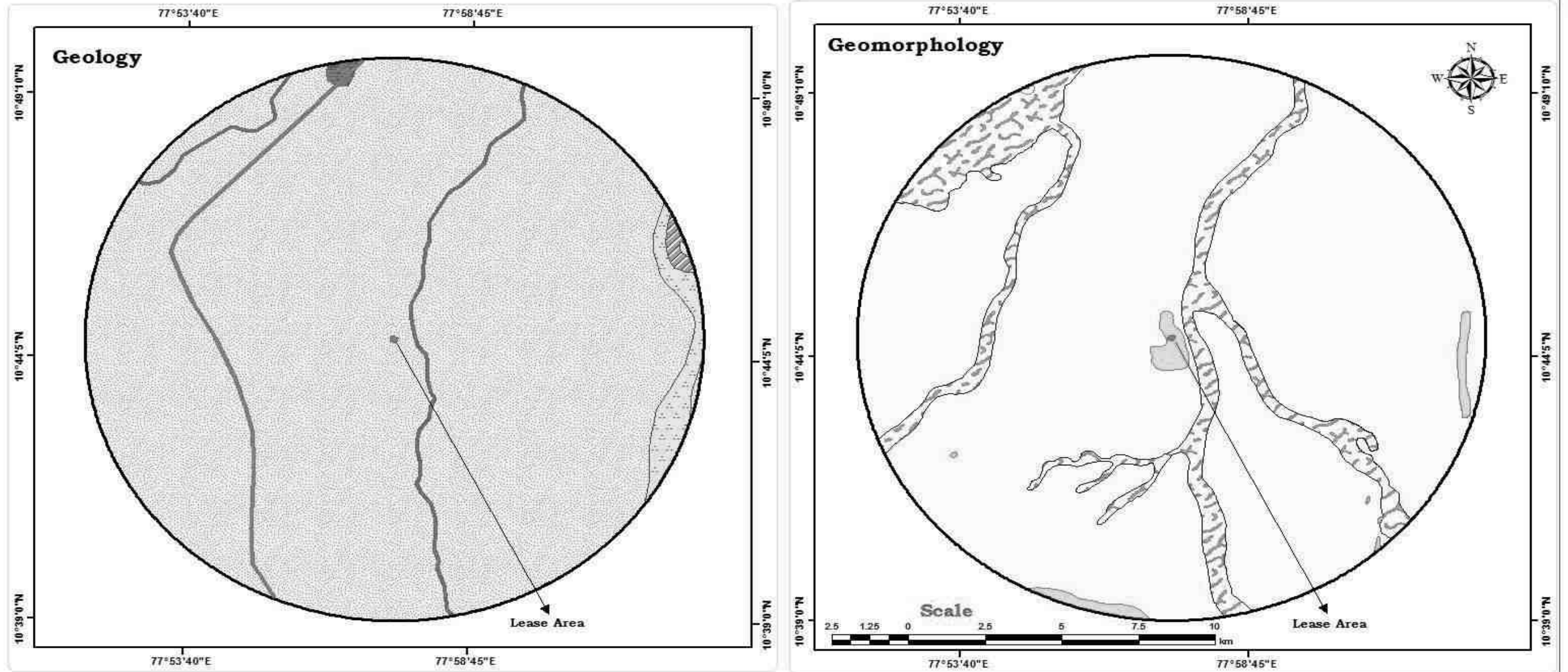
GEOLOGICAL FORMATION OF THE DISTRICT

Quaternary	Recent	Laterite and soil, Pegmatite veins/ quartz veins
Proterozoic	Acid intrusives Pink	Pink augen gneiss and migmatite, Pink medium grained granite/ pegmatoidal granite
	Pink Migmatite	Hornblende biotite gneiss/ Garnet biotite gneiss, Garnetiferous quartzofeldspathic granulite
Archaean	Charnockite Group and Khondalite Group	Pyroxene Granulite Charnockite (acid to intermediate), Calc granulite/ Crystalline limestone Garnetiferous sillimanite gneiss/ Quartzite

2.6.2 Geology of the Precise Area:

The Charnockite rocks are found to occur in K.Paramathi, Punnam areas etc., of Aravakurichi Taluk which is exploited to produce building materials and road metals.

PHYSICAL FEATURES MAP AROUND 10KM RADIUS



LEGEND	
	Hornblende- biotite gneiss
	Granet - sillimanite - graphite gneiss
	Calc - granulite and limestone
	Granite, garnet granolite
	River
	Road
	Lease Area
	Buffer Zone 10km Radius

Applicant
 Thiru. R.K.Paneerselvam,
 S/o R.P. Kaliappan,
 No. 163, Rengapalayam,
 Punnam Chatram, Punnam Village,
 Aravakuruchi Taluk,
 Karur District.

	Inselberg
	Moderately buried Pedipla
	Pediment/ Valley Floor
	Shallow buried Pediplain

Prepared By

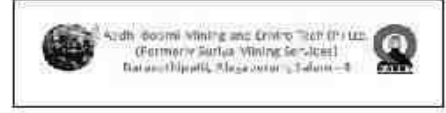


Fig. No: 2.9: Regional Geology & Geomorphology Map

2.6.3 Method of Mining

a) Open cast working:

Opencast -Mechanized method will be adopted for exploiting the Ordinary stone in the quarry in this cluster. There are small quantities of top soil in all proposed mining lease area which will be used for green belt development within the lease area. Elevation of the area is 185 m above MSL.

The benches will be of maximum height of 6 m and the bench width should not be less than bench height. The ultimate pit slope will be maintained at more than 45°. S1 fencing shall be constructed at the top of high benches in order to safe guard the unauthorized entry of men and machinery. In the case of entry and exit of pit(s), G1 fencing as a parapet should be made to control tress passes.

b) Mode of working:

The quarry operation involves drilling, muffle blasting, excavation, loading and transportation of Ordinary stone and gravel to the needy crusher/other buyers. The production of Ordinary stone and gravel in this quarry involves the following method which is typical for Ordinary stone and gravel quarrying in contrast to other major mineral mining.

Splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Ordinary stone from pit head to the needy crusher/other buyers.

2.6.4 Extent of Mechanization

The following machinery is proposed to be exclusively for the development and production work at this quarry. The machinery is proposed to be purchased or engaged on hire basis.

i) Drilling equipment:

Drilling of shot-holes will be carried out using compressor and Jack Hammers combination. Depth of holes shall be 1-2m. The spacing shall be 0.75m and burden shall be 0.60m from the preface. To achieve a correct blasting geometry certain amount of trial blast is prerequisite to effect a perfect pre-determined fragmentation and fly rock control. In case of heavy blasting qualified mine manager has to be appointed for proper calculation of powder factor and control blasting sequencing and arrangement of explosives etc. Details of drilling equipment are given below.

Table No. 2.5: Details of drilling equipment

Type	No's	Dia. of hole	Bucket/ Capacity (m ³)	Make	Motive Power	H.P
Jack Hammer	4	32mm	Hand held	Atlas copco	Air	5.5Kgs/m ³
Compressor	2	-	-	Ford Track	Diesel	80

ii) Loading Equipment: Loading of waste, ordinary stone and gravel and reject materials shall be done by excavator into tippers from the working place periodically. Reject shall be dumped in the site earmarked for dumping as per approved mining plan of all two quarry lease owners. Details of loading equipment are tabulated below.

Table No. 2.6: Details of loading equipment

Type	No's	Bucket/Capacity(m ³)	Make	Motive Power	H.P
Hydraulic excavator (Hire)	1	1.20 m ³	Hitachi	Diesel	EX - 200

iii) Transportation:

Transport of Ordinary stone and gravel, Rejects and waste shall be done by Tippers.

Table No. 2.7: Details of transportation equipment

Type	No's	Size/Capacity(m ³)	Make	Motive Power	H.P
Tipper	2	10M.T	Ashok Leyland	Diesel	120

iii) Blasting Pattern

The massive formation shall be broken into pieces of portable size by jack hammer drilling and shot hole blasting using low strength explosives. Powder factor of explosives for breaking such hard rock shall be in the order of 6 tons per Kg of explosives.

Blasting parameter proposed to be adopted for shot holes of R.K. Panneerselvam Ordinary Stone Quarry

$$\text{Depth (m)} * \text{Burden (m)} * \text{Spacing (m)} = \text{Volume (m}^3\text{)}$$

$$1.00 \quad \times \quad 0.60 \quad \times \quad 0.75 = 0.45 \text{ m}^3$$

Quantity of broken rock per hole = 0.45 x 2.6 = 1.17 Tonnes

Blasting efficiency @ 90% = 1.17 x 90% = 1.05 Tonne/hole

Charge per hole = 140 gms of 25 mm dia. cart.

Quantity of rock broken per day = 24m³ or 60M.T.

Requirement of explosives per day = 6 Kg @ 10 M.T. per Kg of explosives

No. of holes to be drilled per day = 60/1.05= 63Holes.

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iv) Types of Explosives

Following explosives are recommended for efficient blasting with safe practice.

Table No. 2.8: Explosives Details

S. No.	Description	Class / Division	Type	Size
1.	Detonators	class –3 Div-1	Ordinary and Electric (OD & ED)	6.5 x 32
2.	Safety fuse	class - 3 Div - 1	Blue sump fuse coils of 10 m ³ s each	---
3.	Slurry	class –3 Div-1	Nitro compound slurry	25mm

Slurry explosives will be initiated directly by blue sump fuse with ordinary detonators or electric detonators. The Powder factor for waste rock development shall be 6 tones' per Kg. of explosives.

The following steps shall be adopted to control ground vibration during blasting.

- ❖ Geometry of blasting pattern like burden, spacing and inclination of hole should be

$$\begin{array}{ccc} \text{Burden (m)* Spacing (m)} & \text{Inclination} & \\ 0.60 & \times & 0.75 & & 70^\circ \end{array}$$

- ❖ High strength explosives like slurry in the form of cartridge should be used. ANFO mixture for shot holes should not be used which may cause huge fly rock fragments in view of critical diameter problem.
- ❖ To control vibration abatement, use delay or relay arrangements with specific charges
- ❖ Charge per hole should exceed the powder factor designed for each hole based on quantum of blasting, strength of rocks, fracture pattern etc.
- ❖ In case any objection from the public, a long trench in the direction of blasting near lease boundary may be opened to a depth of 2m to control longitudinal waves (P-waves) to arrest any damage to infrastructures.
- ❖ If any building lies within 50m, muffle blasting practice may be followed in addition to the regular safety procedures and the charge per blast hole shall not exceed 2kg as specified by DGMS.
- ❖ Any other method of safety measures shall be advised to the Applicant as and when required by the qualified Mine Manager.

v) Storage of explosives

The Applicant is advised to store the explosives as per the Indian Explosives Act, 1958 and the Explosive Rules, 1983. Necessary permissions should be obtained from the Joint Controller of Explosives to store and uses of explosives in the quarry in the magazine

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permit under Form -23 or Agreement shall be made with holder of Form-22 who can supply and fire explosives as per safety practices. However, blasting in the quarry shall be done as per MMR 1961 under the supervision of Mines Blasting certificate holder appointed under Reg 160 of Metalliferous Mines Regulations, 1961.

2.7 Land Use Pattern of the Core Zone

The proposed area is almost flat terrain with composed of outcrops exposed in area with height 185m above mean sea level. Water table of the area is said to be fluctuated between 30-36m during a year. Existing and proposed land use pattern of the lease areas given in table 2.9

Table No. 2.9: Computation of existing and proposed land use pattern

S. No	Head	Area put on use at start of plan (Ha) (Present)	% of Use	Total Area used at the end of plan (Ha)
i)	Mining area	----	47%	0.41.36
ii)	Road	----	2.3%	0.02.20
iii)	Green belt & Safety area	----	49.7%	0.43.74
iv)	Labour shed	----	1%	0.00.88
v)	Virgin	0.88.0	100%	---
Total		0.88.0	100%	0.88.0

2.8 Estimation of Reserves

2.8.1 Ordinary Stone and Gravel Quarry

a) Geological Resources

The geological resources is estimated by cross sectional method is as **89291m³** of Ordinary stone and gravel up to a depth of **33m** from the surface, having considered the depth of mining, recovery, safety barriers etc. A detail of estimation of geological resources and reserves is given in the table 2.10.

Table No. 2.10: Computation of Geological Resources and Reserves

SECTION	DESCRIPTION	L (m)	W (m)	D (m)	Volume M3	Resources @95% (M3)	Reject @5% (M3)
AB-XY	SAFETY ZONE	57.5	7.5	33	14231	13520	712
	MINEABLE RESERVE	60	61	6	21960	20862	1098
		48	55	6	15840	15048	792
		36	49	6	10584	10055	529
		24	43	6	6192	5882	310
		12	37	6	2664	2531	133
	UNDER MINE BENCH	6	3	6	108	103	5
		18	9	6	972	923	49

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		30	15	6	2700	2565	135
		42	21	6	5292	5027	265
		54	27	6	8748	8311	437
TOTAL					89291	84827	4465

GRAVEL & WEATHERED							
AB-XY		66	64	3	12672		12672
GRAND TOTAL							
					101963	84827	17137

Total Geological resources up to a depth of 33m = 89291m³

Total Geological reserves @ 95% = 84827m³

Total Waste @ 5% = 4465m³

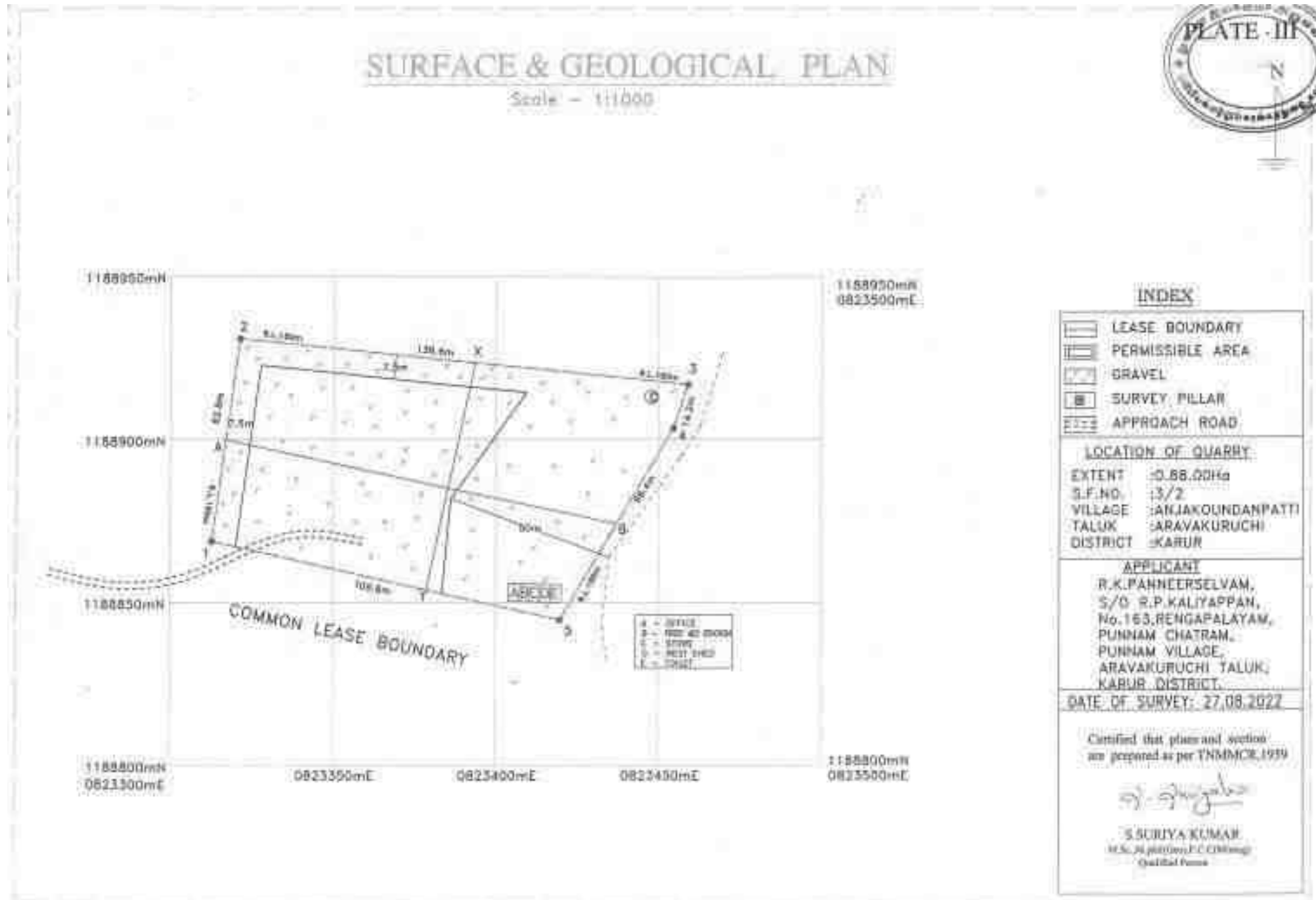


Fig No. 2.10: Geological plan of R.K. Panneerselvam, ordinary stone and gravel quarry

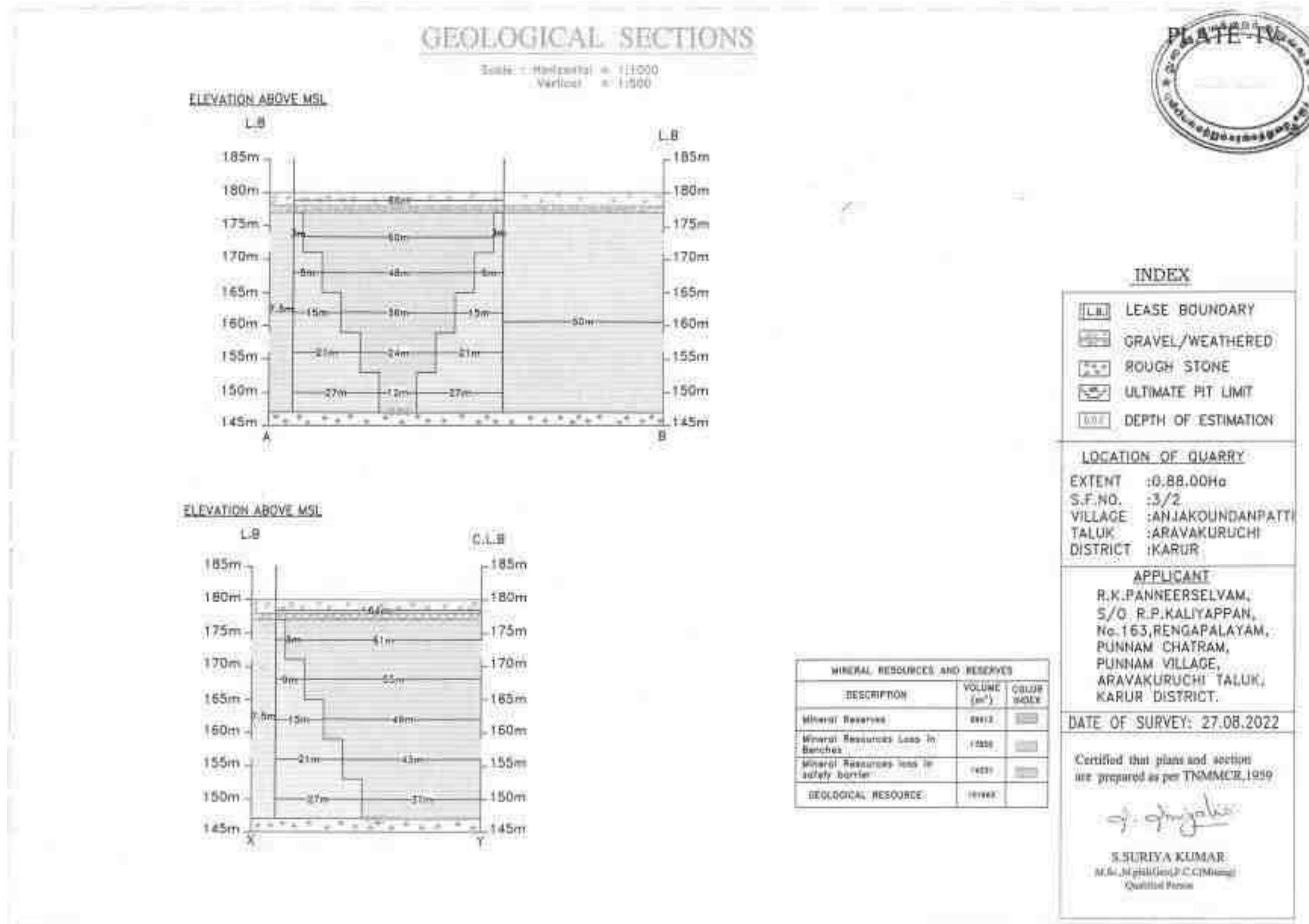


Fig No. 2.11: Geological Cross Section of R.K. Panneerselvam, ordinary stone and gravel quarry

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b) Mineable/Recoverable Reserves:

The mineable/recoverable reserves is estimated by cross-sectional method having considered the recovery factor, depth of mining, safety barriers etc., The mineable reserves is estimated as **57240m³** of Ordinary stone and Gravel is **12672m³** to a depth of mining **33m** from the surface. Details of estimation of mineable reserves are given in table 2.11.

Table No. 2.11: Computation of Mineable/Recoverable Reserves

SECTION	L (m)	W(m)	D(m)	Volume M3	Reserves @95% (M3)	Reject @5% (M3)
AB-XY	60	61	6	21960	20862	1098
	48	55	6	15840	15048	792
	36	49	6	10584	10055	529
	24	43	6	6192	5882	310
	12	37	6	2664	2531	133
TOTAL				57240	54378	2862
GRAVEL & WEATHERED						
AB-XY	66	64	3	12672		12672
GRAND TOTAL				69912	54378	15534

Note:

Total Mineable reserves to a depth of 33m	=	57240m ³
Total Mineable Ordinary Stone reserves @ 95%	=	54378m ³
Total Ordinary Stone Waste @ 5%	=	2862m ³
Total Gravel	=	12672m ³
Total Waste Ratio (2862m ³)	=	2862/54378 = 1: 0.052

Summary of Reserve Estimation

Total Geological resources (A)	=	89291m ³
Mineral reserves blocked under Mine benches (B)	=	17820m ³
Mineral reserves blocked in safety zone (C)	=	14231m ³
Then,		
Total Mineable/Recoverable reserves	=	A-(B+C)
	=	89291-(17820+14231)
	=	89291-32051
Mineable reserves calculated as	=	57240m ³ X 95%
	=	54378m ³

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The recovery factor is taken as 95% from the top bench up to the bottom. The life of the mine is computed as 10 years at an average production rate of 54378m³ per annum for the depth up to 33m from the surface. Further reserves below 33m shall be estimated after assessing water table and necessary permission from DGMS under Reg.111 of MMR, 1961.

2.9. Year Wise Production and Development

The five years production is designed upto a depth of 33m. The waste ratio with reference to the production of ordinary stone and gravel would be 1:0.052.

Table No. 2.12: Computation of year wise production

YEAR	L (m)	W(m)	D(m)	Volume	Recovery @95% (m3)	Reject @5% (m3)
I	20	61	6	7320	6954	366
II	20	61	6	7320	6954	366
III	20	61	6	7320	6954	366
IV	23	55	6	7590	7211	380
V	23	55	6	7590	7211	380
TOTAL				37140	35283	1857
GRAVEL & WEATHERED						
I	66	64	3	12672		12672
GRAND TOTAL				49812	35283	14529

Overall pit slope 45°

Total quantum of production (ROM)	=	37140m ³
Total production for the five years@95%	=	35283m ³
Total Reject @5%	=	1857m ³
Total topsoil	=	12672m ³
Total Waste Ratio (12672m ³)	=	12672/35283 = 1: 0.052

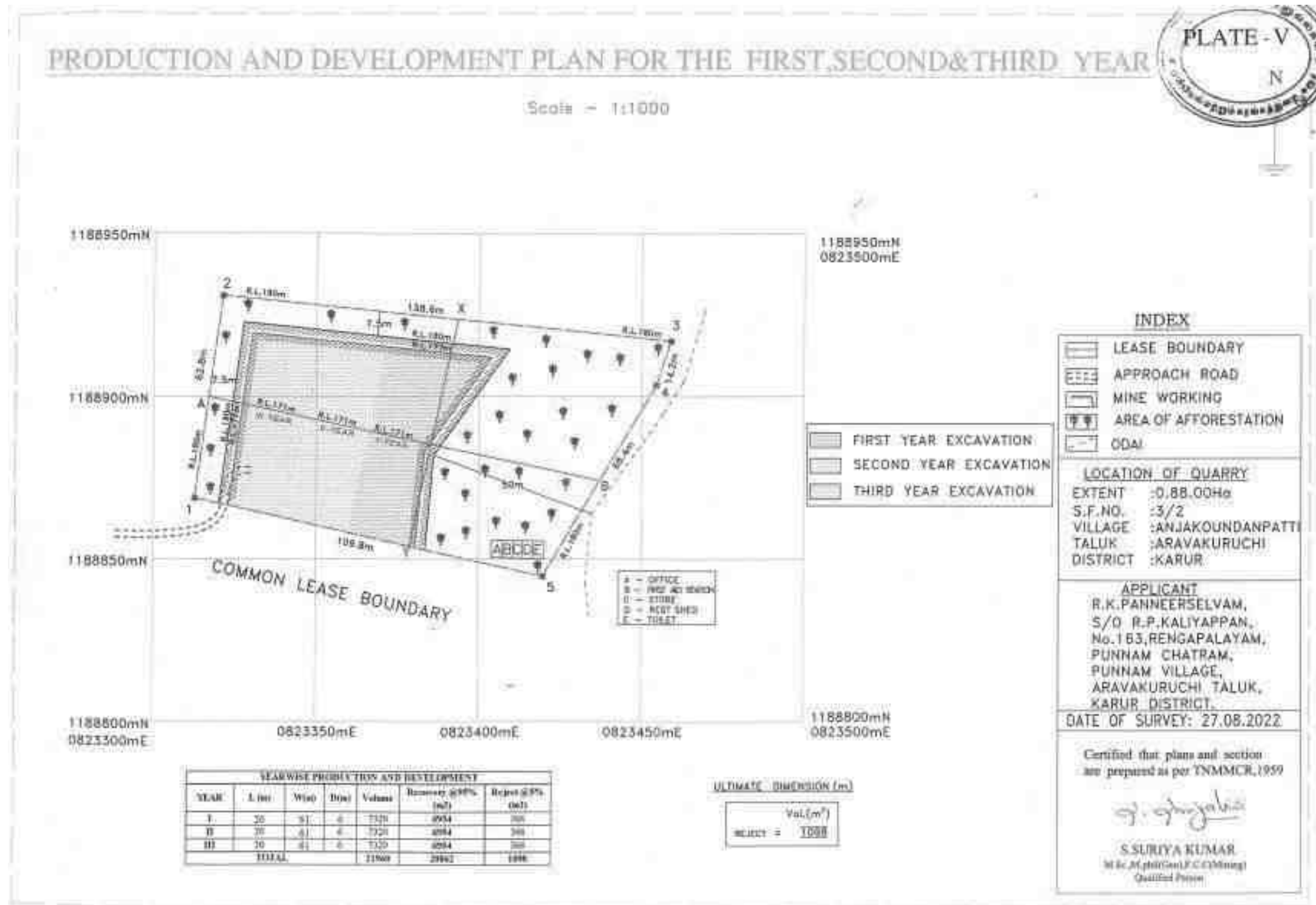


Fig No. 2.12: Section of Production and Development Plan for the First, Second & Third Year of R.K. Panneerselvam, ordinary stone and gravel quarry

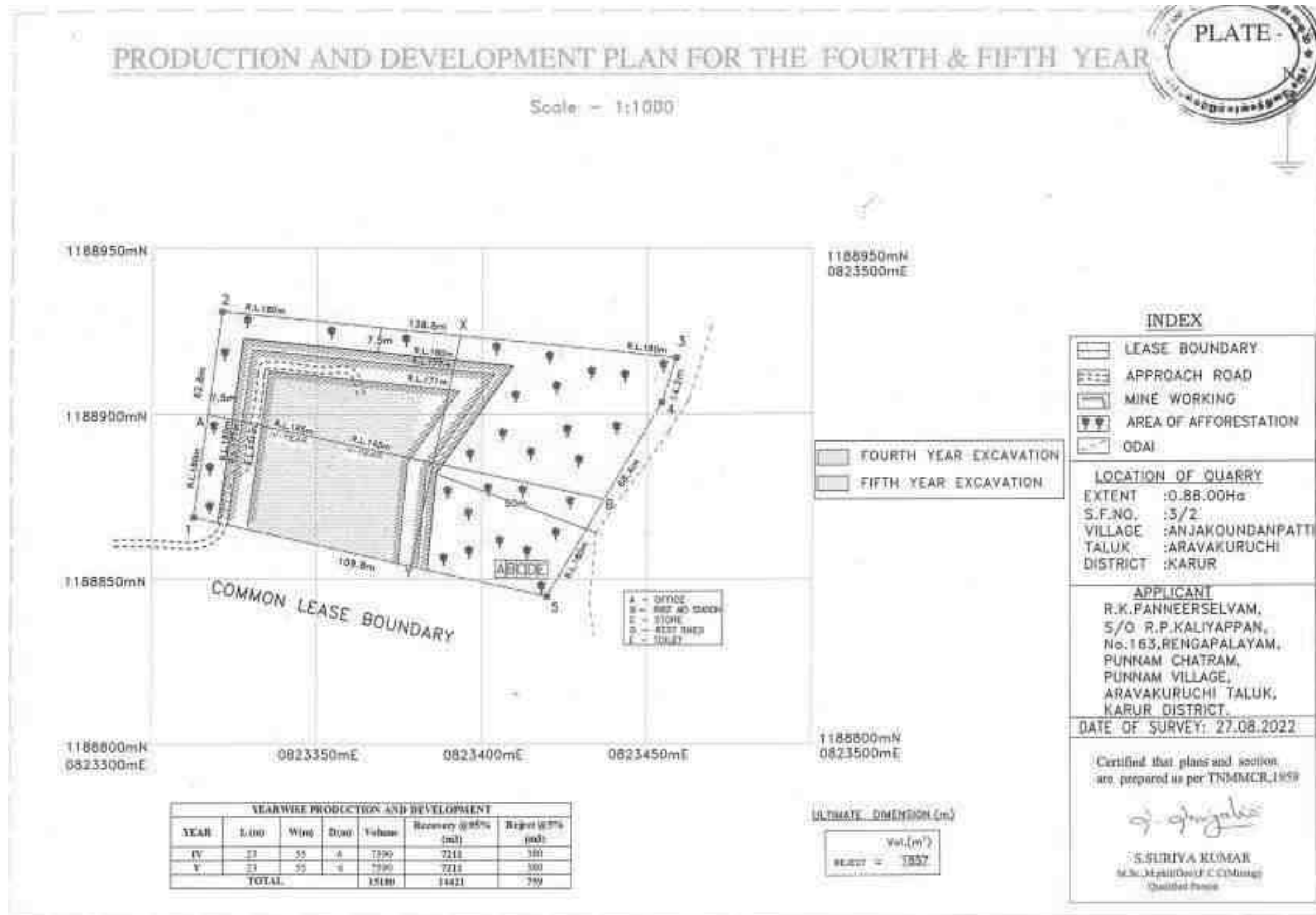


Fig No. 2.13: Section of Production and Development Plan for the Fourth & Fifth Year of R.K. Panneerselvam, ordinary stone and gravel quarry

2.10. Stacking of Mineral Rejects and Disposal of Waste

The Ordinary stone rejects which amounts to 5% of the total excavation; about **1857m³** will be generated for mining up to **33m** depth from surface. It is revealed in the final mine closure plan showing the ultimate depth of mining and ultimate pit configuration maximum height and spread of dumps for the first five years are given as under.

Table No. 2.13: Computation of rejects materials

Year	Gravel (m ³)	Overburden /Waste (m ³)	Ordinary stone Rejects @ 5% (m ³)	Total
First	12672	----	366	13038
Second	---	----	366	366
Third	---	----	366	366
Fourth	---	----	380	380
Fifth	---	----	380	380
Total	12672	----	1857	14529

All waste and reject materials shall be dumped within the lease area maintained by the applicant.

Table No. 2.14: Year Wise Dump Dimension (M)

Description	=	Volume (m ³)
Gravel	=	12672m ³
Reject	=	1857m ³
Total	=	14529m³

2.11 Conceptual Mining Plan/ Final Mine Closure Plan

Conceptual Mining Plan is prepared for a period of 10 years of mining to determine the ultimate pit limits, depth of mining and final slope angle adapted with an object of long-term and systematic development of bench lay-outs, selection of permanent dump(s), avoidance of re-handling, selection of sites for construction of infrastructures, lying of roads. Kindly refer table 2.15.

The ultimate pit size is so designed based on certain practical factors such as the economical depth of mining, safety zones followed, available area for mining. The Ultimate pit size of the mine in bench-wise arrived and calculated as hereunder.

Table No. 2.15: Computation of ultimate pit dimension

<i>Ultimate Pit Dimensions-PIT-I (m)</i>				
Bench	Mineral / overburden	Length(m)	Width(m)	Depth(m)
I	Topsoil	66	64	3
II	Ordinary stone	60	61	6
III	Ordinary stone	48	55	6
IV	Ordinary stone	36	49	6
V	Ordinary stone	24	43	6
VI	Ordinary stone	12	37	6
Total				33m

2.11.1.1 Restoration, Reclamation of already mined out area.

As the rate of production of Ordinary stone is 95% for the five years, only 5% rejects are available to backfill in the quarry out pit. The quarry out pit will be used as water storage pond which improves the agricultural activity in the buffer zone.

The quarry pit will be fenced by using Barbed wire fencing to prevent inherent entry of public and cattle.



Fig No. 2.14: Conceptual plan of R.K. Panneerselvam, ordinary stone and gravel quarry

2.12: Employment Potential (Management & Supervisory personal)

Table No. 2.16: Employment Potential of Thiru R.K. Panneerselvam, Ordinary stone and gravel quarry

Management and supervisory personal	Mines manager	1 No
	Foreman	1 No
	Mate	1 No
	Register Keeper (Workman cadre)	1 No
Skilled	Operator	1 No
Semi-skilled	Drive	2 No's
Unskilled	Musdoors/Labours	20 No's
	Cleaners	2 No's
	Register Keeper	1 No
Total		30 No's

Table No. 2.17: Water Requirements (3.5 KLD) - Thiru. R.K. Panneerselvam, Ordinary stone and gravel quarry

Domestic & Sanitary drinking water	1.5 KLD
Dust suppression & Green Belt & Drilling operation	3.0 KLD
Source	Drinking - Mineral water supply Domestic - nearby wells the Ordinary water tank Dust suppression and Greenbelt - Mine water from pit bottom

2.13 Amenities

2.13.1 Sanitary facilities

Semi-permanent latrines & urinals shall be maintained at convenient places for use of labours as per the provisions of Rule (33) of the main rules, 1955 separately for males and Females. Washing facilities shall also be arranged as per rule (36) of the mines Rules, 1955.

2.13.2 First Aid facility

First Aid station as per provisions under Rule (44) of the Mines Rules, 1955 will be provided and First aid kits kept in mines office room, the qualified first aid personnel should be appointed or nominated to attend emergency first aid treatment.

In case of eventuality, the victim will be given first aid immediately at the site and the injured person will be taken to the hospital located in Aravakurichi. The competent and statutory of Foreman / Mate / Permit Manager will be incharge of the First aid.

2.13.3 Labour Health

Periodic medical examination has to be made for occupational health once in a year in addition to attending medical treatment of occupational injuries under Rule 45 (A).

2.13.4 Precautionary safety measures to the Labourer

Safety provisions like helmet, goggles, safety belt, safety shoes etc have to be provided as per the circulars and amendments made for Mine labours under guidance of DGMS.

Necessary training will be conducted once in a year to all the employees with the help of qualified and experienced officers to train about the safe and systematic quarrying operation

2.13.5 The Child labor Employment

As per the Mines Act, 1952, no child labours below 18 years of old were engaged for any work in the quarry.

2.14 Project Cost

Proposed financial estimate / budget for (EMP) Environment Management

a) Project cost / investment:

i)	Land Cost	=	Rs. 5,00,000/-
ii)	Machinery to be used (Hire)	=	Rs. 5,00,000*/-
iii)	Building & Welfare amenities	=	<u>Rs. 1,00,000/-</u>
	Total	=	<u>Rs. 11, 00,000/- lakhs</u>

(* Part of machineries shall be hired)

b) EMP Cost:

i)	Personal protective equipment	=	Rs. 75,000/-
ii)	Environmental Monitoring	=	Rs. 2,00,000/-
iii)	Occupation Health	=	Rs. 75,000/-
iv)	Green Belt & Dust suppression	=	<u>Rs. 50,000/-</u>
	Total	=	<u>Rs. 4,00,000/- lakhs</u>

2.15 End Use

The excavated ordinary stone is used for building's basement stones and other infrastructure development work in and around the district.

CHAPTER – 3: DESCRIPTION OF THE ENVIRONMENT

3.0 BASELINE ENVIRONMENTAL STATUS

3.1 Introduction

The chapter describes the existing environmental settings in the study area and is based upon the secondary information collected from the published sources, reconnaissance survey, primary socio-economic and environmental monitoring of air, noise, soil, ground and surface water in the study area.

For the purpose of EIA studies, mine lease area was considered as the core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone. Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during 1st March 2022 – 31th May 2022 to assess the existing environmental scenario in this area.

The Various environmental components studied as a part of the baseline study are discussed in the following project activities are:

- ❖ Air Environment
- ❖ Noise Environment
- ❖ Water Environment
- ❖ Soil Environment
- ❖ Ecology and Biodiversity
- ❖ Socio-economic
- ❖ Land Environment

3.2 Methodology

The guiding factors of the present baseline study are the requirements laid down by the Central Pollution Control Board (CPCB) and guidelines as per the Environmental Impact Assessment Notification.

- In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of respirable dust sampler and fine particulate matter sample at different locations within the study area and analyzed to find out the existing status of air quality.
- Ground water samples were collected from the existing tube wells, while samples for surface water were collected from river & small ponds. The samples were analyzed for parameters necessary to determine water quality (based on IS: 10500 criteria) and

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those, which are relevant from environmental impact point of view of the proposed river bed mining project.

- Soil samples were collected and analyzed for relevant physical and chemical characteristics in order to assess the impact of the proposed mining on soil.
- Inventory of flora and fauna species present in the area was made through field visits and survey by ecologists.
- Socio-economic data was collected from primary sources through village – level surveys and household visits.
- The land use patterns of the study area were assessed through latest satellite imaging and topographical sheets of Survey of India.

Appropriate methodologies have been followed in preparing the EIA-EMP report. The methodology adopted for the study is outlined below. The sampling locations were selected on the basis of the following:

- Predominant wind directions recorded by the India Meteorological Department (IMD), Karur observatory, Karur district;
- Existing topography;
- Drainage pattern and location of existing surface water bodies like lakes/ponds, rivers and streams;
- Location of villages/towns/sensitive areas, and;
- Areas, which represent baseline conditions;

3.3 Meteorological Data Recorded at IMD Station, Karur Observatory, Karur District

The meteorology of the project area plays very important role in dispersion of pollutants and build-up of pollution within the air atmosphere. In the present study, in the month of 1st March 2022 – 31th May 2022 meteorological data for site specific has been taken to find the dispersion of pollutant concentration. The mixing height, which is an important parameter to express the dispersive potential of atmosphere, has been taken from the atlas of hourly mixing height and assimilative capacity of atmosphere in India.

Table No. 3.1: Summary of the Meteorological data for the study period

S.No	Parameters	Months	March 2022	April 2022	May 2022
1	Temperature (°C)	Max	37	38	36
		Min	22	25	25
		Average	30	31	30
2	Rainfall (mm)	Total Average Rainfall	45.2		
		No. of rainy days	1	3	5
3	Humidity (%)	Average	53	56	58
4	Wind speed (mps)	Average	2.0	1.7	2.2

3.3.1 Wind Rose

Wind speed and wind direction data is useful in identifying the influence of meteorology on the air quality of the area. The observed wind pattern during the study period is described below. In the present study, in the month of 1st March 2022 – 31th May 2022 meteorological data has been taken to find the dispersion of pollutant concentration. Wind-rose diagram for the study period is shown given below in fig 3.1.

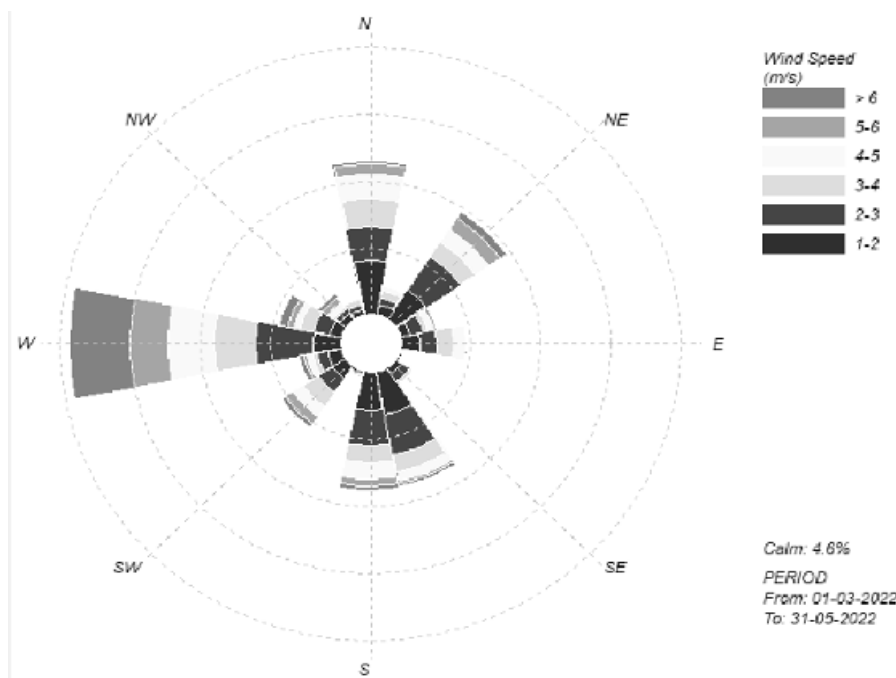


Fig No. 3.1: Wind Rose Pattern for the study period

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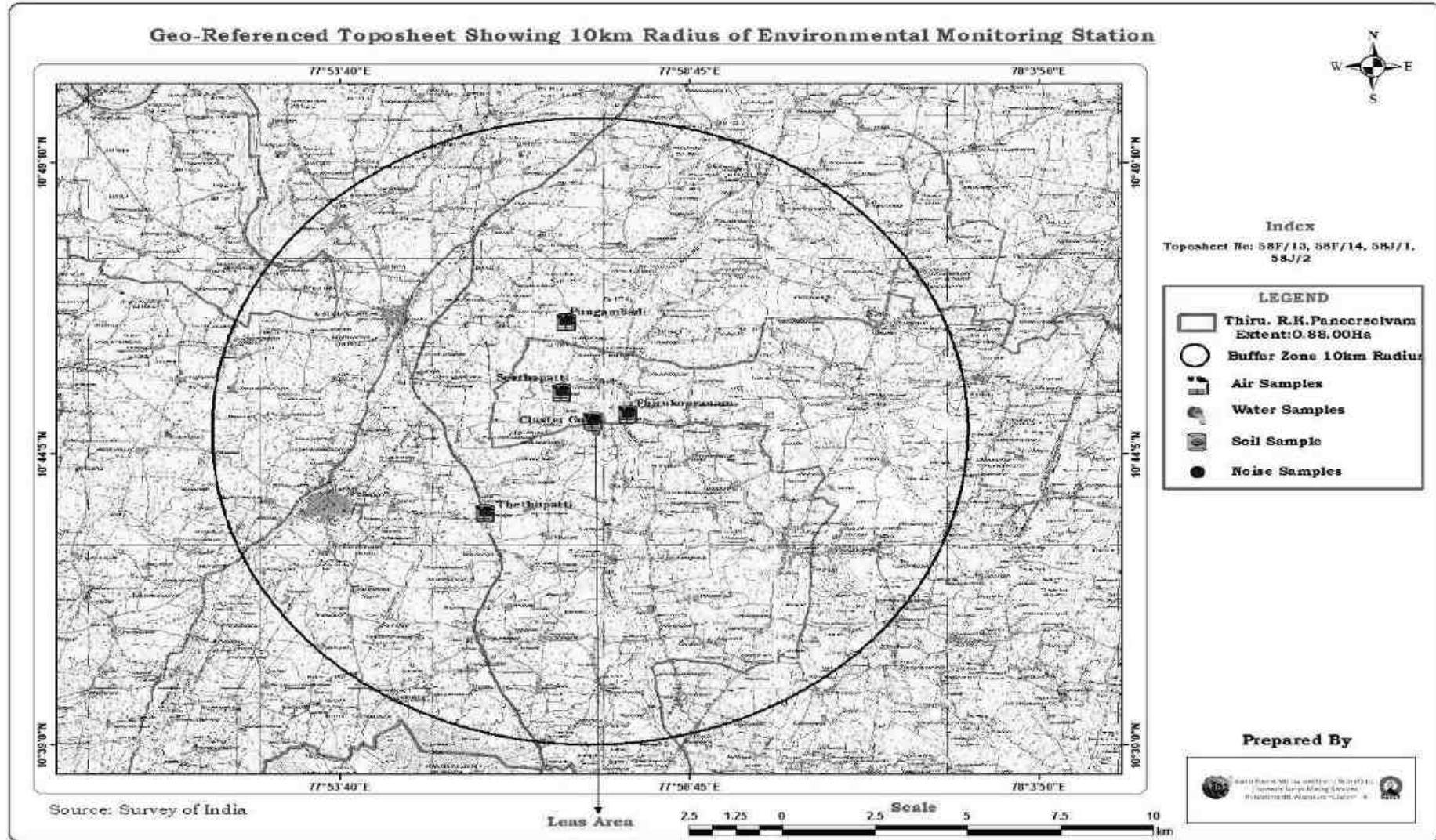


Fig No. 3.2: Geo Referenced Toposheet showing Environmental monitoring station around 10km radius

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3.4 AIR ENVIRONMENT

Prevailing air environment i.e. baseline conditions in an area is primarily governed by many factors activities going on in that area. The pollutant level in atmosphere is also governed by the meteorology, topography, natural settings in terms of plantation, forest cover, vegetation etc as these factors in combination with each other are responsible for dispersion, diffusion, transportation and assimilation of pollutants in the local air shed.

3.4.1 Ambient Air Monitoring

The prime objective of baseline air quality study (10km radius) is to assess the existing air quality of the area to form base line information. The study area represents mostly rural environment. Ambient air monitoring was carried out at 5 locations. The locations were identified keeping in view of predominant wind directions prevailing during study period, sensitive receptors, human settlements and mining activities around. The details about sampling locations are mentioned below in fig 3.3 and table 3.2.

The existing Ambient Air Quality status (AAQ) has been monitored for parameters PM_{10} , $PM_{2.5}$, SO_2 and NO_2 . Ambient air quality monitoring was carried out at a frequency of two days per week at each location for three months at 8 hour continuously. Respirable dust samplers have been used for monitoring the existing PM_{10} status and fine dust samplers are used for monitoring $PM_{2.5}$ status in the study area. Methodologies adopted for sampling and analysis were carried out, as per the approved methods of Central Pollution Control Board (CPCB).

Table No. 3.2: Ambient Air Quality Monitoring Locations

Sampling Code	Location	Latitude	Longitude	Distance (km)	Direction
AAQ 1	Cluster core zone	10°44'39.07"	77°57'21.23"	--	--
AAQ 2	Pungambadi	10°46'22.01"	77°56'58.03"	4.2	N
AAQ 3	Seethapatti	10°45'7.57"	77°56'26.05"	1.7	NW
AAQ 4	Thethupatti	10°43'1.50"	77°55'47.02"	4.3	SW
AAQ 5	Thirukooranam	10°45'20.05"	77°57'36.30"	1.3	NE

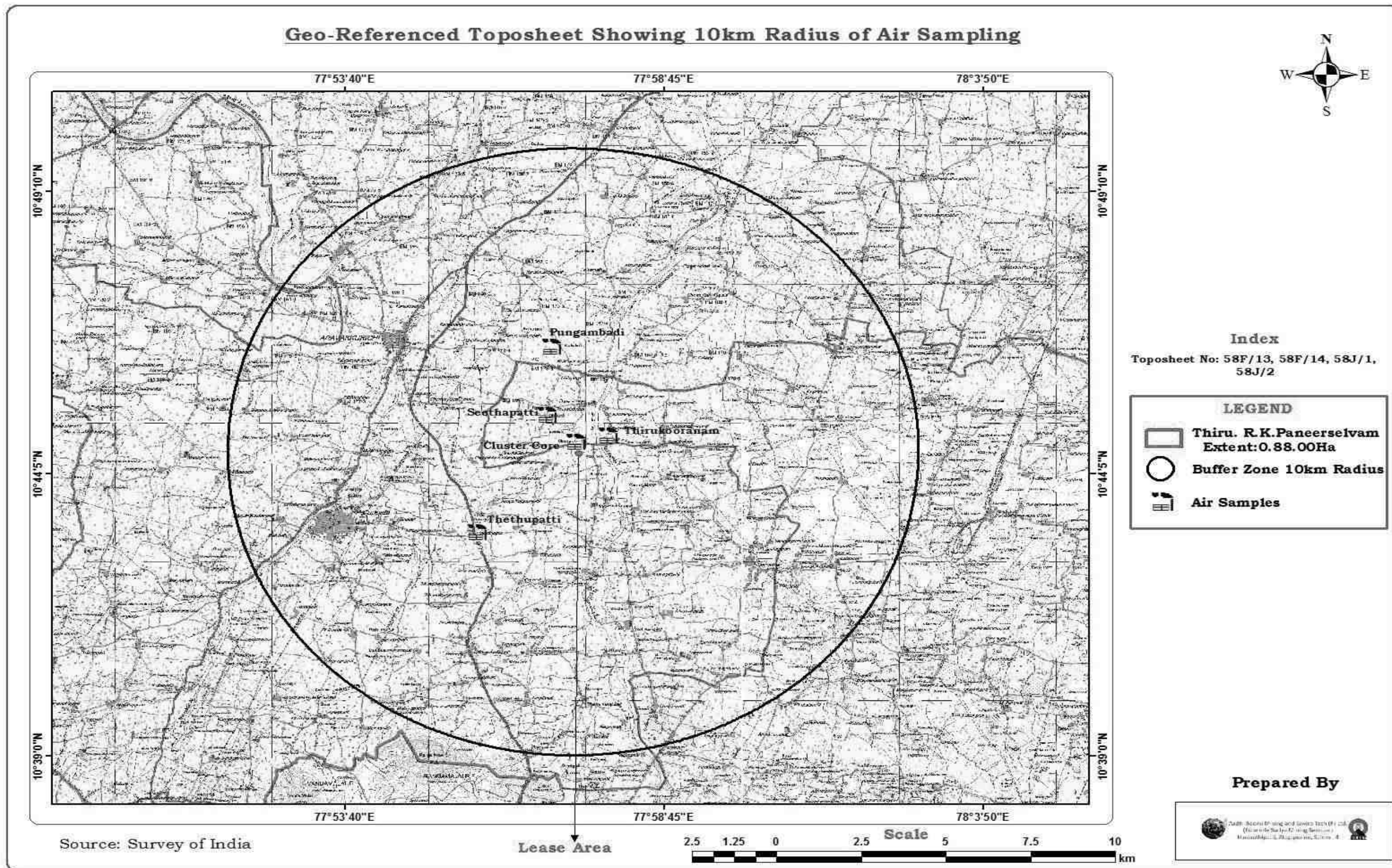


Fig No. 3.3: Geo Referenced Toposheet showing Air sampling station around 10km radius



Fig No. 3.4: Air monitoring locations at Cluster core and Buffer zone

3.4.2 Monitoring Result

Monitoring station-wise minimum and statistical analysis (minimum, maximum, arithmetic mean) for measured levels of PM₁₀, PM_{2.5}, SO₂ and NO₂ in study area for the monitoring period are shown parameter wise in table 3.3 and graphical representation of concentration pollutants are showing in fig 3.5.

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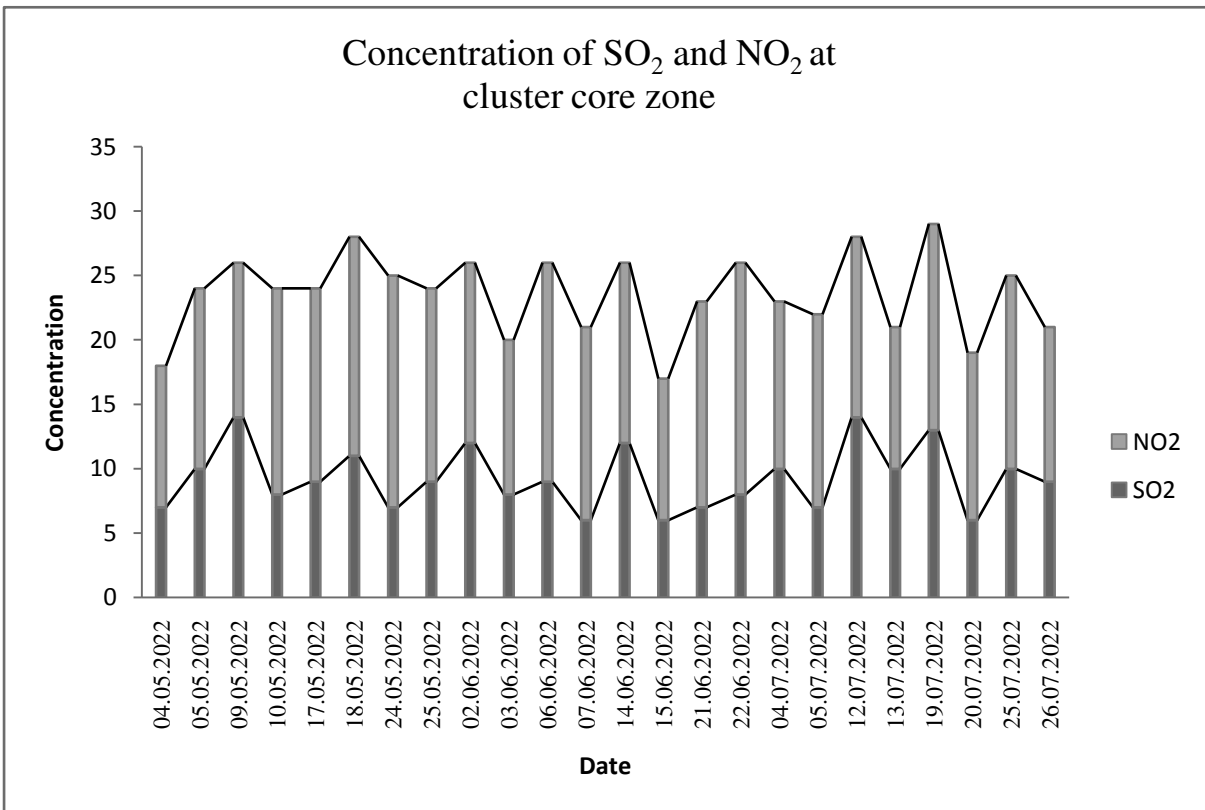
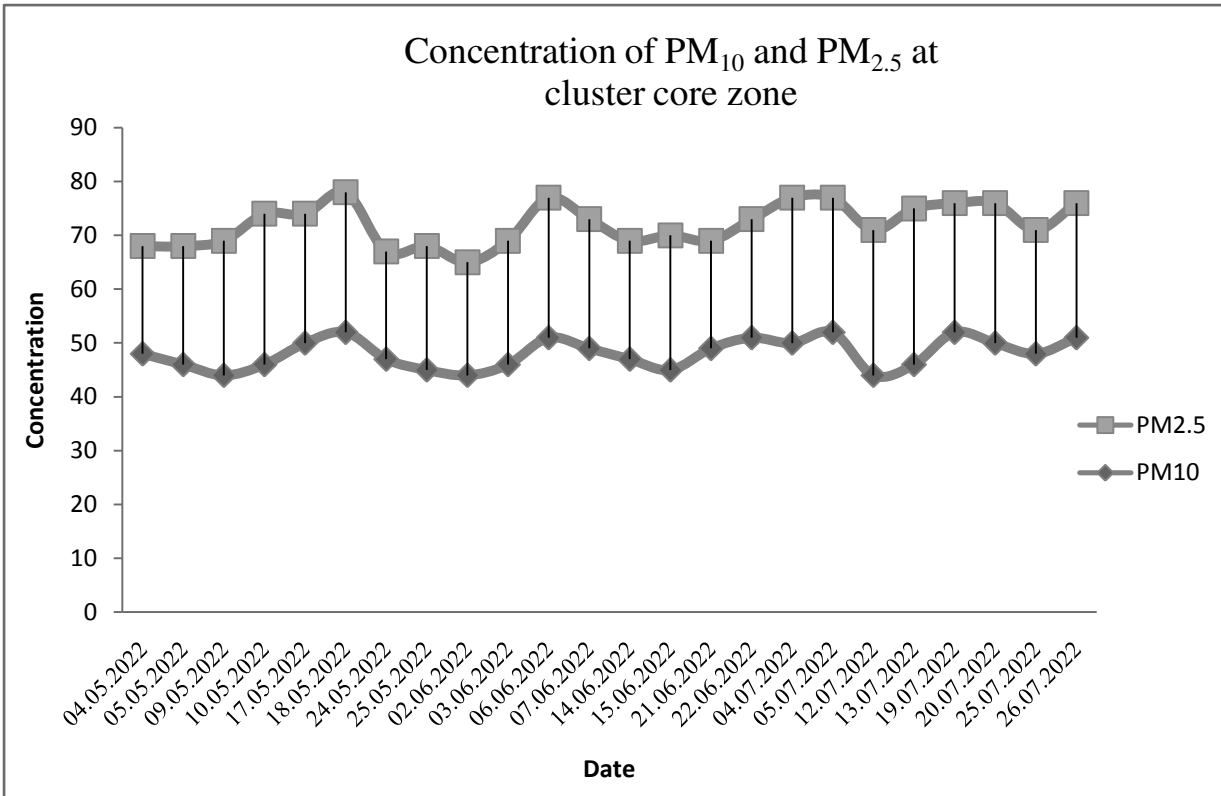
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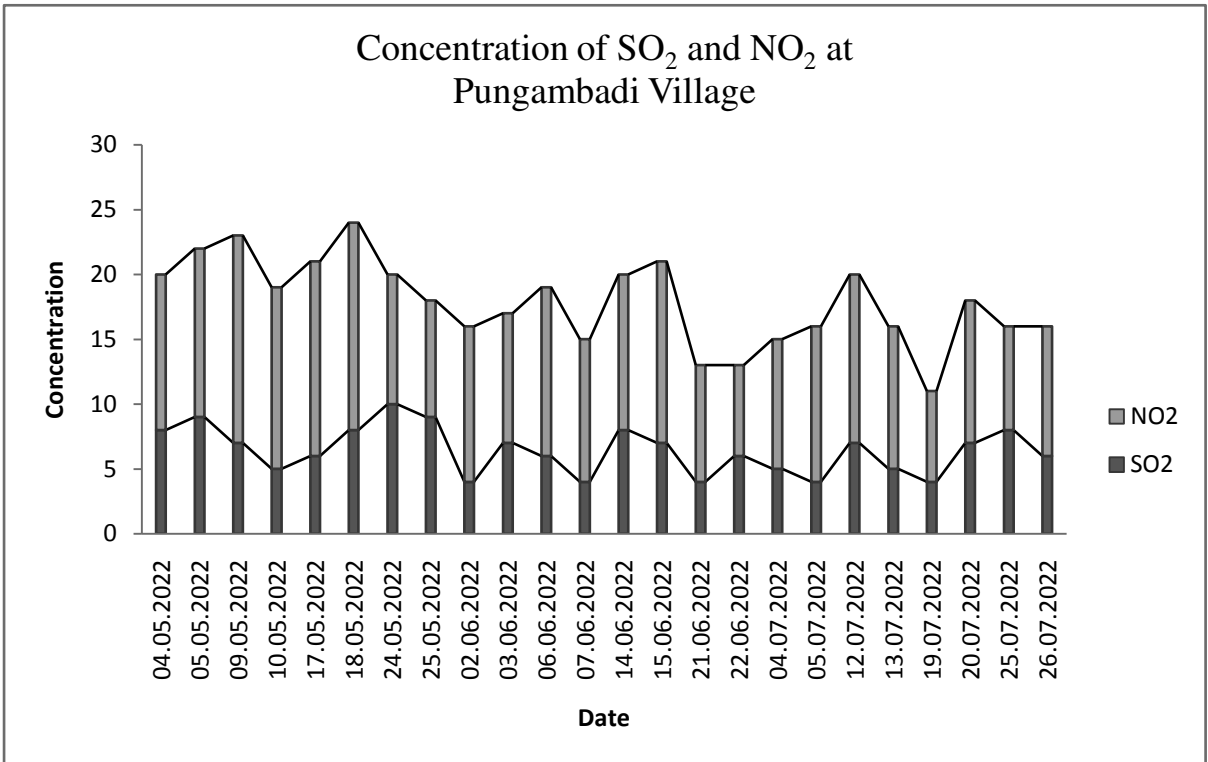
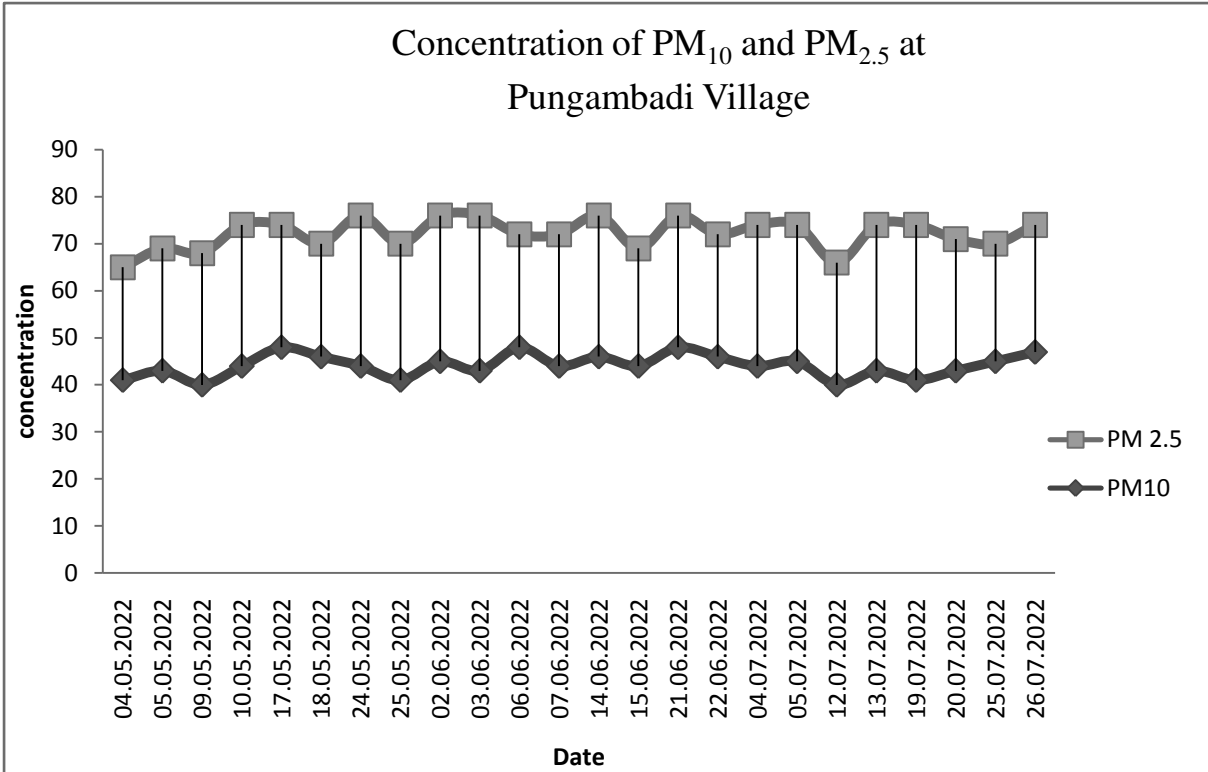
3.4.3. Monitoring Result

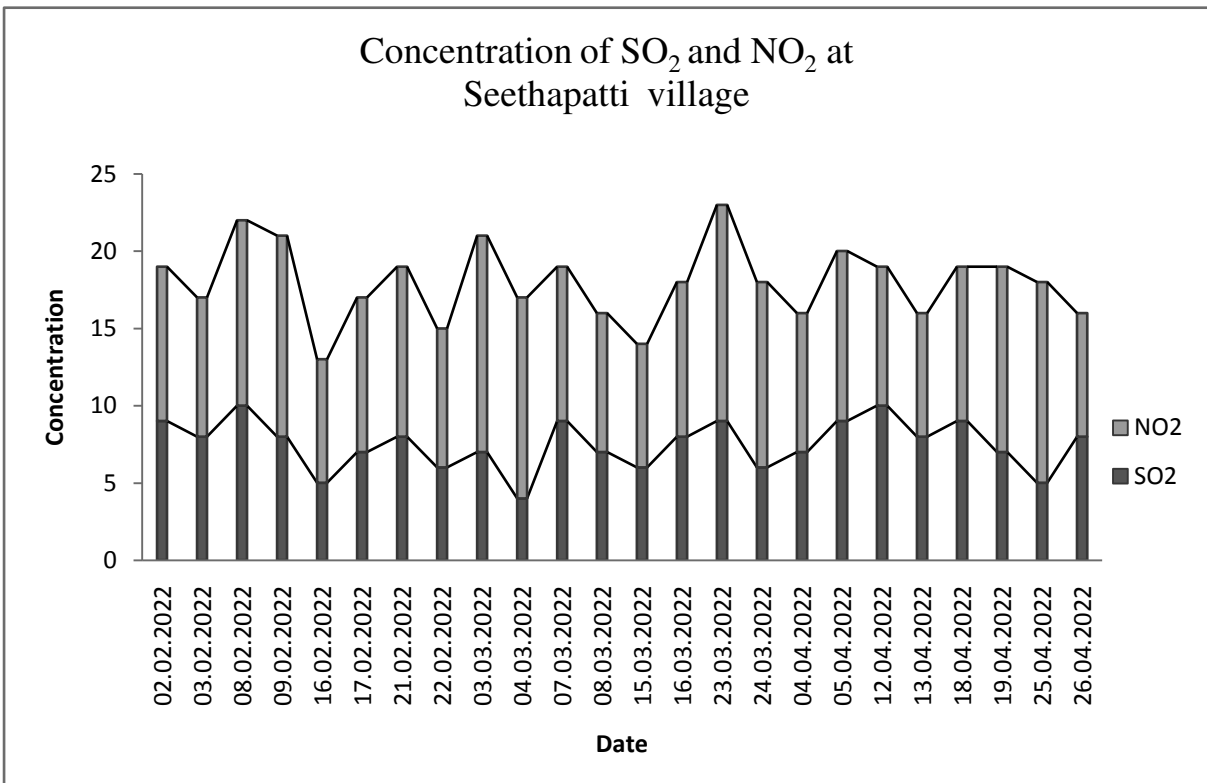
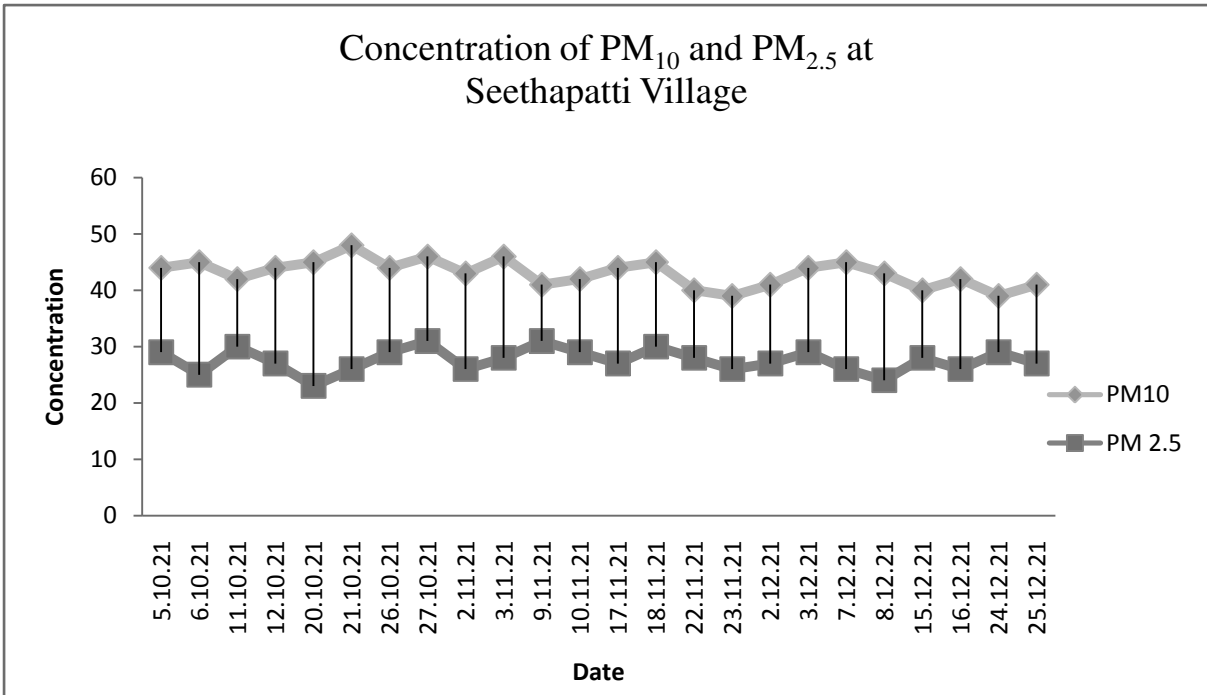
Statistical analysis of Ambient Air Quality in the study area for the monitoring period are shown parameter wise in table 3.3.

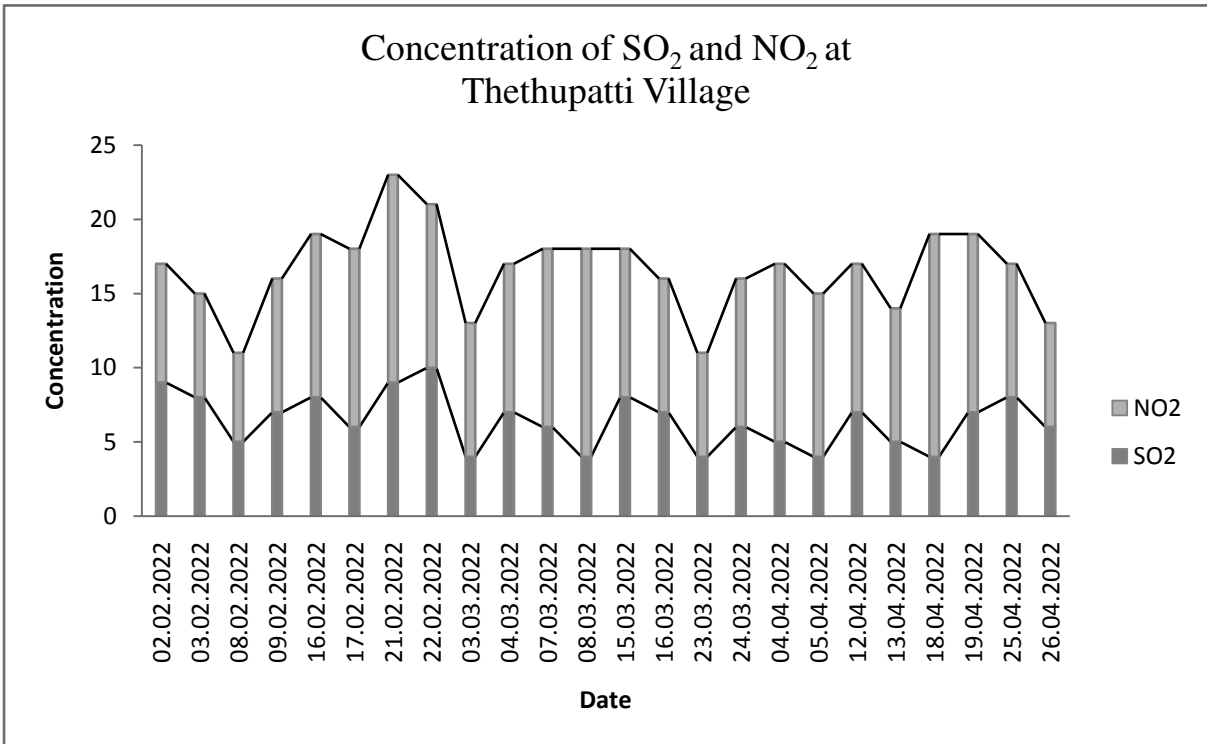
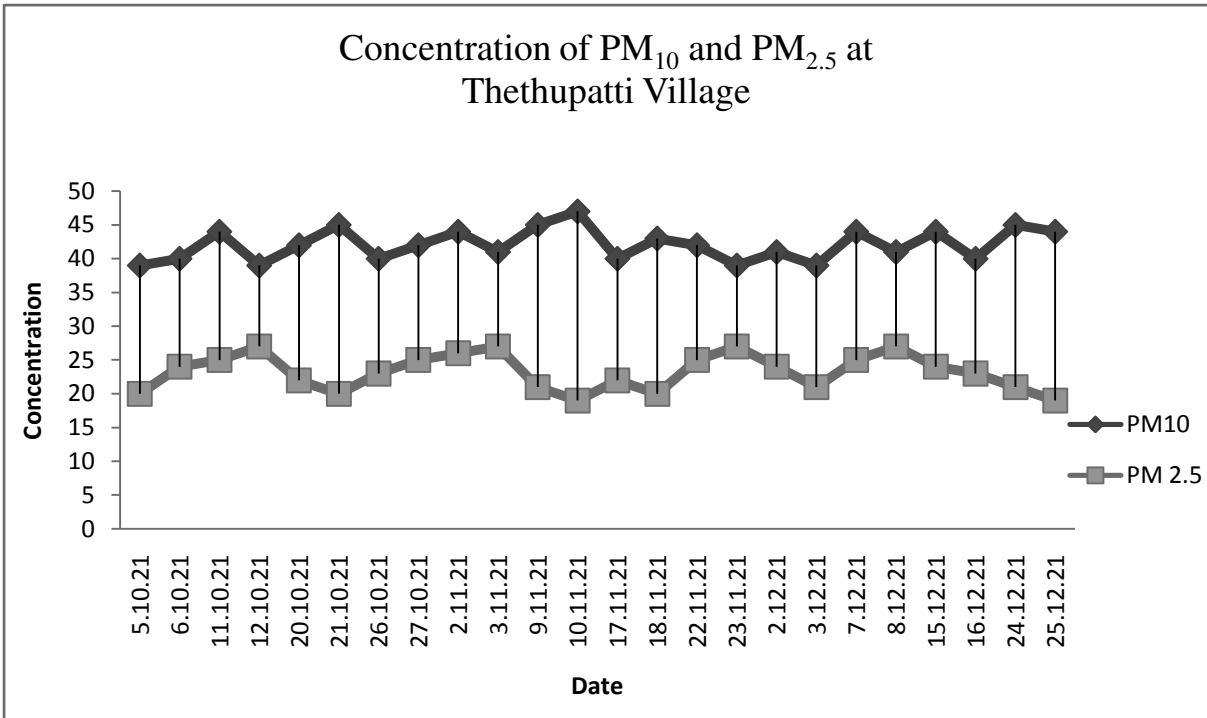
Table No. 3.3: Summary of Ambient Air Quality Results

Code	Locations	Parameters	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m)
AAQ 1	Cluster core zone	Maximum	52	29	14	18
		Minimum	44	20	6	11
		Average	48.0	24	9	14
		98%	52	28.5	14	17
AAQ 2	Pungambadi	Maximum	48	33	10	16
		Minimum	40	24	4	7
		Average	44	28	6	11
		98%	48	32.5	9.5	16
AAQ 3	Seethapatti	Maximum	48	31	10	15
		Minimum	39	22	4	6
		Average	43	27	7	10
		98%	47	31	10	14
AAQ 4	Thethupatti	Maximum	46	27	10	15
		Minimum	39	19	4	6
		Average	42	23	6	10
		98%	45	27	9.5	13.5
AAQ 5	Thirukooranam	Maximum	50	25	11	16
		Minimum	42	18	4	7
		Average	46	21	7	12
		98%	49	24	10	16
NAAQS			100	60	80	80









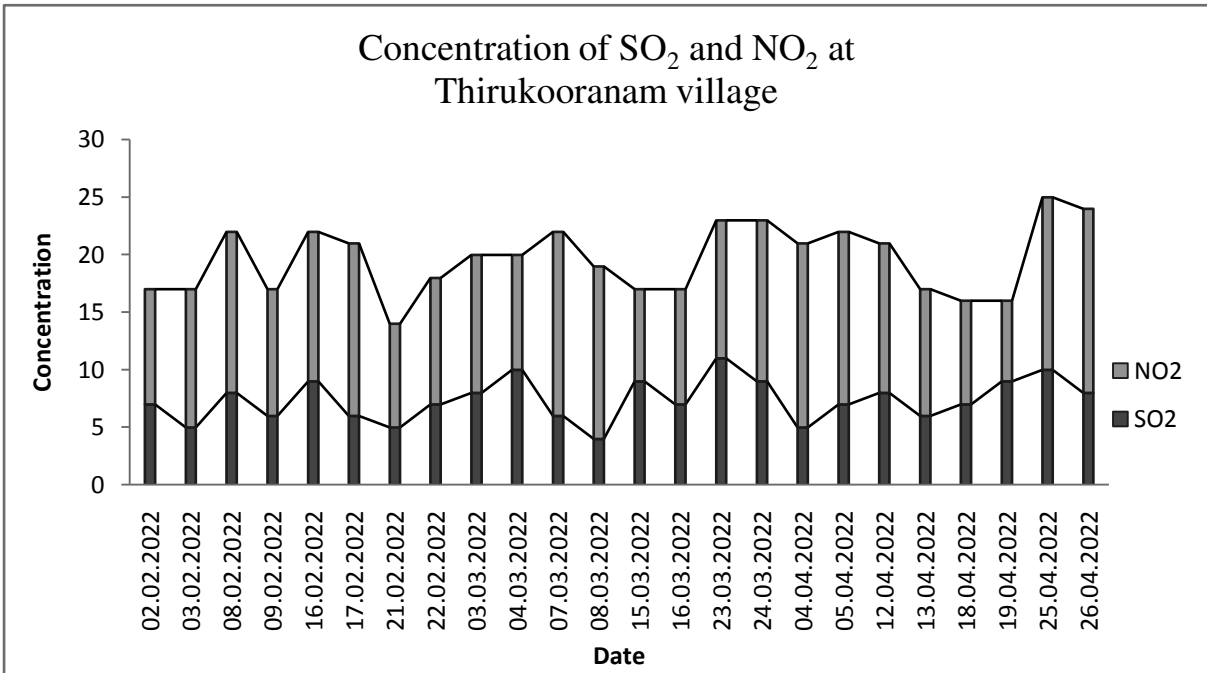
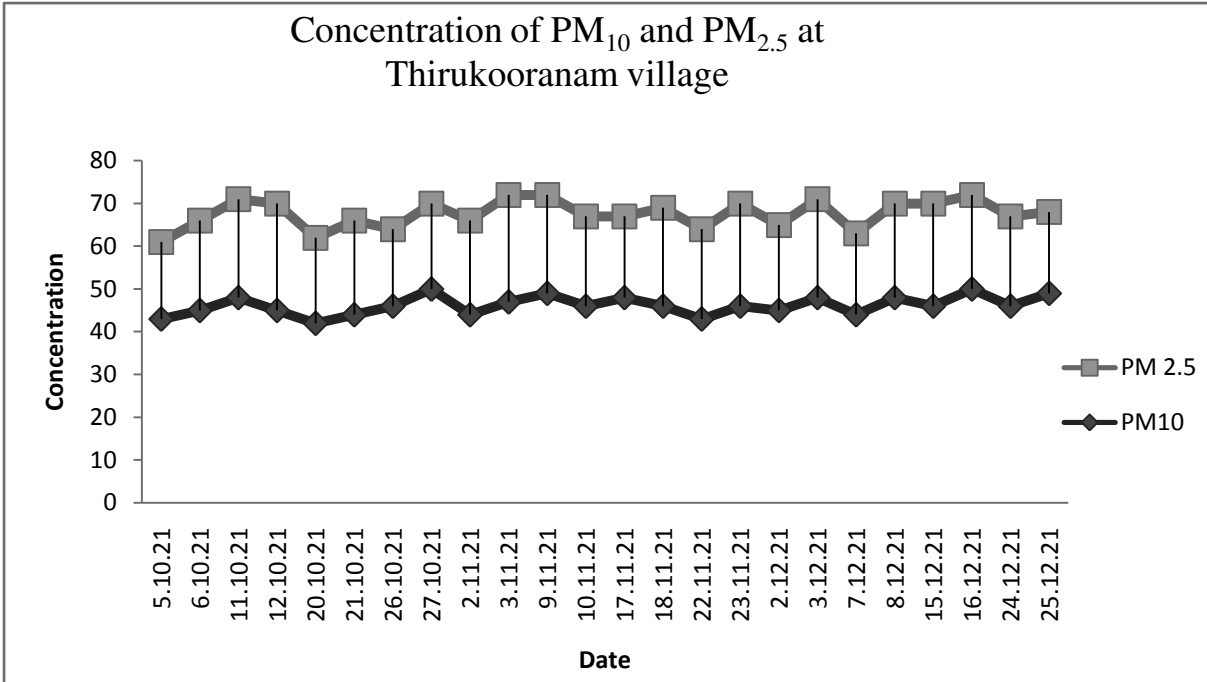


Fig No. 3.5: Variation in Concentration of air pollutants

3.4.4 Observations of Primary Data

The area generally has low levels of pollutants in ambient air, which is well within the National Ambient Air Quality Standards for industrial or rural areas. This is due to the absence of any major pollution generating source in the vicinity.

(i) Particulate Matter (PM_{2.5})

- ✚ The average PM_{2.5} level at five stations was varied from 21µg/m³ to 28µg/m³ for the monitoring period 1st March 2022 to 31st May 2022. The maximum concentration was recorded at Pungambadi village of 33µg/m³ and the minimum concentration was recorded at Thirukooranam village of 18µg/m³.

(ii) Particulate Matter (PM₁₀)

- ✚ The average PM₁₀ level at five stations was varied from 42µg/m³ to 48µg/m³ for the monitoring period 1st March 2022 to 31st May 2022. The maximum concentration was recorded at lease area of 52µg/m³ and the minimum concentration was recorded at Seethapatti and Thethupatti village of 39µg/m³.

(iii) Sulphur Dioxide (SO₂)

- ✚ The average SO₂ level at five stations was varied from 6µg/m³ to 9µg/m³ for the monitoring period 1st March 2022 to 31st May 2022. The maximum concentration was recorded at 14µg/m³ in lease area. The minimum concentration was recorded at Seethapatti and Thethupatti village of 4µg/m³.

(iv) Nitrogen Dioxide (NO₂)

- ✚ The average NO₂ level at five stations was varied from 10µg/m³ to 14µg/m³ for the monitoring period 1st March 2022 to 31st May 2022. The maximum concentration was recorded at core zone of 18µg/m³ and the minimum concentration was recorded at Seethapatti and Thethupatti village of 6µg/m³.
- ✚ Based on comparison study of results with NAAQS for monitored parameters, it is interpreted that ambient air quality of the monitored locations can be considered good as all the results of tested parameters are well within the limits of NAAQS prescribed by CPCB.

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3.5 NOISE ENVIRONMENT

A preliminary reconnaissance was undertaken to identify the major noise generating sources in the area. Five locations (Cluster core area & Buffer zone) were identified based on the activities in the study area, traffic and sensitive areas like hospitals and schools. The noise monitoring locations are shown in fig 3.7. The sampling locations are shown in table 3.4.

The objectives of Noise environment studies are:

- To assess the ambient noise level in the study area.
- To characterize the noise pollution area.
- To predict the temporal changes in the ambient noise level of the area.

The baseline noise levels were taken to assess the Impact of Noise on the workers in the mine site and on the nearby settlements due to mining machineries, movements of vehicles etc. Ten locations were identified based on the activities in the study area in dB (A) scale. Georeferenced Top map showing location of noise sampling is given in the fig 3.6.

Table No. 3.4: Noise Monitoring Stations.

Sl. No	Location	Station code	Distance (km)	Direction
1	Cluster core zone	N1	--	--
2	Pungambadi	N2	4.2	N
3	Seethapatti	N3	1.7	NW
4	Thethupatti	N4	4.3	SW
5	Thirukooranam	N5	1.3	NE

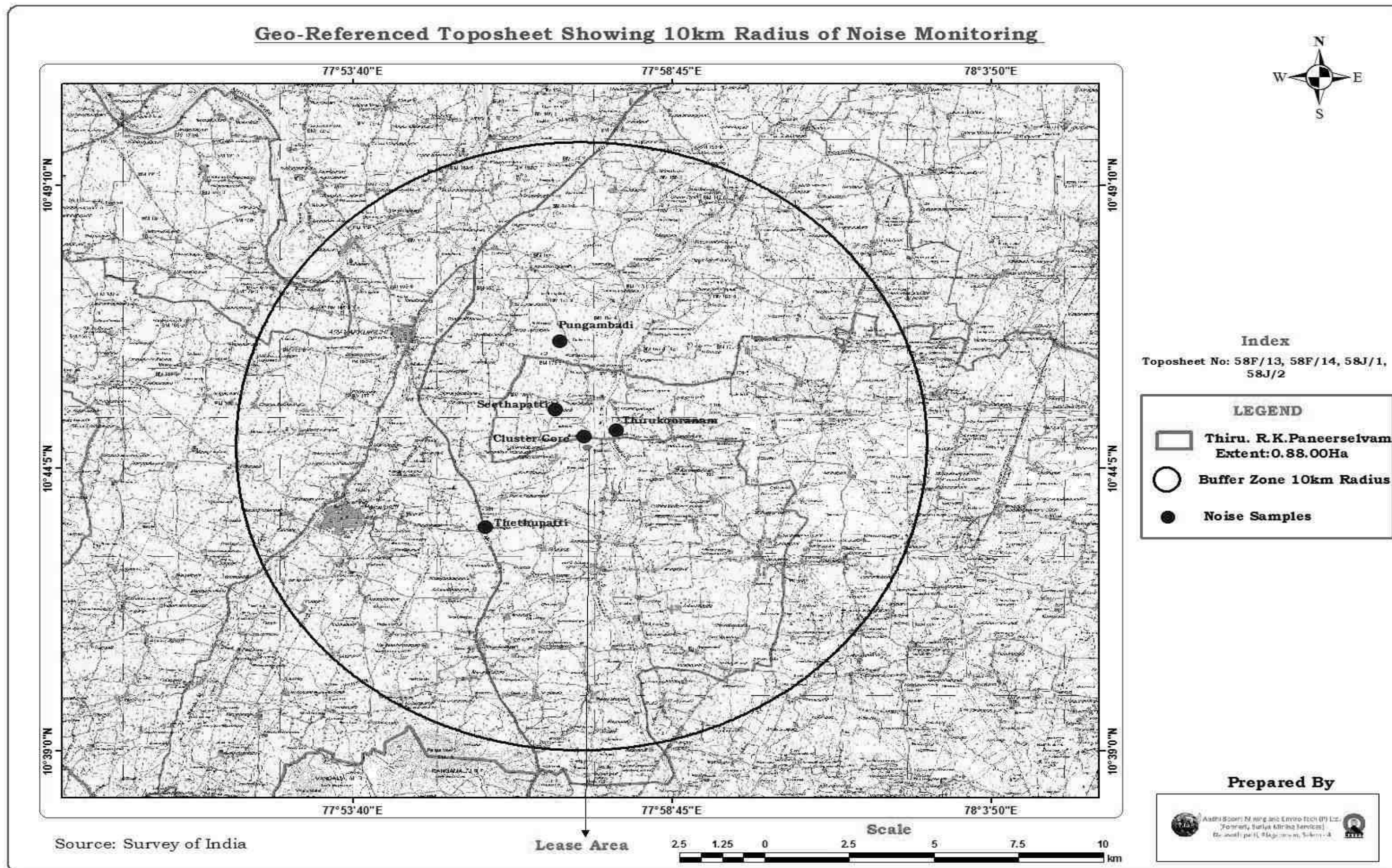


Fig No. 3.6: Geo Referenced Toposheet showing Noise sampling stations around 10km radius

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3.5.1 Method of Monitoring

Sound Pressure Level (SPL) was measured at nine locations; one reading per hour was taken for 24 hours. The day time noise levels were monitored during 6 am to 10 pm and night time levels during 10 pm to 6 am at all the monitoring locations within the study area.



Fig No. 3.7: Noise Monitoring at Cluster core and Buffer zone

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For each location, day and night time Leq values have then been computed from the hourly Leq values such that comparison could be made with the national ambient noise standards.

Table No. 3.5: Summary of Ambient Noise Level during study period

Sample code	Location	Decibel dB (A)		TNPCB Standards
		Day Time	Night Time	
N1	Cluster Core Zone	46.0	36.4	Industrial – 75 dB(A)
N2	Pungambadi	42.2	33.4	
N3	Seethapatti	40.4	31.0	Residential – 55 dB(A)
N4	Thethupatti	45.3	35.1	
N5	Thirukooranam	45.6	35.3	

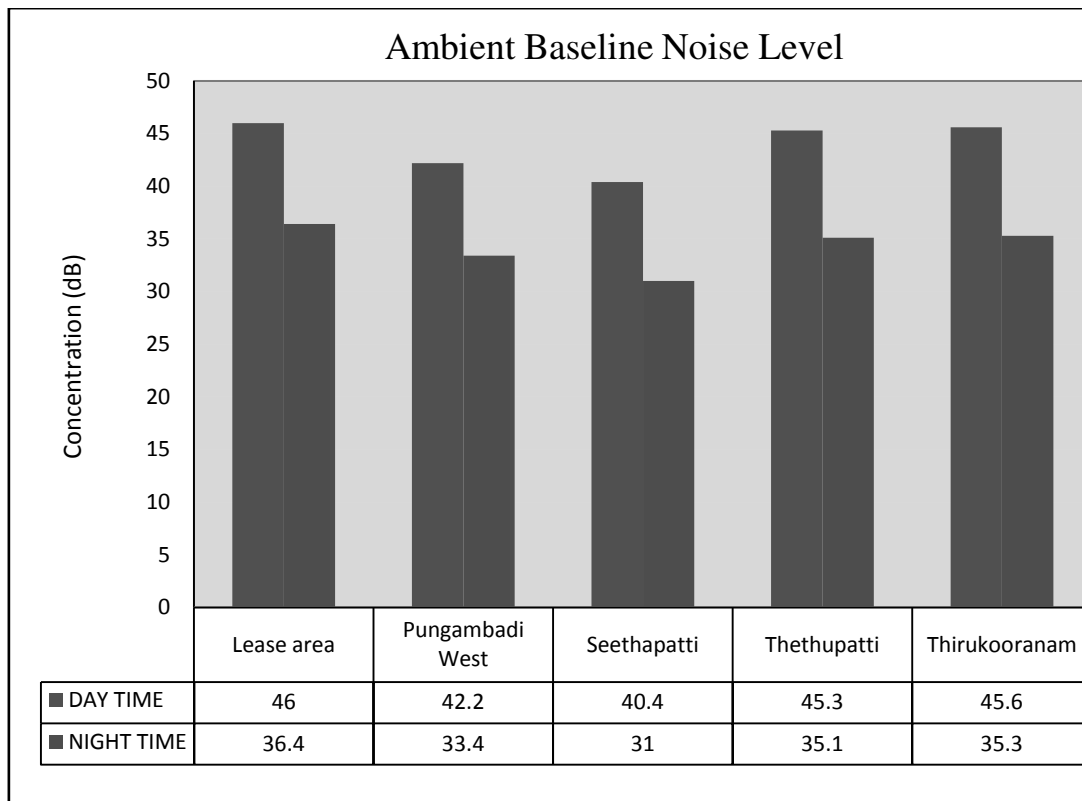


Fig No. 3.8: Ambient Baseline Noise Level

3.5.2 Observations

3.5.2.1 Day Time Noise Levels

The day time noise levels at cluster core zone were observed as 46.0 dB (A) being well within the Industrial area prescribed limit of 75 dB (A) whereas the noise levels at all locations of Buffer zone were observed to be in the range of 40.4–47.6 dB (A) being well within the Residential area prescribed limit of 55 dB (A) as per CPCB Standard for Industrial Areas.

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3.5.2.2 Night Time Noise Levels

The night time noise levels at all locations of buffer zone villages were observed to be in the range of 31.0-36.4 dB (A) being well within the residential area prescribed limit of 45 dB (A) whereas the Noise level in the cluster core zone was observed as 36.4 dB (A) which is also within the prescribed limit of 70 dB (A) as per CPCB Standard for Industrial Areas.

3.6 WATER ENVIRONMENT

Assessment of baseline data on water Environment includes:

- a) Identification of surface and ground water sources.
- b) Collection of water samples.
- c) Analyzing water samples collected for Physico-chemical and biological parameters.

3.6.1 Selection of Sampling Stations

The samplings were taken from the identified monitoring locations within the 10km radius of the study area. Water samples were collected to study the water quality of the study area.

3.6.2 Water Quality

Water samples from various locations in and around the project site within 10 km radius were collected for assessment of the physico-chemical and bacteriological quality to know the baseline status of water quality. Parameters for analysis of water quality were selected based on the utility of the particular source of water as per MoEF & CC guidance. Methodologies adopted for sampling and analysis of water in accordance to the Bureau of Indian Standards. The parameters thus analyzed were compared with IS10500:2012. Details of water sampling locations are present in table 3.6. In addition, water quality details are given in the table 3.7. Locations of cluster core and buffer zone water samples are given in the fig 3.9. The following image of Geo referenced Topomap showing locations of water samples are given in the fig 3.10.

Table No. 3.6: Water Sampling Locations

Sampling code	Location	Latitude	Longitude	Distance(km)	Direction
WQ 1	Cluster Core Zone	10°44'39.7"N	77°57'21.2"E	--	--
WQ 2	Pungambadi	10°46'22.4"N	77°56'57.9"E	4.2	N
WQ 3	Seethapatti	10°45'07.7"N	77°65'26.0"E	1.7	NW
WQ4	Thethupatti	10°43'1.50"N	77°55'47.02"E	4.3	SW
WQ 5	Thirukooranam	10°45'20.05"N	77°57'36.30"E	1.3	NE



Fig No. 3.9: Water Sample Collection at Cluster core and Buffer zone

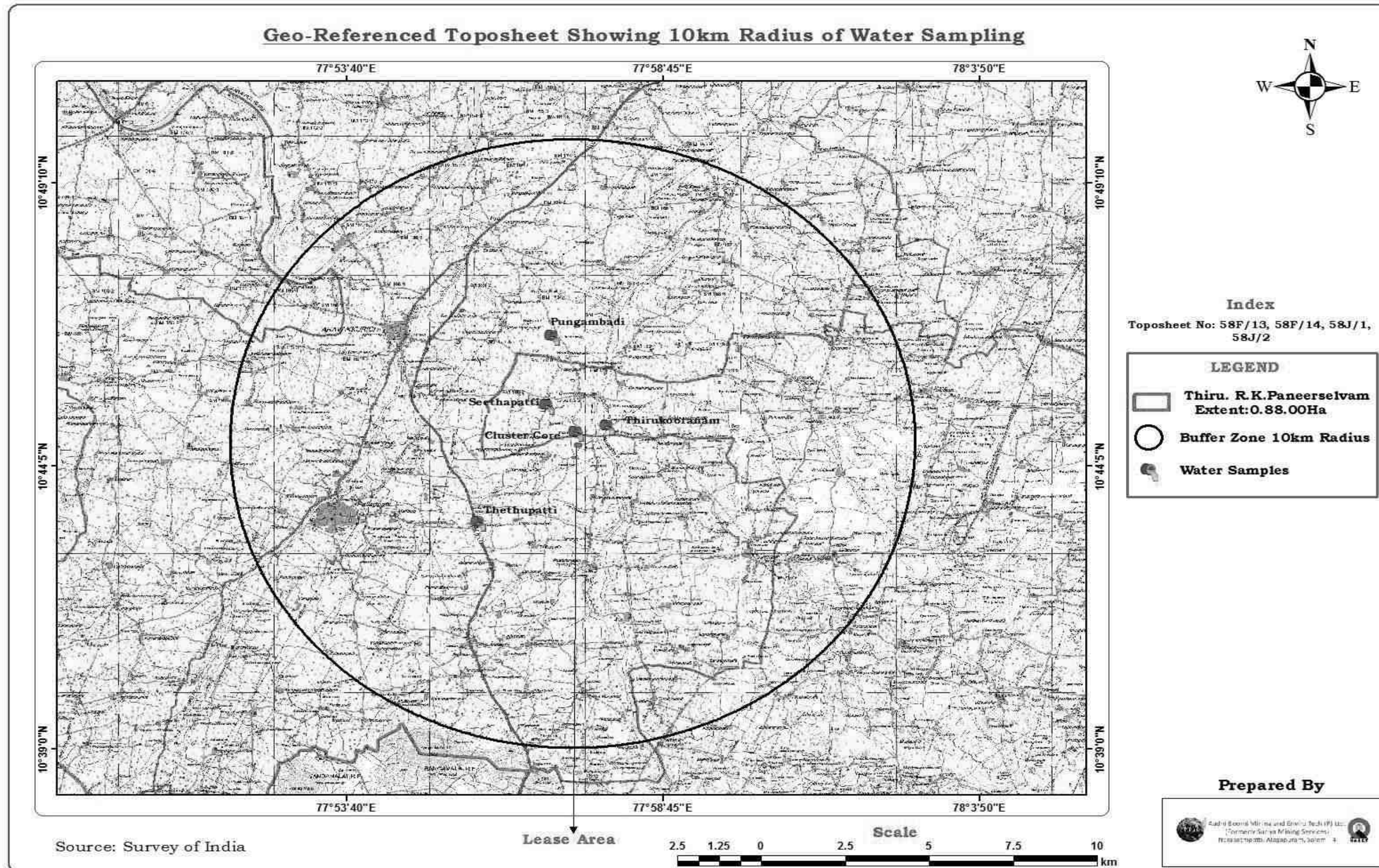


Fig No. 3.10: Geo Referenced Toposheet showing Water sampling station around 10km radius

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Table No. 3.7: Result of Water Quality Analysis

Sampling Site		Parameters												
		pH	EC µs/cm	Tur (NTU)	TSS (mg/l)	TDS (mg/l)	TH (mg/l)	Ca (mg/l)	Mg (mg/l)	Cl (mg/l)	TA (mg/l)	HCO ₃ ⁻ (mg/l)	SO ₄ ²⁻ (mg/l)	Fe (mg/l)
Cluster Core Zone		8.4	4990	BDL	20	2510	1200	360	73	954	138	104	63	0.01
Buffer Zone	Pungambadi	7.48	882	BDL	2	493	95	36	1	668	275	275	13	0.04
	Seethapatti	7.34	5794	BDL	10	3710	1676	404	162	1907	300	300	107	2
	Thethupatti	7.24	1350	BDL	2	756	270	59	24	753	100	100	20	0.07
	Thirukooranam	7.34	5790	BDL	12	3722	1542	351	161	2003	300	300	107	2
IS10500:2012	AL	6.5-8.5	-	1	-	500	200	75	30	250	200	-	200	0.3
	PL	6.5-8.5	-	5	-	2000	600	200	100	1000	600	-	400	0.3

***Protocol followed by:** APHA 23rd Edition 2017

Tur- Turbidity, **TSS-** Total Suspended Solids, **TDS-** Total Dissolved Solids, **TH-** Total Hardness, **Ca²⁺-** Calcium, **Mg²⁺-** Magnesium, **Cl** Chloride, **TA-** Total Alkalinity, **HCO₃⁻-** Bicarbonate, **SO₄²⁻-** Sulfate and **Fe-** Iron.

AL- Acceptable Limit.

PL- Permissible limit.

3.6.3 Interpretation of Water Quality Data

Ground Water Quality results were compared with Acceptable limits for Drinking Water as per the Standard IS 10500:2012. Some parameters of Water samples did not meet the acceptable limits of IS 10500: 2012.

- pH of the water samples ranged from 7.24 -8.4. pH in water samples collected from all the locations are within the acceptable limits limit.
- EC was found to be in the range of 882-5794, is found high in all the locations.
- Carbonates except in cluster core zone (34 mg/l) was all found to be Below Detectable Limit.
- Iron in water samples collected from Cluster core, Pungambadi and Thirukooranam was found to be within permissible limit. The other two locations was found to be 2 mg/l, is beyond the Required/Permissible limit.
- Total Dissolved Solids found in the range of 493 - 3722 mg/l. Highest value was recorded in Thethupatti, cluster core zone, Thirukooranam and was found the limits exceeds the required limit of 500 mg/L as per CPCB norms.
- Total Hardness of water sample varied between 95-1676 mg/l and the maximum value recorded at Thethupatti village. The entire four samples' except Pungambadi village TH exceeds the Acceptable limit.
- Chloride in the water samples ranged from 753 - 2003 mg/l. Highest Chloride value was recorded in Thethupatti, cluster core zone, Thirukooranam and Pungambadi. All the five water samples taken for analysis exceed the acceptable limit.
- Turbidity from all the water samples was found below detectable limit.
- Sulphates in all the water samples were found within the Acceptable limit.

Prolonged consumption of water containing high TH causes Cardio vascular problems, diabetes, skin diseases, rashes, reproductive failure and renal failure. For the excellent quality of drinking the water must be treated with reverse osmosis process to overcome above mentioned such impacts on human body. Boiling of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

3.7 Hydrogeology

3.7.1. Hydro geological details of Aravakuruchi Taluk

Hydrogeology of the Aravakuruchi Taluk, consists fissured, weathered and fractured Archaean crystalline formations consisting of charnockites, Granite Gneisses rocks construct the major aquifer systems. Generally, the groundwater occurs under phreatic conditions in the weathered formation and under semi-confined conditions in the fractured zones at deeper levels. The occurrence and movement of ground water are controlled by various factors such as physiography, Rainfall, climate, geology and structural features. The normal annual rainfall over the district varies from about 750 to about 900 mm.

3.7.2. Scope of the study

- To understand the aquifer characteristics by pumping test
- To delineate the fresh groundwater potential zone and sub surface lithology using electrical resistivity method

3.7.3. Geophysical Investigation Method

Geophysical methods are the irreplaceable tools to explore subsurface with an economical expense of energy, money and man power. A variety of methods are available to assist in the assessment of ground water table, aquifer geometry and sub-surface geological conditions. The main emphasis of the fieldwork undertaken was to determine the thickness and composition of the sub-surface formations and to identify water-bearing zones. This information was principally obtained in the field using vertical electrical soundings (VES), this method is described below.



Fig No. 3.11: Photos Showing Geophysical Survey conducted at the lease area

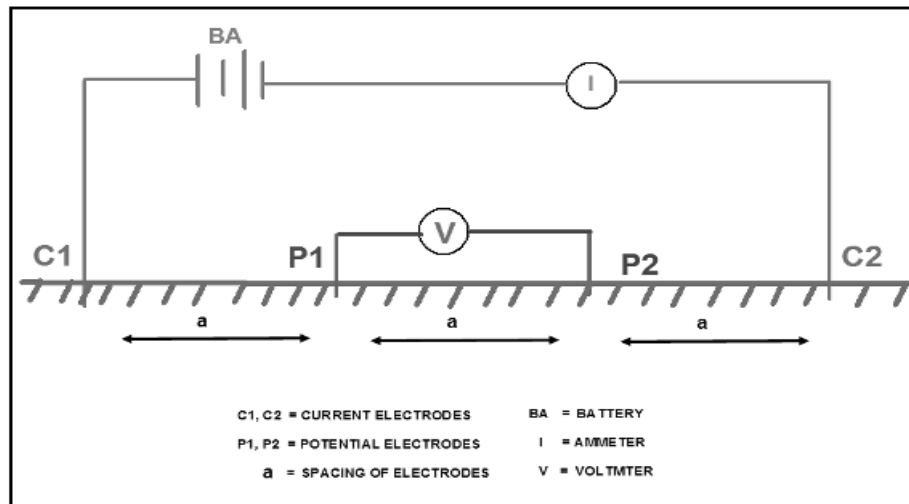
If a material having a resistant of R , cross-sectional area of A , and length of L , then resistivity is given

$$R = \frac{V}{I}$$

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In resistivity method three quantities are to be measured at each observation point. One is mutual separation between the electrodes that is “geometric configuration”. The other two are the current (I) passed into the ground through the current electrodes and potential difference (V) developed between the potential electrodes. Thus two pairs of electrodes are used, one pair for sending the current and the other for recording the voltage. Thus we need to have a current source and a potentiometer.



A geometrical pattern of electrodes used in vertical electrical sounding, constant separation traversing, and induced polarization surveys. During a resistivity sounding, the separation between the two current electrodes is step-wise increased (in what is known as a Schlumberger Array), thus causing the flow of current to penetrate greater depths. When plotting the observed resistivity values against depth on a graph sheet, a resistivity graph is formed, which shows the variation of resistivity with depth. This graph can be interpreted with the aid of a computer and the actual resistivity layering of the subsoil is obtained. The depths and resistivity values provide the hydro geologist with information on the geological layering and thus the occurrence of groundwater.

3.7.4. Interpretation for Electrical sounding

In general the groundwater prospects are less in hard rock areas, especially in Hard rock terrains. The deeper aquifers in hard rock terrains have potential only when they are fed by fractures and thick weathered layer. In the present study, to know the subsurface Lithology and layer thickness of groundwater potential zone were carried out vertical electrical soundings (VES). The resistivity signal dimensions were collected by using DDR-3 model resistivity meter. AB/2 electrode spacing of 100m is used by Schlumberger configuration. The data were analyzed by curve matching techniques. From the apparent resistivity data, the interpreted resistivity curve obtained using the software it is observed that 3 layer curves

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shown in the fig 3.12. Data collection is another important factor for the success of resistivity method. The interpretation of resistivity data four layer master curve matching technique has been used. Interpreted Resistivity and layer thickness of various layers shown in table 3.8.

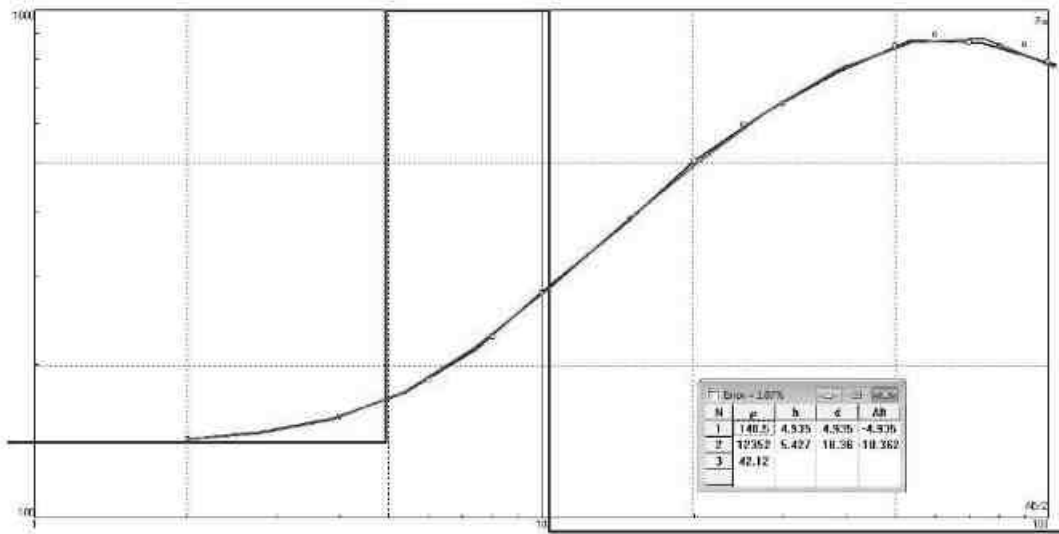


Fig No. 3.12: Interpreted resistivity curve matching technique

Table No. 3.8: Interpreted layer parameters from Geo-electric resistivity soundings

Resistivity (Ωm)	Depth in (m)	Formation
140.5	4.93	Dry loose sand formation/Red soil
12352	5.42	Massive rock
42.12		Fracture water bearing formation

3.7.5. Aquifer Performance Test

Aquifer performance tested (APT) to assess the groundwater potential of the hard rock terrain. There are few bore wells located around 10 km radius of buffer zone. One of the bore well is located is reported to be 244.0 meter depth and gives moderate yield. The bore well is fitted with 7.5 HP submersible pumps and water is pumped using for Domestic use. These data of pumping test are used to estimate the hydraulic properties like drawdown, transmissivity using Jacob's straight-line method, while the recovery transmissivity was determined by the Theis recovery method.

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Fig No. 3.13: Pump test survey conducted on bore well around 1Km radius from lease area

Pumping well with constant discharge of 3.80 LPS for 100 minutes pumping duration. The depth to water level was 49.50 m bgl. The recuperation data was collected for duration of 100 minutes. The data plot showing Time V/s Drawdown and Residual Drawdown V/s t/t'- shown in fig 3.13 and data in table 3.10.

Table No. 3.9: Pump test survey conducted parameters

Parameter	:	Observations
Static Water Level (m)	:	32.50
Duration of the test(Time in min)	:	100
Discharge (Q) m ³ /day	:	129.6
Total Drawn down (m)	:	54.30
Specific capacity (lpm/m)	:	2.38
Transmissivity (Jacob method) m ² /day	:	1.69
Transmissivity (Theis recovery method) m ² /day	:	1.18

Estimation of the hydraulic parameters is very essential to optimal management of this resource. The hydraulic parameters are estimated from pumping test carried out on Pungambadi village which showed that the transmissivity T values ranged from Jacob method 1.69 m²/day and Theis recovery method 1.18 m²/day. The result of the pumping test data shows that there are limited groundwater prospects in the region which certainly needs careful planning and management of the available water resource.

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Table No. 3.10: Aquifer Performance Test (APT)

Village Name		Pungambadi					
Depth of the well		204.0 m					
Static water level		32.50 m					
Discharge lps		1.5 lps					
Discharge (Q m³/day)		129.6 m ³ /day					
Time since pump started (min)	Depth to water	Drawdown (m)	Time (t)	Time since pump stopped (min) (t')	Depth to water (m bgl)	Residual Drawdown (m bgl)	t/t'
	(m)						
0	32.50	0.00	100	0	86.80	54.30	0
1	34.80	2.30	101	1	75.30	42.80	101.00
2	36.60	4.10	102	2	73.50	41.00	51.00
3	38.20	5.70	103	3	71.60	39.10	34.33
4	40.20	7.70	104	4	69.20	36.70	26.00
5	42.00	9.50	105	5	67.60	35.10	21.00
6	43.30	10.80	106	6	65.30	32.80	17.67
7	44.20	11.70	107	7	64.30	31.80	15.29
8	46.50	14.00	108	8	63.50	31.00	13.50
9	48.30	15.80	109	9	62.10	29.60	12.11
10	50.10	17.60	110	10	61.50	29.00	11.00
12	53.20	20.70	112	12	60.20	27.70	9.33
14	56.00	23.50	114	14	59.20	26.70	8.14
16	58.20	25.70	116	16	58.60	26.10	7.25
18	60.80	28.30	118	18	57.10	24.60	6.56
20	62.50	30.00	120	20	56.50	24.00	6.00
25	66.30	33.80	125	25	55.80	23.30	5.00
30	69.20	36.70	130	30	54.90	22.40	4.33
35	71.50	39.00	135	35	53.70	21.20	3.86
40	73.10	40.60	140	40	52.60	20.10	3.50
45	74.00	41.50	145	45	51.20	18.70	3.22
50	74.50	42.00	150	50	50.40	17.90	3.00
55	74.90	42.40	155	55	49.60	17.10	2.82
60	75.30	42.80	160	60	48.50	16.00	2.67
70	75.55	43.05	170	70	47.50	15.00	2.43
80	79.20	46.70	180	80	-	-	2.25
90	86.80	54.30	190	90	-	-	2.11
100	86.80	54.30	200	100	-	-	2.00

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Computation of Transmissivity of Pumping Well

By Jacobs Method

Transmissivity calculated from Drawdown vs time data plots.

T	=	$2.3 Q/4\pi\Delta s$
Q	=	129.6 m ³ /day
Δs	=	14.0 m
T	=	$\frac{2.3 \times 129.6}{4 \times 3.14 \times 14}$
T	=	1.69 m ² /day

By Theis Method

Transmissivity calculated from Residual Drawdown vs t/t' data plots.

T	=	$2.3 Q/4\pi\Delta s$
Q	=	129.6 m ³ /day
Δs	=	20.0 m
T	=	$\frac{2.3 \times 129.6}{4 \times 3.14 \times 20}$
T	=	1.18 m ² /day

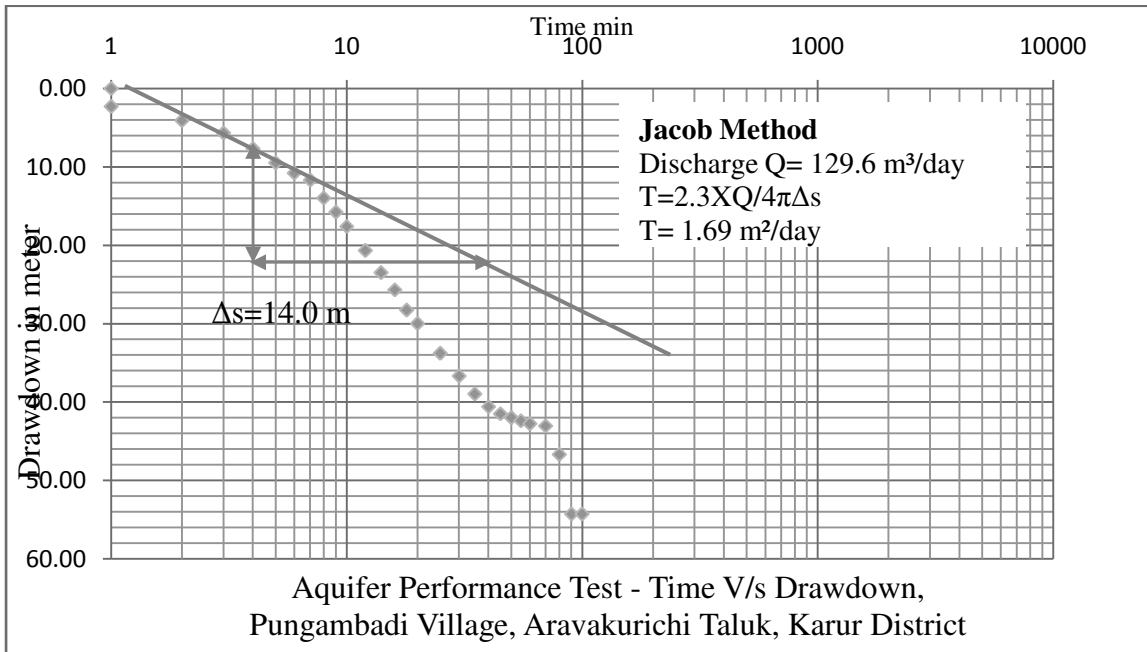


Fig No. 3.14: Aquifer Performance Test data plot- Time V/s Drawdown

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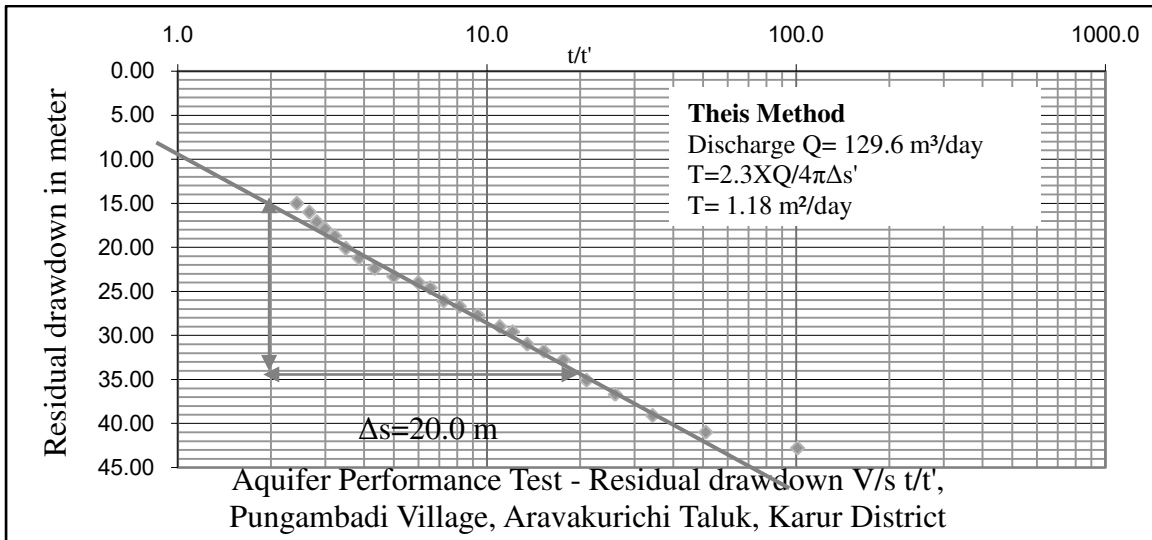


Fig No. 3.15: Aquifer Performance Test data plot - Residual Drawdown V/s t/t'

3.7.6. Conclusion

An integrated approach of pumping test and geophysical methods of survey including 2D resistivity method help us to assess the groundwater potential zones, ground water table, aquifer geometry and direction of groundwater movement and subsurface lithology variations. Present scenario no shallow aquifers Zone identified. Favorable aquifer potential zone encountered above 80m depth and the hydrological condition 10 km radius of buffer zone depth to the static water levels of the aquifer ranges from above 32.50 to 48.15m bgl.

3.7.7. Study on Bore wells within the radius of 1Km

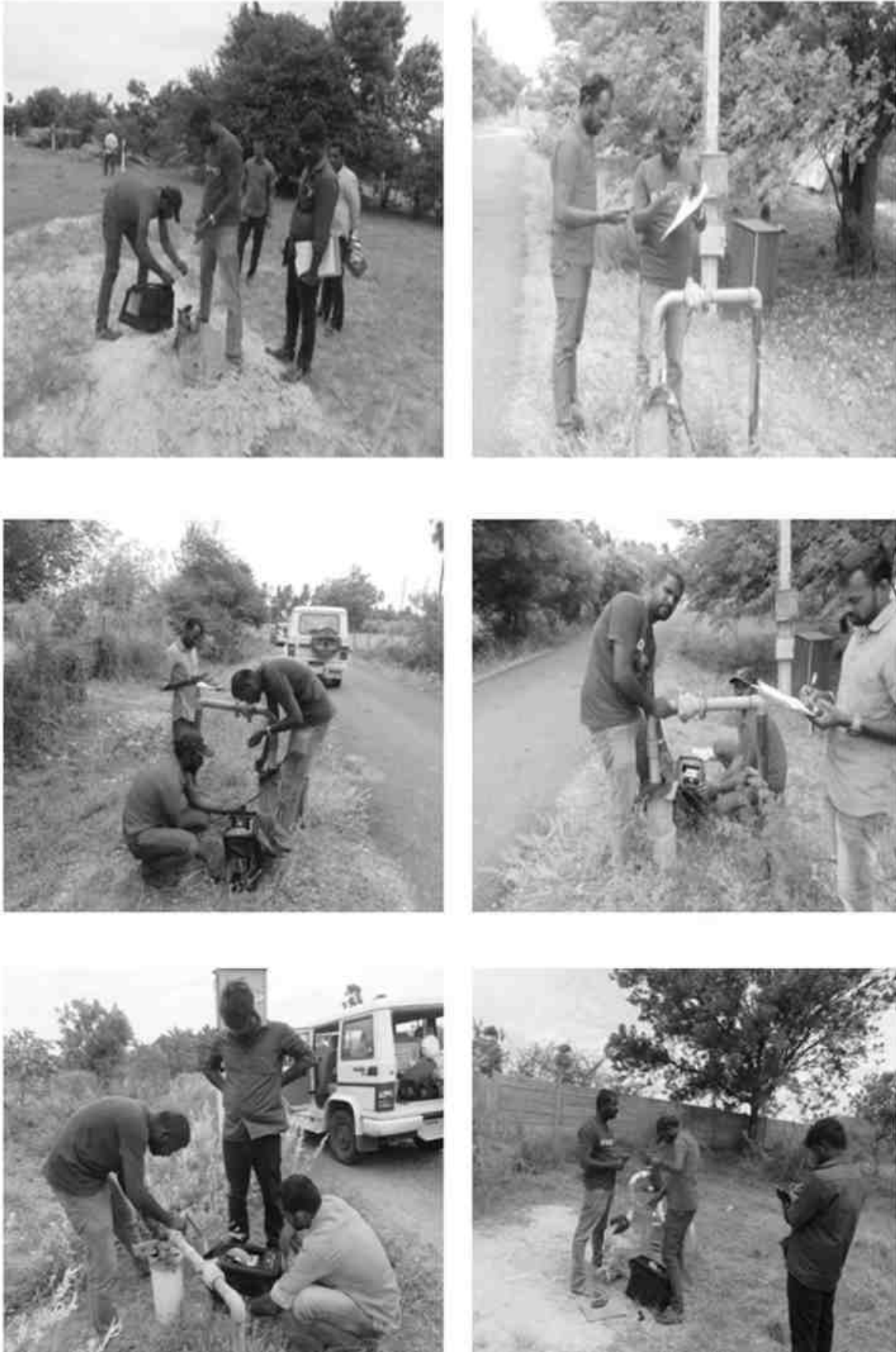


Fig No. 3.16: Well inventory survey data recording around 1km Radius

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Fig No. 3.17: Google image showing bore & well located from lease area

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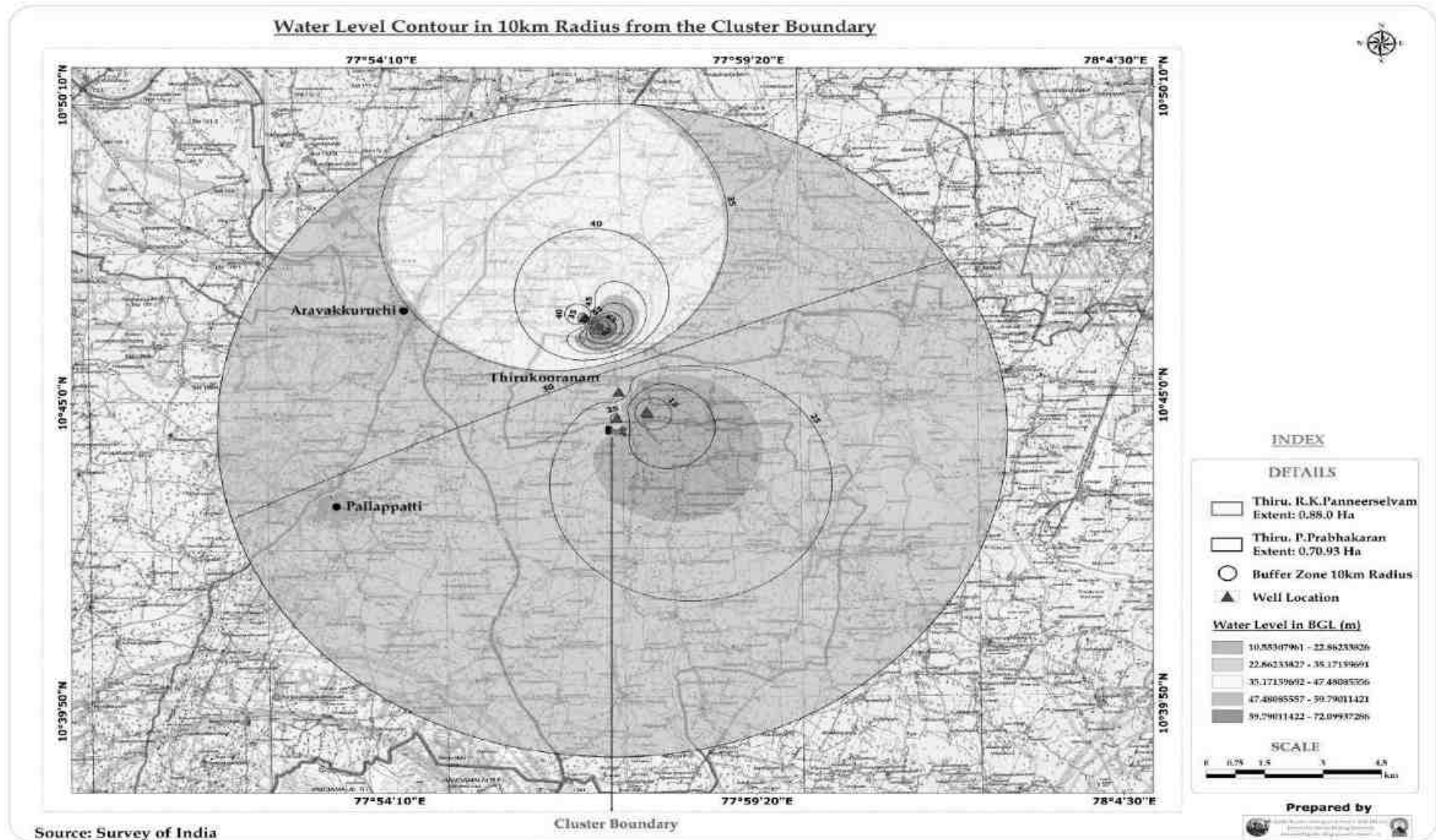


Fig No. 3.18: Water level contour in 10km radius from the cluster boundary

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Table No. 3.11: Details on number of Bore wells within the radius of 1km

S. No	Location details	Latitude & Longitude & MSL	Type of well	Water level
1	Thirukooranam Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°44'41.0"N, Long: 77°57'24.8"E Elevation=179MSL	Bore well Total depth=170m	25.5m
2.	Thirukooranam Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°45'7.44"N Long: 77°57'26.79"E Elevation=175MSL	Bore well, Total Depth =210m	27.3m
3.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°46'13.47"N Long: 77°57'10.47"E Elevation=179MSL	Bore well, Total Depth=300m	72.5m
4.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°46'22.1"N Long: 77°56'58.3"E Elevation=185MSL	Bore well, Total depth=170m	32.5m
5.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°44'47.6"N Long: 77°57'50.3"E Elevation=173MSL	well, Total depth=21m	10.5m
6.	E.Almarrathupatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°44'45.5"N Long: 77°57'50.8"E Elevation=177MSL	Bore well, Total depth=150m	12.5m

3.8 Soil Environment

The type of soil is an important factor for the growth of plants and crops in any area. The soil system has various criteria to classify the soils of a region such as geology, humidity, rainfall pattern, soil texture, soil salinity etc.

Soil quality study has been carried out at the site and in the study area of 10 km radius around the project site to understand the physical-chemical nature of the soil. Soil sampling was carried out at 5 selected locations.

The frequency and methodology of soil quality sampling process is given in table 3.12. Moreover, Georeferenced soil Map of around 10 km radius is given in fig 3.18 and table 3.13 presents the soil quality monitoring locations of the study area. The sampling was carried out once in the study period.

Table No. 3.12: Frequency and methodology for soil sampling & monitoring

S. No	Particulars	Details
1	Frequency	One sample from each station— once during the Study Period
2	Methodology	Soil Sample has been collected as per the CPCB standard

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3.8.1 Methodology of Soil Environment

Soil samples were collected from different depth below the surface. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis. The samples were homogenized and the quality was reduced using the coning and quartering method to provide a respective sample for analysis. The samples were analyzed as per Indian Standards IS: 2720 (Revised Parts).

- ❖ To determine the baseline soil characteristics of the study area
- ❖ To determine the impact of the project on soil characteristics and
- ❖ To determine the impact on soils more importantly loss of fertility from agricultural productivity point of view.

Table No.3.13: Soil Sampling Locations

Sampling code	Location	Latitude	Longitude	Distance (km)	Direction
S 1	Cluster core zone	10°44'39.07"N	77°57'21.23"E	--	--
S 2	Pungambadi	10 ⁰ 46'22.4" N	77 ⁰ 56'57.9" E	4.2	N
S 3	Seethapatti	10 ⁰ 45'07.5" N	77 ⁰ 65'26.0" E	1.7	NW
S 4	Thethupatti	10 ⁰ 43'1.50"N	77 ⁰ 55'47.2"E	4.3	SW
S 5	Thirukooranam	10 ⁰ 45'20.05"N	77 ⁰ 57'36.30"E	1.3	N

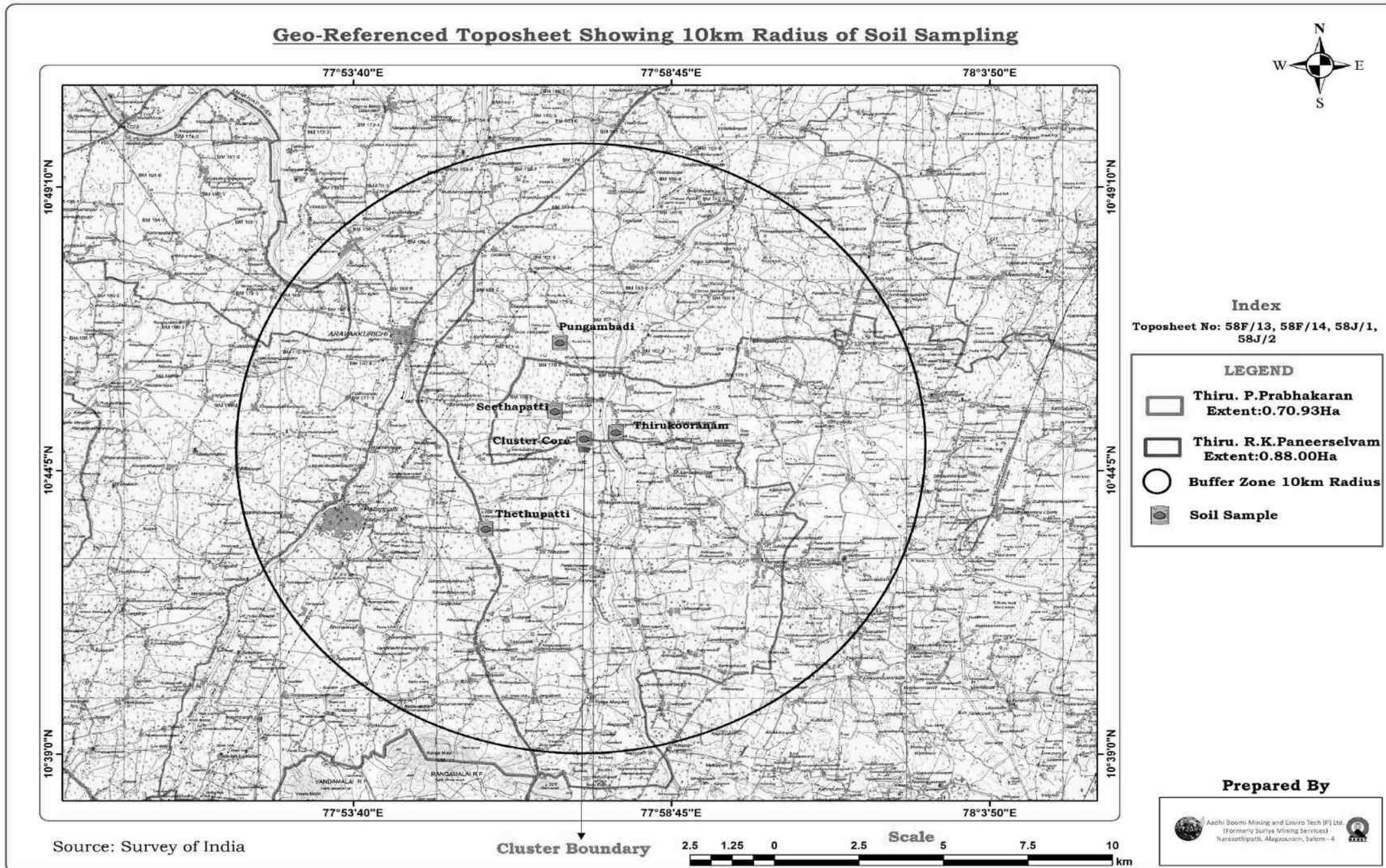


Fig No. 3.19: Geo referenced Toposheet showing Soil sampling Locations around 10km radius



Fig No. 3.20: Soil sampling at cluster core and Buffer zone

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Table No. 3.14: Result of Soil Sample Analysis

Sample Site		Soil Parameters											
		pH (10%Sol)	EC (10% Sol) $\mu\text{s/cm}$	M (%)	BD (g/cc)	WHC (%)	Texture (%)			OC (%)	Ca (%)	Mg (%)	Cl (%)
							Sand	Silt	Clay				
Cluster Core Area		6.65	101	0.11	1.27	64	48	36	16	0.48	0.37	BDL	3.9
Buffer Zone	Pungambadi	7.76	64	1.4	1.13	60	56	16	28	0.68	0.005	BDL	0.001
	Seethapatti	8.39	934	0.43	1.04	68	36	20	44	2.1	0.002	BDL	0.013
	Thethupatti	8.74	537	2.01	1.00	64	44	16	40	1.67	0.001	BDL	0.003
	Thirukooranam	8.92	491	1.3	1.07	52	52	12	36	0.63	0.000	BDL	0.020

EC-Electrical Conductivity, **M**- Moisture, **BD**- Bulk Density, **WHC**- Water Holding Capacity, **OC**- Organic Carbon, **Ca**- Calcium, **Mg**-Magnesium and **Cl**-Chloride.

BDL = Below the Detectable Limit.

DL = Detection Limit.

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3.8.2 Observations

Soil characteristics were delineated through specific parameters viz. moisture, bulk density, texture, water holding capacity, organic matter and other parameters as depicted in table 3.14.

pH is an important parameter indicative of alkaline or acidic nature of soil. It greatly affects the microbial population as well as solubility of metal ions and regulates nutrient availability. The pH varies from 6.65 to 8.92 in the soil samples. In Thethupatti and Thirukooranam pH range was (8.74 & 8.92 respectively) value of soil was slightly basic.

Electrical conductivity (EC): a measure of soluble salts in the soil was in the range of 64 $\mu\text{S}/\text{cm}$ to 934 $\mu\text{S}/\text{cm}$.

Regular cultivation practices increase the bulk density of soils thus inducing compaction. This results in reduction in water percolation rate and penetration of roots through soils. The soils with low bulk density have favorable physical conditions whereas those with high bulk density exhibit poor physical conditions for agriculture crops. The bulk density of the soil samples are in the range of 1.0 g/cc to 1.27 g/cc respectively, which indicate favorable physical condition for plant growth.

Water holding capacity was found to be in the range of 52% to 68% in all the soil samples collected from core and buffer villages.

Organic matter present in soil influences its physical and chemical properties and is responsible for stability of soil aggregates. Organic matter was found to be in the range of 0.48 – 2.1%. This shows that soil was deficient in organic matter content.

Available Chlorides content range of between 0.003-3.9 mg/kg in both core and buffer villages.

Magnesium level of soil sample in the core zone and buffer zone was found to be BDL (DL:1) in all the soil samples collected.

Calcium content in these soils ranges between 0.001–0.37 mg/kg thereby indicating that the soils are with low levels of available Calcium content.

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3.9 ECOLOGY AND BIOLOGICAL ENVIRONMENT

3.9.1 Description of Karur District Environment

Karur Taluk, which was once a part of Coimbatore district, was merged with Tiruchirappalli district during 1910. Karur District came into existence by the bifurcation of Trichy District as per G.O.(Ms)No.683 Revenue(RA1(1)) Department dated:25.07.1996. It is bounded on the North by Namakkal, South by Dindugal, East by Tiruchirappalli and West by Erode districts. The District is located between 10° 37'N to 11°12' N Latitude, 77° 46' E to 78° 15'E Longitude. Karur town is located on the bank of Amaravathi River. Its area is 2895.6 Sq.Km.

Karur district comprises two divisions of Karur and Kulithalai, seven circles namely Karur, Aravakurichi, Manmangalam, Bukalur, Kulithalai, Krishnarayapuram and Kadavur and 203 revenue villages. The district has 157 panchayats and eight districts namely Karur, Dandoni, Aravakurichi, K.Paramathi, Kulithalai, Krishnarayapuram, Kadavur, Thogamalai. In this district there are two municipalities namely Karur and Kulithalai and eleven municipalities namely Aravakurichi, Krishnarayapuram, Marudur, Nangavaram, Old Jayangkonda Solapuram, Pallapatti, Puliyur, Punchai Thotakurichi, Punsai Bukhlur, TNBL Bukhlur, Uppidamangalam.

The average annual rainfall is 652.2 mm. The district receives the rain under the influence of both southwest and northeast monsoons. The major rainfall occurs during north-east monsoon. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

The mean maximum temperature ranges from 26.7 to 38.56 °C and the mean minimum temperature ranges from 18.7°C to 29.3°C. The day time heat is oppressive and the temperature are as high as 43.9°C. The lowest temperature recorded is of the order of 13.9°C.

3.9.2 Agriculture activities in Karur District

Karur district has specifically known for Moringa and Banana cultivation and other prominent crops under cultivation are Tapioca, Gloriosa, Betelvine, Jasmine, Ixora, Coconut and other vegetable crops. Karur district Soils types' clay l red soil dark red soil, the other soil series are Palladam, Palathurai, palaviduthi, Vannapatti and Mixed alluvium.

The principal crops of the district are paddy, millets, pulses, oilseeds, sugarcane and banana. The major paddy area is in Kulithalai and Krishnarayapuram taluks. Pulses are grown in rice fallow areas. In uplands millets like sorghum, pearl millet pulses such as red gram, horse gram oilseeds such as groundnut, gingerly and sunflower are grown both under irrigated and rain fed conditions.

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Table No. 3.15: Details of Important crops in Karur District

S. No	Common name	Scientific name	Family
1.	Paddy	<i>Oryza sativa</i>	Poaceae
2.	Cholam	<i>Sorgham bicolor</i>	Poaceae
3.	kambu	<i>Pennisetum glaucum</i>	Poaceae
4.	Ragi	<i>Eleusine coracana</i>	Poaceae
5.	Groundnut	<i>Arachis hypogaea</i>	Fabaceae
6.	Sugarcane	<i>Saccharum officinarum</i>	Poaceae
7.	Black gram	<i>Vigna mungo</i>	Fabaceae
8.	Cotton	<i>Gossypium herbaceum</i>	Malvaceae
9.	Vargu	<i>Paspalum crobiculatum</i>	Poaceae
10.	Maize	<i>Zea mays</i>	Poaceae
11.	Green gram	<i>Vigna radiata</i>	Fabaceae
12.	Red gram	<i>Cajanus cajan</i>	Fabaceae
13.	Castor	<i>Ricinus communis</i>	Euphorbiaceae
14.	Kuthiraivali	<i>Echinochloa frumentacea</i>	Poaceae
15.	Horsegram	<i>Macrotyloma uniflorum</i>	Fabaceae

3.9.3 Forest resources

The forest resources of this district are very meagre when compared to the State as a whole. Karur district has only about 3.11% of its land under forest cover. The total forest area of Karur District is 6187 Hectares. All the forests are degraded forests and tropical dry thorny forests.

3.9.4 Water resources

Major Rivers flowing the district are

- Cauvery
- Amaravathy
- Nanganjiyaaru
- Noyyal

Major part of Karur district is drained by Cauvery River. Amaravathi, Kodavanar and Pungar are the important rivers draining the western part of the district and the river Pungar drains in eastern part of the district. The drainage pattern, in general, is dendritic. All the rivers are seasonal and carry substantial flows during monsoon period The River Cauvery is flowing on the northern and eastern boundaries.

3.9.5 Study Area Ecology

A survey was conducted to study the flora around 10 km radius. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded. The primary data collected was compared with the Secondary data collected from Forest Department. There are no ecologically sensitive areas such as Biosphere reserves, Wildlife Sanctuaries, national Parks and other protected areas in or around the project site in a radius of 10 km. Generate Baseline Data from field observations.

3.9.6 Methodology of Sampling

A methodology of Sampling Flora and fauna studies were carried out during the winter season to assess the list of terrestrial plant and animal species that occur in the core area and the buffer area up to 10 km radius from the project site. No damage is created to flora and fauna during the sampling. None of the specimens were collected as voucher specimens and for the herbarium. It is basically done through field observations only. The study of flora is conducted as per the guidelines of the Ministry of Environment Forest and Climate Change (MoEF&CC) and Botanical Survey of India (BSI).

The study involved in the collection of primary data by conducting a survey in the field, examination of flora and fauna records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used

3.9.7 Flora

The present study on the floral assessment for the existing project activity is based on extensive field survey of the area. The plant species were identified with the help of plant taxonomy manual, literatures and Botanical Survey of India website (efloraindia.nic.in). In addition besides the collection of plant species, information was also collected with vernacular names of plant species made by local inhabitants.

3.9.7.1. Flora in Core Zone

Taxonomically a total of 27 species distributed in 16 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were tree 15 (56%) followed by shrubs 6 (22%), herbs 5 (19%) and creeper 1 (3%) Details of flora with the scientific name were mentioned in table 3.16 and fig 3.21. No ecologically sensitive plant species has been reported from this area.

3.9.7.2. Flora in Buffer Zone

Taxonomically a total of 49 species distributed among 30 families have been recorded from the buffer area. Based on habitat classification of the enumerated plants the majority of species were tree 25 (51%) followed by shrubs 12 (24%), herbs 8 (16%) and rest 4 (4%) is a climber. Details of flora with the scientific name were mentioned in table 3.16 and fig 3.21.

3.9.7.3 Crop Pattern in Buffer Zone

The buffer area of mining lease area mostly cultivated for varieties of flowers such as, jasmine, firecracker flower, marigold and crops area mango and groundnut. Details crops with name mentioned in table 3.16.

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Table No. 3.16: Floral Diversity in Core and Buffer area
(R.K.Panneerselvam, Ordinary Stone and Gravel Quarry, Karur District)

S. No	Common Name	Local Name	Family	Scientific Name	Core	Buffer
TREES						
1.	Coconut	Tennai Maram	Arecaceae	<i>Coccus nucifera</i>	+	+
2.	Tamarind	Puliya Maram	Fabaceae	<i>Tamarindus indica</i>	+	+
3.	Drumstick tree	Murungai Maram	Moringaceae	<i>Moringa oleifera</i>	-	+
4.	Banyan	Ala Maram	Moraceae	<i>Ficus benghalensis</i>	-	+
5.	Neem	Vempa Maram	Meliaceae	<i>Azadirachta india</i>	+	+
6.	Khejri Tree	Vanni Maram	Fabaceae	<i>Prosopis spicigera</i>	-	+
7.	Palmyra palm	Panai Maram	Arecaceae	<i>Borassus flabellifer</i>	+	+
8.	Mango	Maa Maram	Anacardiaceae	<i>Mangifera indica</i>	+	+
9.	Papaya Tree	Papali Maram	Caricaceae	<i>Carica Papaya</i>	-	+
10.	Teak	Tekku Maram	Lamiaceae	<i>Tectona grandis</i>	+	+
11.	Sandal wood	Santhana Maram	Santalaceae	<i>Santalum album</i>	-	+
12.	Chebolicmyrobalan	Kudukkai Maram	Combretaceae	<i>Terminalia chebula</i>	+	+
13.	Pungamin	Pungai Maram	Fabaceae	<i>Pongamia pinnata</i>	+	+
14.	Lemon-Scented Gum	Thaila Maram	Myrtaceae	<i>Eucalyptus citriodora</i>	+	+
15.	Black plum	Naval Maram	Myrtaceae	<i>Syzygium cumini Sps.</i>	+	+
16.	Banana	Vaazhai Maram	Musaceae	<i>Musa paradisica</i>	-	+
17.	Thorn mimosa	Karuvellam Maram	Mimosaceae	<i>Acacia nilotica</i>	+	-
18.	Ceylon olive	Ularga karai Maram	Elaeocarpaceae	<i>Elaeocarpus serratus</i>	+	-
19.	Guava	Koiya Maram	Myrtaceae	<i>Psidium guajava</i>	-	+
20.	Indian date	Elandhai Maram	Rhamnaceae	<i>Ziziphus jujuba</i>	+	+

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21.	Sweet acacia	Kastuurivel Maram	Fabaceae	<i>Vachellia farnesiana</i>	-	+
22.	Iron wood	Savukku Maram	Casuarinaceae	<i>Casuarina equisetifolia</i>	+	+
23.	Broome rain Tree	Vagai Maram	Fabaceae	<i>Albizia lebbek</i>	-	+
24.	Cannonbal tree	Nagalinga Maram	Lecythidaceae	<i>Couroupita guianensis</i>	-	+
25.	Tanner's cassia	Avaram poo Maram	Fabaceae	<i>Senna auriculata</i>	-	+
26.	Blackboard Tree	Aezhilai Paalai Maram	Apocynaceae	<i>Alstonia scholaris</i>	-	+
27.	Custard apple	Seethe pazham Maram	Annonaceae	<i>Annona squamosa</i>	+	+
SHRUBS						
1.	Jimson weed	Ummathai cheedi	Solanaceae	<i>Datura stramonium</i>	+	+
2.	Coat buttons	Thatha cheedi	Asteraceae	<i>Tridax porcumbens</i>	-	+
3.	Rose	Rosa	Rosaceae	<i>Rosa rubiginosa</i>	-	+
4.	Spiral cactus	Thirugu kalli	Euphorbiaceae	<i>Euphorbi tortilis</i>	+	+
5.	Indian Abutilon	Thuthi keerai	Meliaceae	<i>Abutilon indicum</i>	+	+
6.	Peacock flower	Mayil kontai	Fabaceae	<i>Caesalpinia pulcherrima</i>	+	+
7.	Marigold	Samanthi cheedi	Asteraceae	<i>Tagetes erecta</i>	-	+
8.	Jasmine	Mali cheedi	Oleaceae	<i>Jasminum officinale</i>	-	+
9.	Firecracker flower	Kanakambaram	Acanthaceae	<i>Crossandra infundibuliformis</i>	-	+
10.	Hibiscus	Cembarutti	Malvaceae	<i>Hibiscus rosanaceae</i>	-	+
11.	Crown flower	Erukku cheedi	Apocynaceae	<i>Calotropis gigantean</i>	+	+
HERBS & GRASS						
1.	Sickle senna	Thagarai	Fabaceae	<i>Senna tora</i>	+	+
2.	Indian doab	Arugampul	Poaceae	<i>Cynodon dactylon</i>	+	+
4.	Carrot grass	Mookkuthi poo	Asteraceae	<i>Parthenium</i>	+	+

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				<i>hysterophorus</i>		
5.	Indian Copper leaf	Kuppaimeni	Euphorbiaceae	<i>Acalypha indica</i>	-	+
6.	Devil bean	Kilukiluppai	Fabaceae	<i>Crotalaria retusa</i>	+	+
7.	Indian comet grass	Narival	Poaceae	<i>Perotis indica</i>	-	+
8.	Villosa	Kavali	Fabaceae	<i>Tephrosia villosa</i>	-	+
9.	Black nightshade	Manathakkali	Solanaceae	<i>Solanum nigrum</i>	+	+
CREEPERS/CLIMBERS						
1.	Bitter cucumber	Petikari	Cucurbitaceae	<i>Citrullus colocynthis</i>	-	+
2.	Bitter melon	Pavakkai	Cucurbitaceae	<i>Momordica charantia</i>	-	+
3.	Veldt grape	Perandai	Vitaceae	<i>Cissusqua dranqularis</i>	+	+
4.	Ivy gourd	Kovakkai	Cucurbitaceae	<i>Coccinia grandis</i>	-	+

Table No. 3.17: Crops pattern in: Floral Diversity in Core and Buffer area
(R.K.Panneerselvam, Ordinary Stone and Gravel Quarry, Karur District)

S. No	Common Name	Scientific Name	Family
1	Jasmine flower	<i>Jasminum officinale</i>	Asteraceae
2	Marigold plant	<i>Tagetes erecta</i>	Asteraceae
3	Firecracker flower	<i>Crossandra infundibuliformis</i>	Acanthaceae
4	Mango plant	<i>Mangifera indica</i>	Anacardiaceae
5	Groundnut plant	<i>Arachis hypogaea</i>	Fabaceae

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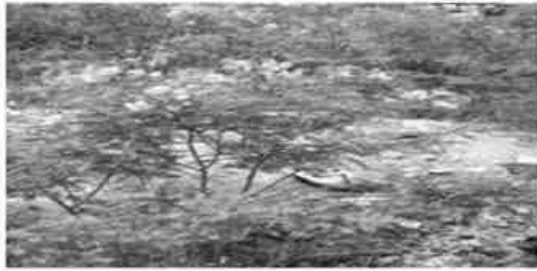
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Thatha Chedi - Tridax procumbens



Veppa maram - Azadirachta indica



Aavaram - Senna auriculata



Earukkam chedi - Calotropis gigantea



Murungai maram - Moringa oleifera



Karuvella maram - Acacia nilotica



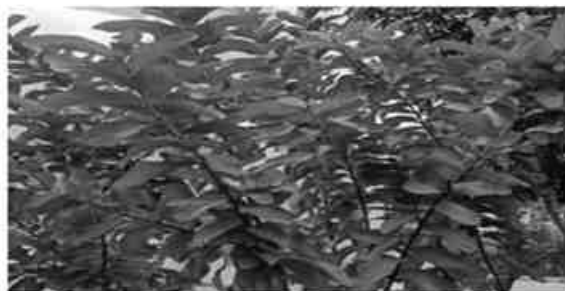
Pannai maram - Borassus flabellifer



Pappali maram - Carica Papaya



Kanagaparam chedi - Crossandra infundibuliformis



Koiya maram - Psidium guajava

Fig No. 3. 21: Photos of Flora in Cluster core and Buffer zone

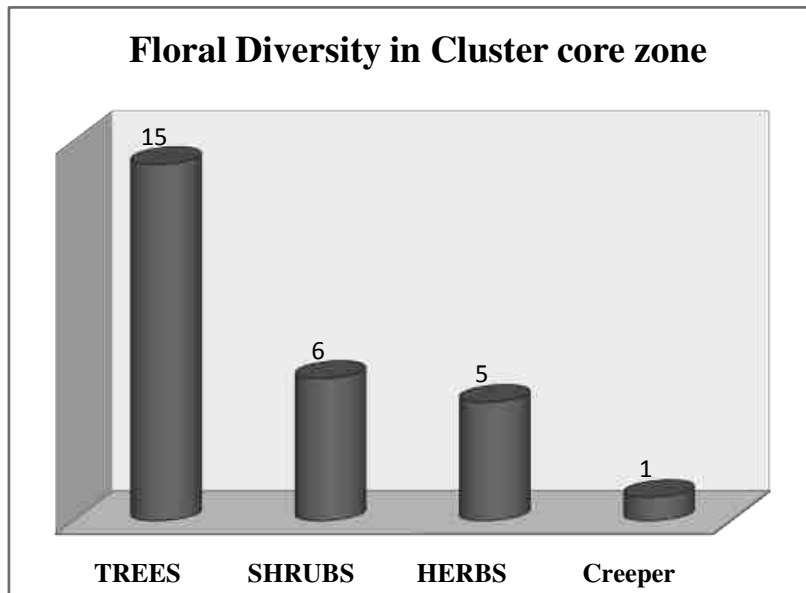


Fig No. 3.22: Floral diversity in Cluster Core Zone

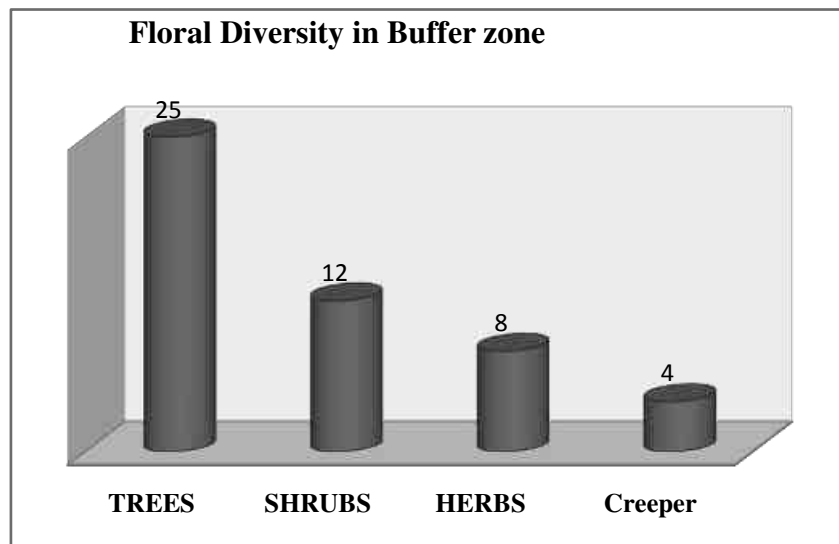


Fig No. 3.23: Floral diversity in Buffer Zone

3.9.8. Fauna

The fauna survey has been carried out as per the methodology cited and listed out Mammals, birds, Reptiles, Amphibians, and Butterflies. All the listed species were compared with Red Data Book and Indian Wildlife Protection Act, 1972.

The study of fauna takes a substantial amount of time to understand the specific fauna characteristics of the area. The assessment of fauna has been done on the bases of primary data collected from the lease sites. The presence was also confirmed from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area. In addition officials, local peoples were another source of information for studying the

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fauna of the area. Field activities are physical/active search, covering rocks, burrows, hollow inspection and location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife envis database (wiienvis.nic.in/Database/Schedule Species Database) and Zoological Survey of India (ZSI).

Table No. 3.18: 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	Ali S (1941); Grimmett R (2011); Collins 2015

3.9.8.1. Fauna in Core Zone

Varieties of species were observed in the core zone (0-2km radius) of the Quarry. Number of species decreases towards the mining area this might be due the lack of vegetation and forest cover in mining lease area. None of these species are threatened or endemic. Taxonomically a total of 21 species belonging to 16 families have been recorded from the core mining lease area. Based on habitat classification the majority of species were birds 10 (47%) followed by insects 7 (33%), reptiles 2 (9%) and mammals 2 (9%). Dominant species were mostly birds and insects no amphibians were observed during the extensive field visit. Details of fauna with the scientific name were mentioned in table 3.19 and fig 3.24.

There are no critically endangered, endangered, vulnerable and endemic species were observed.

3.9.8.2. Fauna in Buffer Zone

Taxonomically a total of 31 species belonging to 20 families have been recorded from the buffer mining lease area. Based on habitat classification the majority of species were birds 12 (39%) followed by insects 12 (39%), reptiles 3 (10%) and mammals 4 (13%). There were no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna with the scientific name were mentioned in table 3.19 and fig 3.24.

There were no critically endangered, endangered, vulnerable and endemic species were observed.

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Bat-Pteropus medius



Common myna -Acridotheres tristis



Milkweed butterfly-Danausplexippus



Black drongo -Dicrurusmacrocerus



Red-veined darter-Sympetrumfonscolombii



Commonmongoose - Herestes edwardsii

Fig No. 3.24: Photos of Fauna in Cluster Core and Buffer Zone

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Table No. 3.19: Faunal in Diversity in Cluster Core and Buffer area
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Sl. No	Common Name	Family Name	Scientific Name	Core	Buffer	Schedule list wildlife protection act 1972	IUCN Red list data
MAMMALS							
1.	Bat	Pteropodidae	<i>Pteropus medius</i>	+	+	NL	NL
2.	Common mangoose	Herpestidae	<i>Herestes edwardsii</i>	-	+	NL	NL
3.	Palm squirrel	Sciuridae	<i>Funambulus pennantii</i>	-	+	NL	NL
4.	House mouse	Muridae	<i>Musmus culus</i>	+	+	NL	LC
INSECTS							
1.	White butterfly	Pieridae	<i>Pieris rapae</i>	-	+	Schedule IV	LC
2.	Baronet	Nymphalidae	<i>Euthalia nais</i>	+	+	Schedule IV	NE
3.	Milkweed butterfly	Nymphalidae	<i>Danaus plexippus</i>	+	+	NL	LC
4.	Mottled emigrant	Pieridae	<i>Catopsilia pyranthe</i>	+	+	Schedule IV	LC
5.	Common grass yellow	Pieridae	<i>Eurema brigitta</i>	-	+	Schedule IV	LC
6.	Marbled white	Nymphalidae	<i>Melanargia galathea</i>	-	+	Schedule IV	LC
7.	Banded hairstreak	Lycaenidae	<i>Satyrium calanus</i>	-	+	Schedule IV	NE
8.	Blue basher	Libellulidae	<i>Pachydiplax longipennis</i>	+	+	NL	LC
9.	Slaty skimmer	Libellulidae	<i>Libellula incesta</i>	-	+	NL	LC
10.	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	+	+	NL	LC
11.	Common Tiger	Nymphalidae	<i>Dananus genutia</i>	+	+	NL	NE
12.	Plain Tiger	Nymphalidae	<i>Dananus chrysippus</i>	+	+	NL	NE

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REPTILES							
1.	Peninsular rock agama	Agamidae	<i>Psammophilus dorsalis</i>	+	+	NL	NL
2.	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	-	+	NL	NL
3.	Fan-Throated Lizard	Agamidae	<i>Sitana ponticeriana</i>	+	+	NL	LC
BIRDS							
1.	Common cuckoo	Cucalidae	<i>Cuculuscanorus</i>	+	+	NL	LC
2.	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	-	+	NL	LC
3.	Japanese quail	Phasianidae	<i>Coturnix japonica</i>	-	+	NL	LC
4.	House crow	Corvidae	<i>Corvus splendens</i>	+	+	NL	LC
5.	White-breasted waterhen	Rallidae	<i>Amaurornis phoenicurus</i>	+	+	NL	LC
6.	Rose-ringed parakeet	Psittacidae	<i>Psittacula krameri</i>	+	+	NL	LC
7.	Common myna	Sturnidae	<i>Acridotheres tristis</i>	+	+	NL	LC
8.	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	+	+	NL	LC
9.	Crow Pheasant	Cucalidae	<i>Centropus sinensis</i>	+	+	Schedule IV	LC
10.	Koel	Cucalidae	<i>Eudynamis scolopaceus</i>	+	+	Schedule IV	LC
11.	House sparrow	Passeridae	<i>Passer domesticus</i>	+	+	Schedule IV	LC
12.	White throated king fisher	Alcedinidae	<i>Halcyon smyrnensis</i>	+	+	Schedule IV	LC

((+) Symbol indicate presence of Species, (-) Symbol indicate absence of Species, *NL- Not listed, NE- Not evaluated, LC- Least concern)

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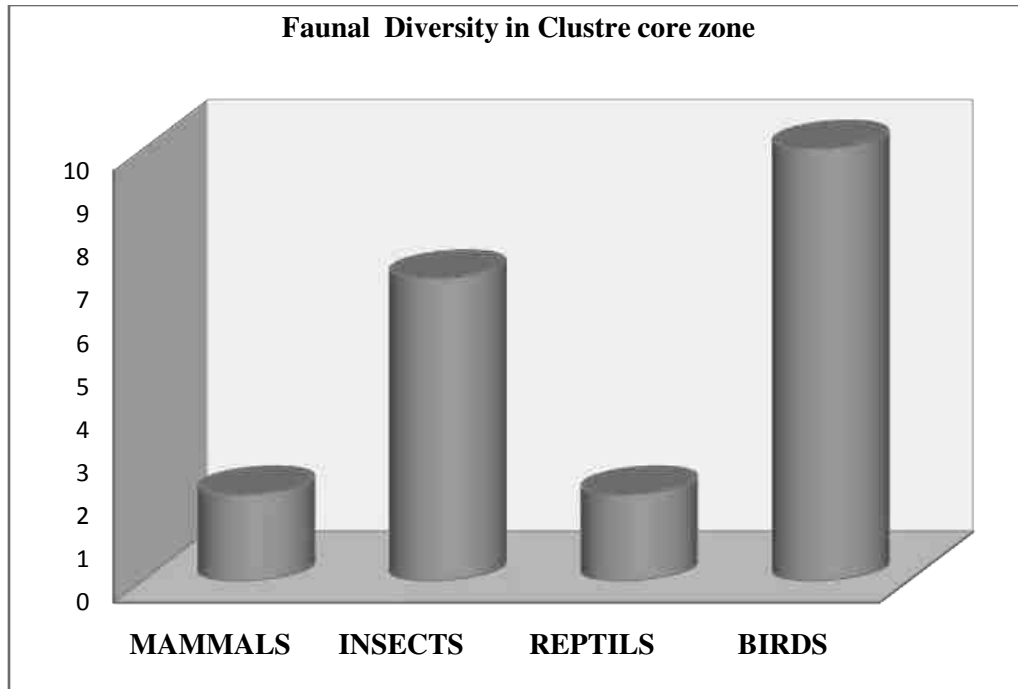


Fig No. 3.25: Faunal diversity in Cluster core zone

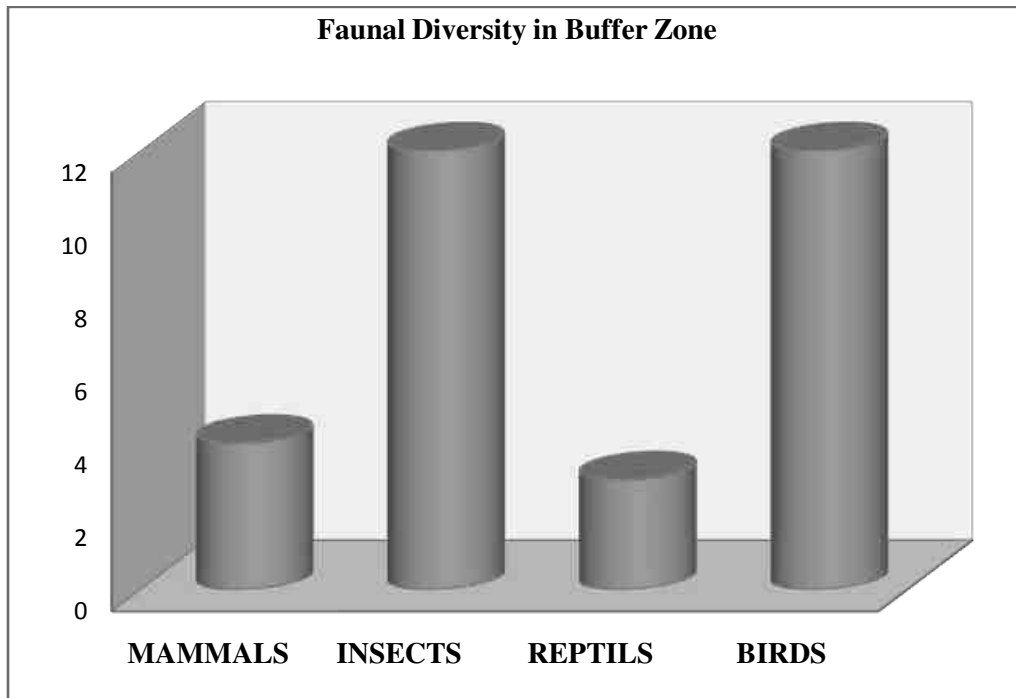


Fig No. 3.26: Faunal diversity in Buffer zone

3.10 SOCIO-ECONOMIC ENVIRONMENT

3.10.1 Introduction

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

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

3.10.2 Objectives of the Study

The report deals with the Socio-Economic Impact Assessment of the ordinary stone and gravel quarries project proponents by Thiru. K.Panneerselvam, residing at, No.163, Rengapalayam, Punnam chathiram, Punnam Village, Aravakuruchi Taluk, Karur District-639136, Tamil Nadu.

The objectives of the socio-economic impact assessment are as follows:

- a) To study the socio-economic status of the people living in the study area of the quarry project.
- b) To assess the impact on socio-economic environment due to the quarry project.
- c) To study the socio economic environment like noise, water due to impact of the quarry project.

3.10.3 Scope of Work

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

3.10.4 Study Area – Anjagoundanpatti village

Gram Panchayat name of the Anjagoundanpatti village is Anjagoundanpatti. Anjagoundanpatti village is in Aravakuruchitaluk of Karur district in Tamil Nadu, India. It is situated 6.02km away from sub-district headquarter Aravakuruchi (Tahsildar office) and 24.63km away from district headquarter Karur. As per 2009 stats, Anjagoundanpatti village is also a gram panchayat.

Table 3.20: Anjagoundanpatti village Census 2011 Data

S. No	Description	Census 2011 Data
1	Village Name	Anjagoundanpatti
2	Tehsil Name	Aravakuruchi
3	District Name	Karur
4	State Name	TamilNadu
5	Total Population	220
6	Total Area	0.70.93

3.10.5 Population Characteristics – Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District (2001-2011)

In Anjagoundanpatti village had a total household 69 in 2001, which is increased to 83 in according to census 2011. Village had a total person of 220 in 2011 census previous census 229 persons in 2001. There were about 124men (54.15%) according to 2001 census and 110 men (50.00%) in 2011 census marking Decrease of about 14men over the previous census. During 2001 there were about 105women (45.85%), which is an increase to 110(50.00%) in 2011 census.

In Anjagoundanpatti village had a literate accounted for 103 persons (44.98%) in 2001 and increased to 113 persons (51.36%) in 2011. There were about 30.57percent males in 2001 and 34.64 percent in 2011. During 2001 there were about 14.41 percent females which is an increase to 17.73 in 2011.

Sex composition is the most important demographic characteristics that affect the incidence of birth and death. The average sex ratio in Aravakuruchi taluk, Anjagoundanpatti village was 846.77 during 2001 and increased to 1000 the year of 2011. The highest sex ratio may be either due to the migrants for educational purpose and employment opportunities and due to infant birth of female is very high. The population characteristics of Anjagoundanpatti Village (2001-2011) are shown in table 3.21 and fig 3.27.

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Table No. 3.21: Population Characteristics- Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District (2001-2011)

S. No	Characteristics	Anjagoundanpatti Village			
		2001	%	2011	%
1	Total Household	69	30.13	83	37.73
2	Rural population	229		220	
3	Male Population	124	54.15	110	50.00
4	Female Population	105	45.85	110	50.00
5	Rural Literacy	103	44.98	113	51.36
6	Male Literacy	70	30.57	74	33.64
7	Female Literacy	33	14.41	39	17.73
8	Sex Ratio		846.77		1000

Source: Census 2001 & 2011, Karur District, Tamil Nadu

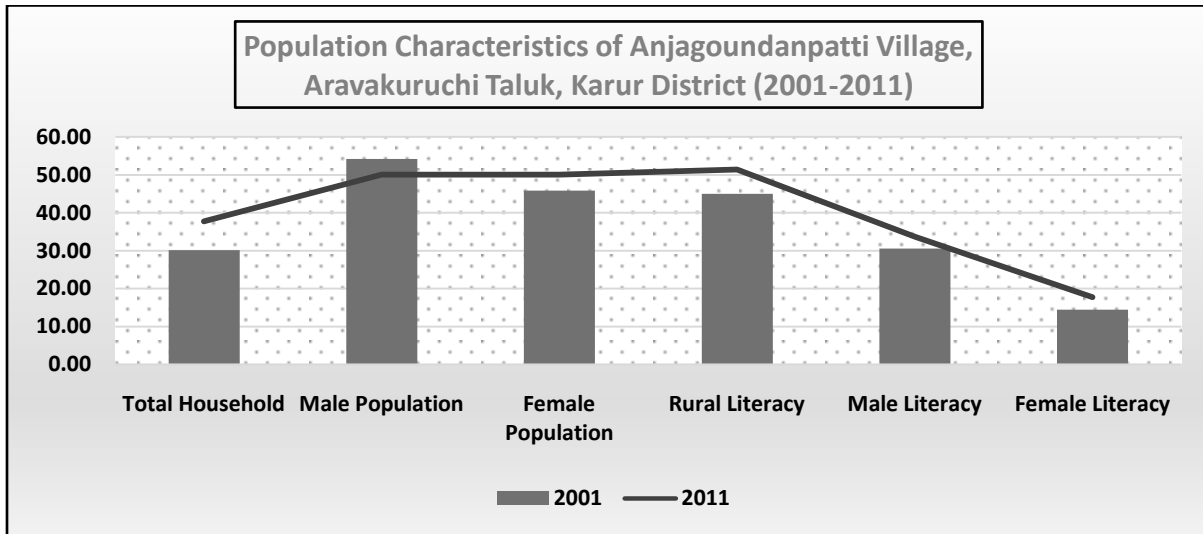


Fig No. 3.27: Population Characteristics of Anjagoundanpatti Village (2001-2011)

3.10.6 Occupational profile of Anjagoundanpatti Village

The term workers denote the population engaged in primary, secondary and tertiary activities classified in the census reports of Indian government. During the year 2001 Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

The Occupational structure in terms of analyzing the geographical, economic and technological development of various factors among these in this Anjagoundanpattivillage denote the workers population are classified in the census reports in Indian government. Based on the social economic survey primary and secondary data collected from the EIA team likely impacts on the socio-economic scenario from the mining site in 10 km buffer zone implemented

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in these surrounding villages where it's monitoring and analyzing the social consequences in this mine site area.

In Anjagoundanpatti village had a total main workers accounted of 150 (65.50%) persons during 2001 census which is a Decrease to 118 (53.64%) persons during 2011. There were about 59 (25.76%) women in 2001 and 24 (10.91%) women according to the census 2011 marking Decreases 35women over the previous census.

The study area has experienced a change in the occupational structure in the form of a decline in the proportion of cultivators, agricultural laborers and an increase in the proportion of Non workers. In Anjagoundanpatti village had non workers population accounted of 102 (46.36%) according to census 2011. Which increased from census 2001 had population 78 (34.06%). Compare to 2011 census has and increased previous census is 24 persons. Because of more number of people are educated most of people living the village had mining and household industries like tobacco, coolie etc., earn our daily life

There are three phases of occupational distributions and economic development and growth rate of populations in census of Indian government. In First phase the agriculture proportions of people are working in this site, the second phase where the populations are continuing in this agro-based industries and as well as migrating one place to another place for manufacturing or employ engaged, the third phase the distributions of the occupational characteristics growth rate of working population becomes greater than or differentiates in the secondary census data wise.

As per the occupational pattern differentiated in 2001 and 2011 census the workers are classified main workers, marginal workers, non-workers, cultivators and agricultural workers, marginal house hold workers. More opportunities' nearby villages for giving employing the local people for getting income and not for searching coolie job far away. It will increase their household income. From the data it was observed that occupational population decreased where the government and private entrepreneurs' should give an opportunity to develop an occupational pattern is restructure itself.

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Table No. 3.22: Occupational Characteristics of Population - Anjagoundanpatti Village (2001-2011)

S. No	Census Parameters	Anjagoundanpatti Village			
		2001	%	2011	%
1	Total Population	229		220	
2	Total Workers	151	65.94	118	53.64
3	Male Workers	91	39.74	72	32.73
4	Female Workers	60	26.20	46	20.91
5	Total Main workers	150	65.50	71	32.27
6	Male Main workers	91	39.74	47	21.36
7	Female Main Workers	59	25.76	24	10.91
8	Total Cultivators	44	19.21	28	12.73
9	Male Cultivators	34	14.85	21	9.55
10	Female Cultivators	10	4.37	7	3.18
11	Total Main Agricultural Labourers	97	42.36	38	17.27
12	Male Agri.Labourers	51	22.27	24	10.91
13	Female Agri.Labourers	46	20.09	14	6.36
14	Total Main HHI	2	0.87	0	0.00
15	Male HHI	0	0.00	0	0.00
16	Female HHI	2	0.87	0	0.00
17	Total Main Other Tertiary workers	7	3.06	5	2.27
18	Male OT	6	2.62	2	0.91
19	Female OT	1	0.44	3	1.36
20	Total Non-workers	78	34.06	102	46.36
21	Male Nonworkers	33	14.41	38	17.27
22	Female Non workers	45	19.65	64	29.09

Source: Census 2001 & 2011, Karur District, Tamil Nadu

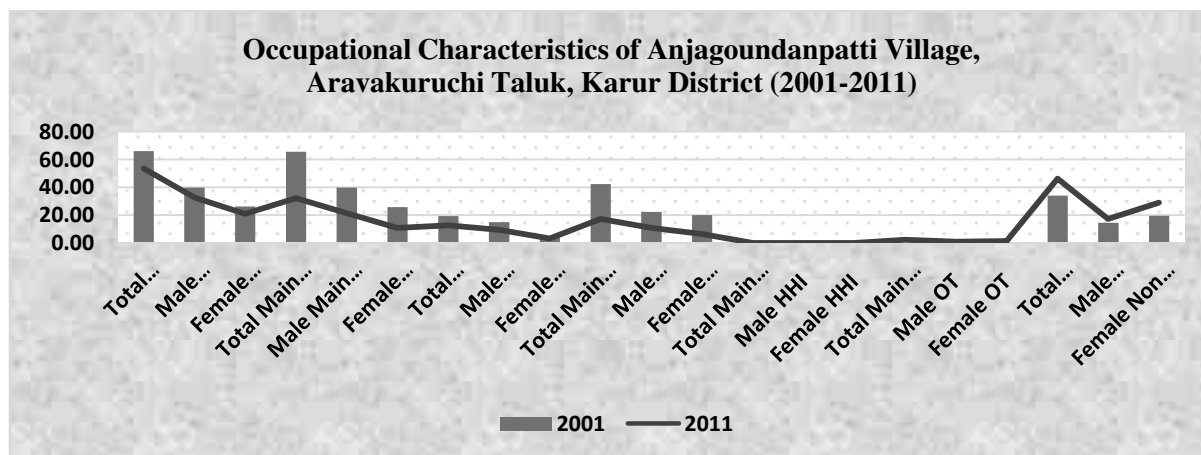


Fig No. 3.28: Occupational Characteristics of Population - Anjagoundanpatti Village (2001-2011)

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3.10.7 Socio economic studies in buffer area

It is cluster mining project covering an extent of 10.74.25 Ha and comes under B1 category. The impact of proposed project will be up to the distance of 10km surrounding the project site. The socio - economic benefits of proposed project is given below.

1. The proposed project will generate employment within 10km radius
2. As the workers and tippers from various villages move to and fro projects site, shops such as mechanic, welding, tea and hotels will be developed around the project site. It will generate indirect employment to the village people.
3. The surrounding village people will get benefits under CER and CSR Scheme. CER is 2.0% of project cost whereas CSR is 2.5% of the project profit.
4. When people get employment, it will upgrade the living standard of the people.
5. As the people getting employment in their native places, migration towards developed cities in search of employment may be prevented. Thereby, agricultural activities will not be affected.

The list of revenue villages and its details within 10km radius are given as follows

Table No.3.23: List and Details of Revenue villages within 10km radius

S. No	Village	Population
1	Anjagoundanpatti	220
2	Aravakurichi	183321
3	Esanatham	5311
4	Pallapatti	2308
5	Pungambadi(East)	1961
6	Alamarathupatti	3133
	Total	1926254

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

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Table No. 3.24: Population Data of Study Area

Village Name	No. of House Holds	Total Population	Male	Female	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate
Anjagoundanpatti	83	220	110	110	113	74	39	107	36	71
Aravakurichi	53489	183321	90669	92652	125033	69821	55212	58288	20848	37440
Esanatham	1490	5311	2604	2707	3638	2030	1608	1673	574	1099
Pallapatti	704	2308	1167	1141	1632	887	745	676	280	396
Pungambadi(East)	543	1961	1001	960	1204	721	483	757	280	477
Alamarathupatti	892	3113	1506	1607	1942	1084	858	1171	422	749

Table No. 3.25: Communication & Transport Facilities in the Study Area

S. No	Village Name	PO	SPO	PTO	T	PCF	BS	PBS	RS	SH	MDR	BTR	GR	FP
1.	Anjagoundanpatti	1	0	0	0	0	1	1	0	0	1	1	1	1
2.	Aravakurichi	1	1	0	1	0	1	1	0	1	1	1	1	1
3.	Esanatham	0	0	0	0	0	1	1	0	0	1	1	1	1
4.	Pallapatti	1	1	1	0	6	1	1	0	2	2	1	1	1
5.	Pungambadi (East)	1	0	0	0	1	1	1	0	1	1	1	1	1
6.	Alamarathupatti	1	0	0	0	1	1	1	0	1	1	1	1	1

Abbreviations: **PO** - Post Office; **RS** - Railway Station; **GR** - Gravel Roads; **SPO** - Sub Post Office; **PTO** - Post & Telegraph office; **PCF** - Private Courier Facility; **SH** - State Highways; **FP** - Foot path; **T** - Telephone (Landline); **BS** -Public Bus Service; **MDR** - Major District Road; **PBS** - Private Bus Service; **BTR** - Black Topped (Pucca Road).

Note: 1 - Available within the village; 2 -Not available

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Table No. 3.26: Water & Drainage Facilities in the Study Area

S. No	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1.	Anjagoundanpatti	1	1	1	1	1	2	2	1	1	1	2
2.	Aravakurichi	1	2	1	1	1	2	2	2	1	1	2
3.	Esanatham	1	2	1	1	1	2	2	2	1	1	2
4.	Pallapatti	1	2	1	1	1	2	2	2	1	1	2
5.	Pungambadi (East)	1	1	1	2	2	2	2	2	1	1	2
6.	Alamarathupatti	1	1	1	1	1	1	2	1	1	1	2

Abbreviations: **TP**-Tap Water; **R/C**-River/Canal; **CW**-Covered Well; **T/P/L**-Tank/Pond/Lake; **UCW**-Uncovered Well; **CD**-Covered Drainage; **HP**-Hand Pump; **OD**-Open Drainage; **TW/BH**-Tube/Bore Well; **CT**-Community Toilet Complex for General public; **S**-Spring

Table No. 3.27: Other Facilities in the Study Area

S. No	Village Name	ATM	CB	COB	ACS	SHG	PDS	AMS	NC	NC-AC	CC	SF	PL	NPS	APS	BDRO	PS
1.	Anjagoundanpatti	2	1	1	2	2	1	2	2	1	2	2	1	1	2	1	1
2.	Aravakurichi	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	1
3.	Esanatham	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1
4.	Pallapatti	9	8	2	2	2	1	2	2	1	2	2	2	1	1	1	1
5.	Pungambadi (East)	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	1
6.	Alamarathupatti	2	1	1	2	2	1	2	2	1	2	2	2	1	1	1	1

Abbreviations: **ATM** - Automatic Teller Machine; **PDS** - Public Distribution System (Shop); **CB** - Commercial Bank; **COB** - Co-operative Bank; **AMS** - Agricultural Market

Society: **ACS** –Agricultural Credit Societies; **NC**- Nutritional Centre; **SHG**-Self Help Group; **NC-AC**-Nutritional Centre – Anganwadi Centre; **BDRO**-Birth & Death Registration Office; **PS**-Power Supply; **CC**- Community Centre (without TV); **SF** – Sports field; **PL**- Public library, **NPS** – Newspaper supply; **APS** – Assembly polling station.

Note: 1-Available within the village; 2- Not available

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Table No. 3.28: Educational Facilities in the Study Area

S. No	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1.	Kadalangudi	1	2	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2.	Anjagoundanpatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3.	Thiruvallaputhur	1	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5.	Namasivayapuram	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6.	Thirumangalam	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Abbreviations: **PPS**-Pre Primary School; **SSS**-Senior Secondary School; **DC**-Degree School; **PT**-Polytechnic; **PS**-Primary School; **G**-Government; **EC**-Engineering College; **VTS**-Vocational School /ITI; **MS**-Middle School; **P**-Private; **MC**-Medical College; **SSD**-Special School for Disabled; **SS**-Secondary School; **MI**-Management College/Institute;

Table No. 3.29: Medical Facilities in the Study Area

S.No	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1.	Kadalangudi	2	1	1	2	2	2	2	2	1	2	2	a
2.	Anjagoundanpatti	2	1	1	2	2	2	2	2	1	2	2	b
3.	Thiruvallaputhur	2	2	1	2	2	2	2	2	2	2	2	b
4.	Namasivayapuram	2	2	1	2	2	2	2	2	1	2	2	b
5.	Thirumangalam	2	2	1	2	2	2	2	2	2	2	2	b
6.	Kadalangudi	2	1	1	2	2	2	2	2	2	2	2	c

Abbreviations: **CHC**-Community Health Centre; **TBC**- TB Clinic; **VH**- Veterinary Hospital; **PHC**-Primary Health Centre; **HA**-Allopathic Hospital; **FWC**-Family Welfare Centre; **PHSC**-Primary Health Sub Centre; **HAM**-Alternative Medicine Hospital; **MHC**-Mobile Health Clinic; **MCW**-Maternity and Child Welfare Centre; **D**-Dispensary; **NGM-I/O**-Non Government Medical Facilities In & Out Patient

Note-1-Available within the village; 2 -Not available; a- Facility available at<5kms; b- Facility available at>10kms

3.10.8 Primary survey conducted by FAE- SE

Primary survey conducted 10 villages total population is 1926254. Anjagoundanpatti village has approximately 1 percent of total population of the village area. This calculation is total sample size has 250 around 10km radius core and buffer zone from mine lease boundary.

3.10.8.1 Primary survey methodology

The study was carried out with a participatory approach by involving the stakeholders, particularly the project beneficiaries and probable affected persons through a series of consultative process. The population groups that were consulted include beneficiary group of people in the project influence area, particularly the shopkeepers, farmers, Gram Panchayat members, village elders etc. Proportionate and purposive sampling methods were used for selecting respondents for household survey. Male and female respondents, both were selected for household survey. Structured questioners were used for survey.

3.10.8.2 Data structures

The data collected with the help of questionnaire survey for list of villages of Anjagoundanpatti Taluk were suitably converted into uni-variate, bi-variate and multivariate tables. The selection of these blocks were meaningfully done in order to get complete details of the surveyed population, their living environment, socio economic and socio-cultural and healthcare practices so as to conceptualize the findings with the help of interrelationships between Occupation and income status. the surveyed population were examined and interpreted with reference to socioeconomic living area, family structure and Educational, Sanitation etc.,

The Survey was conducted by SE expert Mrs. S.Santhi (FAE) along with her team.



Fig No 3.30: Primary Survey Photographs of village wise, Karur District

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3.9.10 Summary and Conclusion

From the primary survey, it is found that the basic facilities such as water road, PHSC, schools are available within the surveyed villages. The people stated that they did not get benefits under CER and CSR activities. Also they suggested that to operate the truck at minimum speed while crossing villages, schools, hospitals. The strongly asked to provide the employment opportunities only to the village people and registered their complaint on employment opportunities to other state people.

The proponent assured that he will improve facilities in government schools and hospitals under CER and CSR Schemes.

The socio-economic wellbeing of the area and its people is represented by the infrastructure and the social assets available in the area. The study area constituted of various infrastructures related to education, health care, communication, transportation, drinking waters etc.

3.11 LAND ENVIRONMENT

3.11.1 Land use of Study Area

The land-use and land cover map of the 10 km radial study area from the periphery of project site has been prepared using Landsat8 having 30 m spatial resolution and date of pass March 2021 satellite image with reference to Google Earth data. In order to strengthen the baseline information on existing land use pattern, the following data covering approx. 10°44'26.32"N to 10°44'31.60"N latitude and 77°57'16.76"E to 77°57'18.91"E longitude and elevation 174 meter are used as per the project site confined within that area. Land use pattern of the study area as well as the catchment area was carried out by standard methods of analysis of remotely sensed data and followed by ground truth collection and interpretation of satellite data. The outcome of land use study is presented below in subsequent tables and figures.

Table No. 3.30: Data Specification Used For Present Study

Satellite Image	Sensor	Spatial Resolution	Date of Acquisition
Landsat8	*OLI & TIRS	30m	March 2021

* Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS)

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	Bands	Wavelength (Micrometers)	Resolution
Landsat8 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) Launched February 11, 2013	Band 1 - Coastal aerosol	0.43 - 0.45	30
	Band 2 - Blue	0.45 - 0.51	30
	Band 3 - Green	0.53 - 0.59	30
	Band 4 - Red	0.64 - 0.67	30
	Band 5 - Near Infrared(NIR)	0.85 - 0.88	30
	Band 6 - SWIR1	1.57 - 1.65	30
	Band 7 - SWIR2	2.11 - 2.29	30
	Band 8 - Panchromatic	0.50 - 0.68	15
	Band 9 - Cirrus	1.36 - 1.38	30
	Band 10 - Thermal Infrared (TIRS)1	10.60 – 11.19	100
	Band 11 - Thermal Infrared (TIRS)2	11.50 – 12.51	100

3.11.2. Objective

The objectives of Land use studies are:

- ✓ To determine the present land use pattern as per EIA/EMP norms by MoEF.
- ✓ To determine the drainage pattern present in the study area.

3.11.3 Data Used

A. Remote sensing data

- ✓ Landsat8-30m Resolution, OLI & TIRS (Sensor)

B. Collateral Data

- ✓ Survey of India Toposheet bearing Toposheet No. 58F/14 (1:50,000 Scale) and the Toposheet map representing the project site is shown in Chapter 1.

3.11.4 Methodology

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

Salient features of the adopted methodology are given below:

- ❖ Acquisition of satellite data
- ❖ Preparation of base map from Survey of India Toposheet.
- ❖ Data analysis using visual interpretation techniques
- ❖ Ground truth studies or field checks using GPS & Digitization using head up vectorization method
- ❖ Topology construction in GIS Topography and location of surface water bodies like ponds, canals and rivers;
- ❖ Location of villages/towns/sensitive areas;

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- ❖ Identified pollution pockets, if any within the study area;
- ❖ Accessibility, power availability and security of monitoring equipment;
- ❖ Areas which represent baseline conditions; and
- ❖ Collection, collation and analysis of baseline data for various environmental attributes.
- ❖ Area calculation for statistics generation.

The spatial resolution and the spectral bands in which the sensor collects the remotely sensed data are two important parameters for any land use survey. Landsat8 data offers spatial resolution of 30 m and 185 kilometer (115 mile) wide swath of the Earth in 15-30 meter resolution covering wide areas the data is collected in 11 visible bands namely **Band**

Number μm Resolution

1	0.433–0.453	30 m
2	0.450–0.515	30 m
3	0.525–0.600	30 m
4	0.630–0.680	30 m
5	0.845–0.885	30 m
6	1.560–1.660	30 m
7	2.100–2.300	30 m
8	0.500–0.680	15 m
9	1.360–1.390	30 m
10	10.6-11.2	100 m
11	11.5-12.5	100 m

3.11.5 Land Use/Land Cover Classification

3.11.5.1 Land use/Land cover within the lease area:

The base maps of the study area were prepared, with the help of Survey of India Toposheet on 1:50,000 scale fig. 3.32. Preliminary interpreted land use and the land cover features boundaries from Landsat8 sensor OLI & TIRS having 30m spatial resolution, False Colour Composite were modified in light of field information and the final thematic details were transferred onto the base maps. The final interpreted and classified thematic map was cartograph. The cartographic map was categorically differentiate with standard colour coding and described features with standard symbols. All the classes were identified and marked by the standard legend on the map. The following Land Cover classes were derived and classified as under.

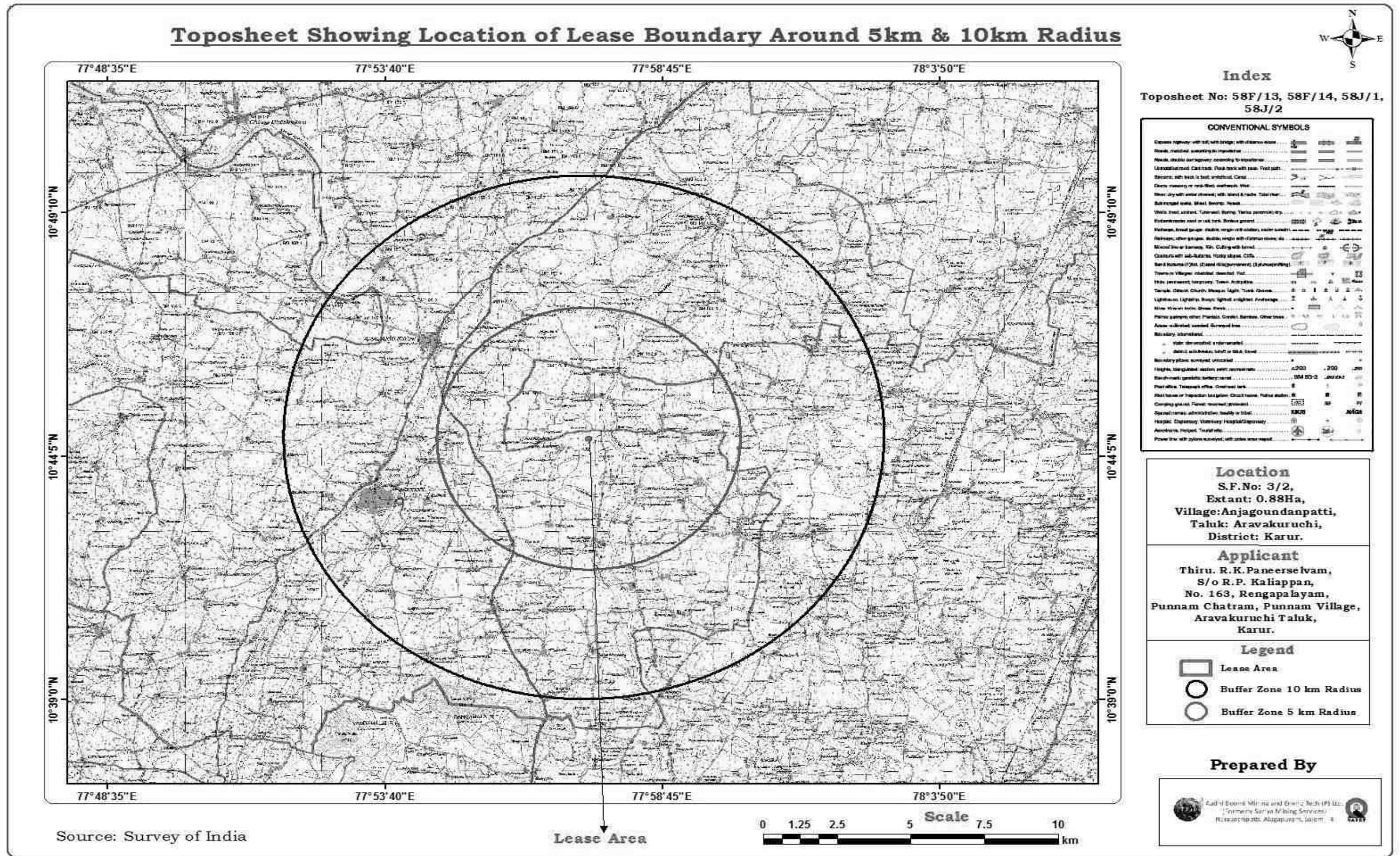


Fig No. 3.31: Toposheet Showing Location Lease Boundary around 10km radius

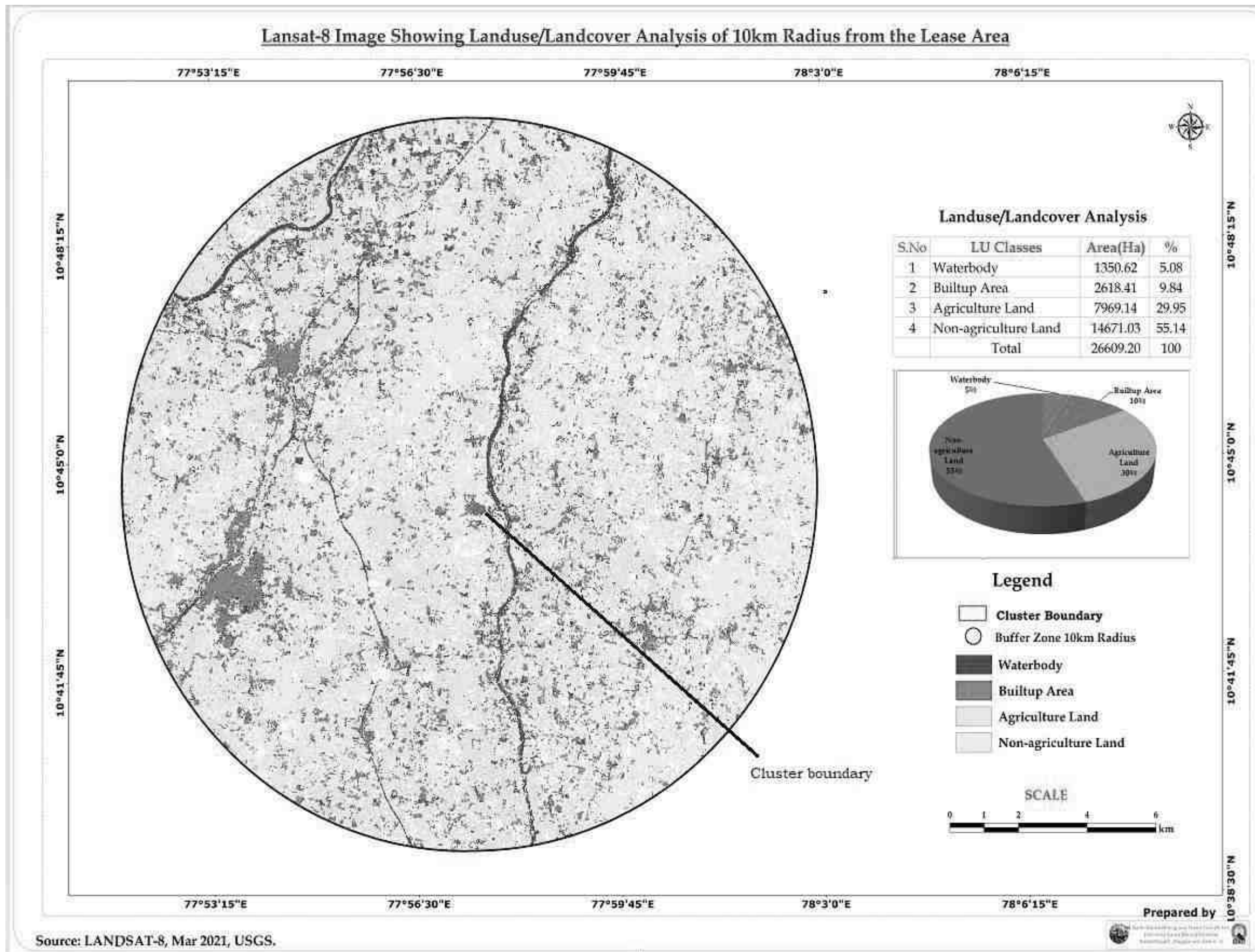


Fig No. 3.32: LANDSAT Image showing Location of Lease area around 10km radius

Table No. 3.31: Computation of existing and proposed land use pattern

S. No	Names	Area(Ha)	%
1	Water Bodies	1350.62	05.08
2	Built-up Area	2618.41	09.84
3	Agriculture Land	7969.14	29.95
4	Non-Agriculture Land	14671.03	55.13
	Total	26609.20	100

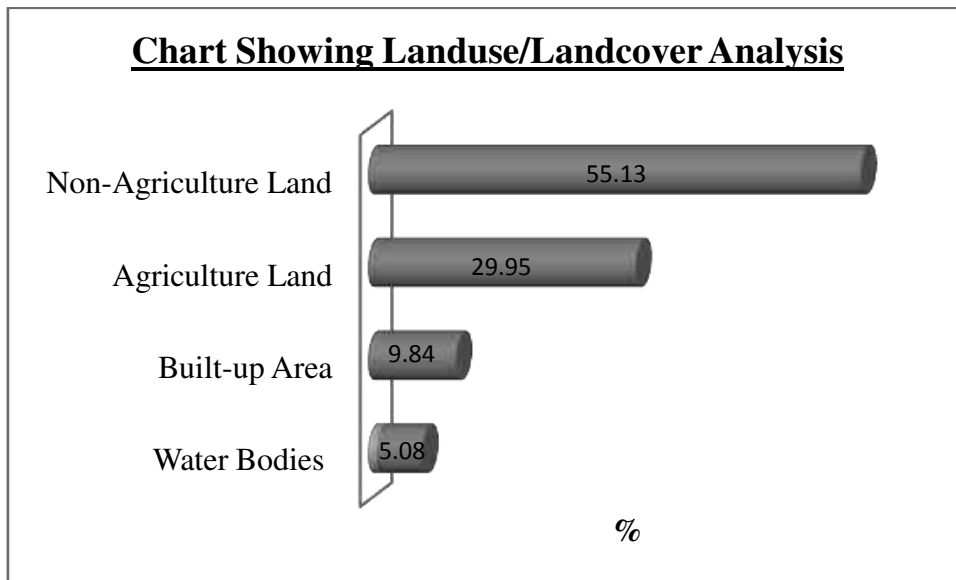


Fig No. 3.33: Land use/Land Cover around 10 km radius

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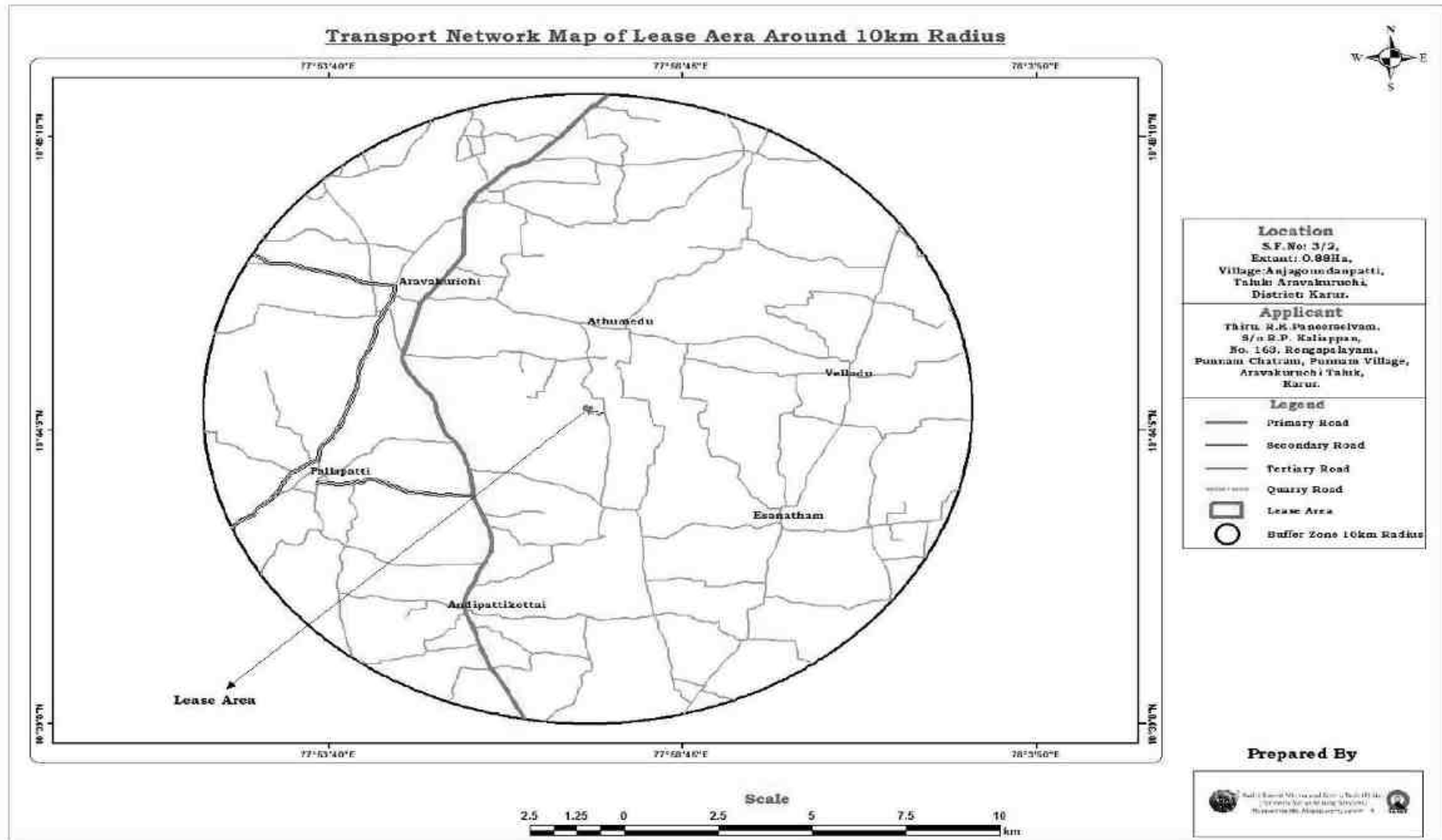


Fig No. 3.34: Toposheet showing Road Accessibility details of 10 Km Radius

3.11.6 Drainage Pattern of the Area

The drainage pattern is dendritic and the flow direction of the streams is southerly direction and controlled by the N-S trending shear zone. The streams originating in the Javadi reserve forest disappear in the colluvium of the bazada zones which is the characteristic feature of the drainage system.

Remote Sensing has the ability of obtaining synoptic view of a large area at one time and very useful in analyzing the drainage morphometry (Rudraiah, 2008). Visual interpretation of satellite imagery in analysis of geological, landforms and land erosion characteristics in conjunction with drainage pattern facilitates effective delineation of distinct features to evaluate the influence of drainage morphometry on landform characteristics and their processes. Horton's law of stream lengths suggests a geometric relationship between the number of stream segments in successive stream orders and landforms (Horton, 1945). The drainage has been delineated using satellite data with the reference of SOI Toposheet of 1:50,000 scale.

3.11.7 Contour

Contour lines are the greatest distinguishing feature of a topographic map. Contour lines are lines drawn on a map connecting points of equal elevation, meaning if you physically followed a contour line, elevation would remain constant. Contour lines show elevation and the shape of the terrain in the study area. The contour map was derived from a SRTM data of the study area. Contour interval at 20m, minimum 2m has very plain with fluvial landforms and general terrain is quite elevated at maximum 294m above. To make topographic maps easier to read, because it's impractical to mark the elevation of every contour line on the map, the index contour lines are the only ones labeled.

3.11.8 Slope

The slope map was derived from a SRTM data of the study area. The slope of the study area was classified into four classes, such as less than 5 percent/degree gentle, low speed ground motion, sheet erosion and soil erosion, a lot of ground movement and erosion. Slope zone 5-10°, 10-20°, 20-30° slightly steep, a lot of ground movement and erosion, especially landslides that area flat and above 30° very steep, intensive denudation processes and ground movements are common.

3.11.9 Soils

The major soil types in the district are Red soil, Red sandy soil and Black Cotton soil. Red soils are prevalent in Palani, Natham and Odanchattiram, while Red sandy soils are prevalent in Nilakottai, Dindigul and Vedasandur. Black soil found in all taluks except Kodiakanal.

3.11.10 Geology

The district is essentially a high grade gneissic terrain characterized by highly deformed rocks, which can be classified under three groups as 1) Khondalite Group, 2) Charnockite Group and 3) Migmatite Group. The terrain also exposes basic/ultrabasic and younger acid intrusives.

Sillimanite gneiss, garnet-cordierite gneiss and garnet quartz-feldspar gneiss. Quartzite is an important member of the group, which occurs as linear bands of 5 m to 50 m thick and occupies the crest of linear ridges. It is white or smoky grey and consists of interlocking grains of quartz with minerals like garnet, biotite, diopside, sillimanite and magnetite as accessories. Magnetite quartzite bands are of restricted thickness. Cal gneiss is grey or green and banded, which shows typical ribbed weathering.

The charnockite (Ac) rock series consists of several naturally occurring rocks which are a product of metamorphosis. Metamorphosis is the continual process of earthly debris being exposed to harsh weather conditions and pressure. These results in the formation of rocks, many of these rocks have a highly important application in various industries. Generally, charnockite is anhydrous and essentially consists of orthopyroxene as its character-defining ferromagnetic mineral along with quartz and feldspar.

The minerals present in a granulite will vary depending on the parent rock of the granulite and the temperature and pressure conditions experienced during metamorphism. A common type of granulite found in high-grade metamorphic rocks of the continents contains pyroxene, plagioclase feldspar and accessory garnet, oxides and possibly amphiboles. Both clinopyroxene and orthopyroxene may be present, and in fact, the coexistence of clino- and orthopyroxene in a metabasite (metamorphed basalt) defines the granulite facies.

Khondalite Group comprises quartzite, calc granulite / crystalline limestone, garnetsillimanite gneiss, garnet-cordierite gneiss and garnet quartz-feldspar gneiss. Quartzite is an important member of the group, which occurs as linear bands of 5 m to 50 m thick and occupies the crest of linear ridges.

3.11.11 Geomorphology

Geomorphologically, the entire region can be classified into areas occupied by erosional landforms and areas occupied by depositional landforms. Geomorphology is a study of earth structures and also depicts the various landforms relating to the ground water potential zones and also structural features. Geomorphology of an area depends upon the structural evolution of geological formation.

Denudational hills (DU) Carved out of more resistant formations standing as a continuous system of hills, characterized by coarse texture and high relief. Kanniwadi (DH1), Thowar R.F (DH2) subjected to differential erosion and other weathering processes occupy 14.3% of the total area.

Pediments valley floor have been regarded as smooth, gently inclined, surfaces that front receding escarpments, are epigene forms shaped by running water, and are well represented in arid and semi-arid lands. In the study area found Western and Northern plain.

Shallow weathered Pediplain (PPS) Gently undulating surface of a buried pediplain with a shallow overburden developed by the planation of high relief areas, later subjected to the formation of shallow weathered zone. Groundwater occurrence is restricted to the weathered zone.

Moderately weathered pediplain (PPM) gently undulating surface of a buried pediplain having a relatively thick overburden in the Purana and Gondwana formations, occupies about 53.2% of the total area. Owing to its thick overburden, this area is suitable for bore wells and tube wells.

The plains are dominant in between these hill ranges, in which the district headquarters Karur and Dindigul is located. It is undulating plain covered by red soil, except for a stretch of black cotton soil in areas around Ottanchatram. The district is drained by four parallel tributaries of Periya kombai Ar. These ephemeral streams have their origin in the Kannivadi hill. Inselbergs, residual hills, pediments and pediplains are the prominent landforms. Shallow weathered buried plain in the study area.

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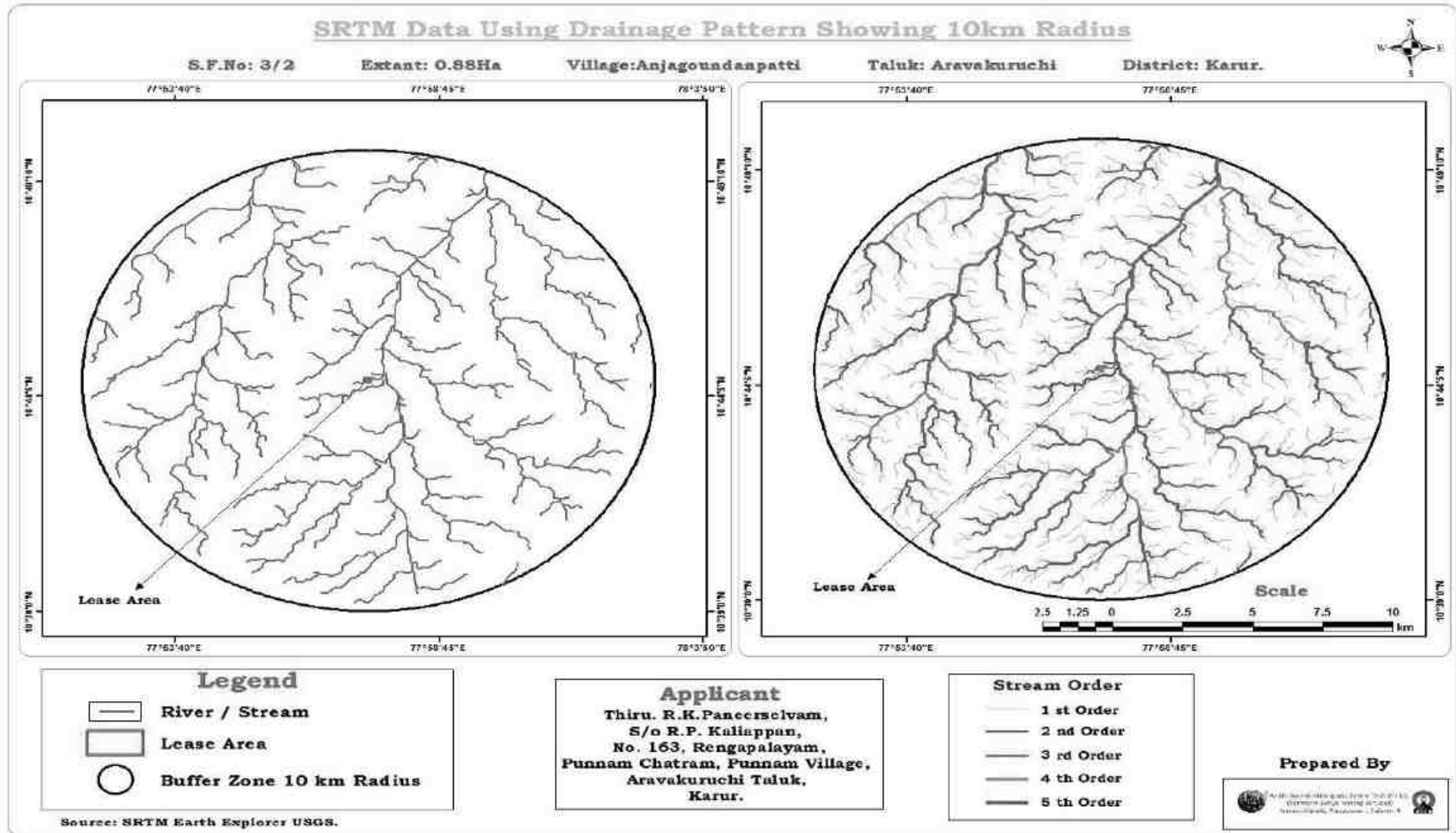


Fig No. 3.35: Image Representing the River/Streams (Drainage) of the study area within 10km radius from the project site

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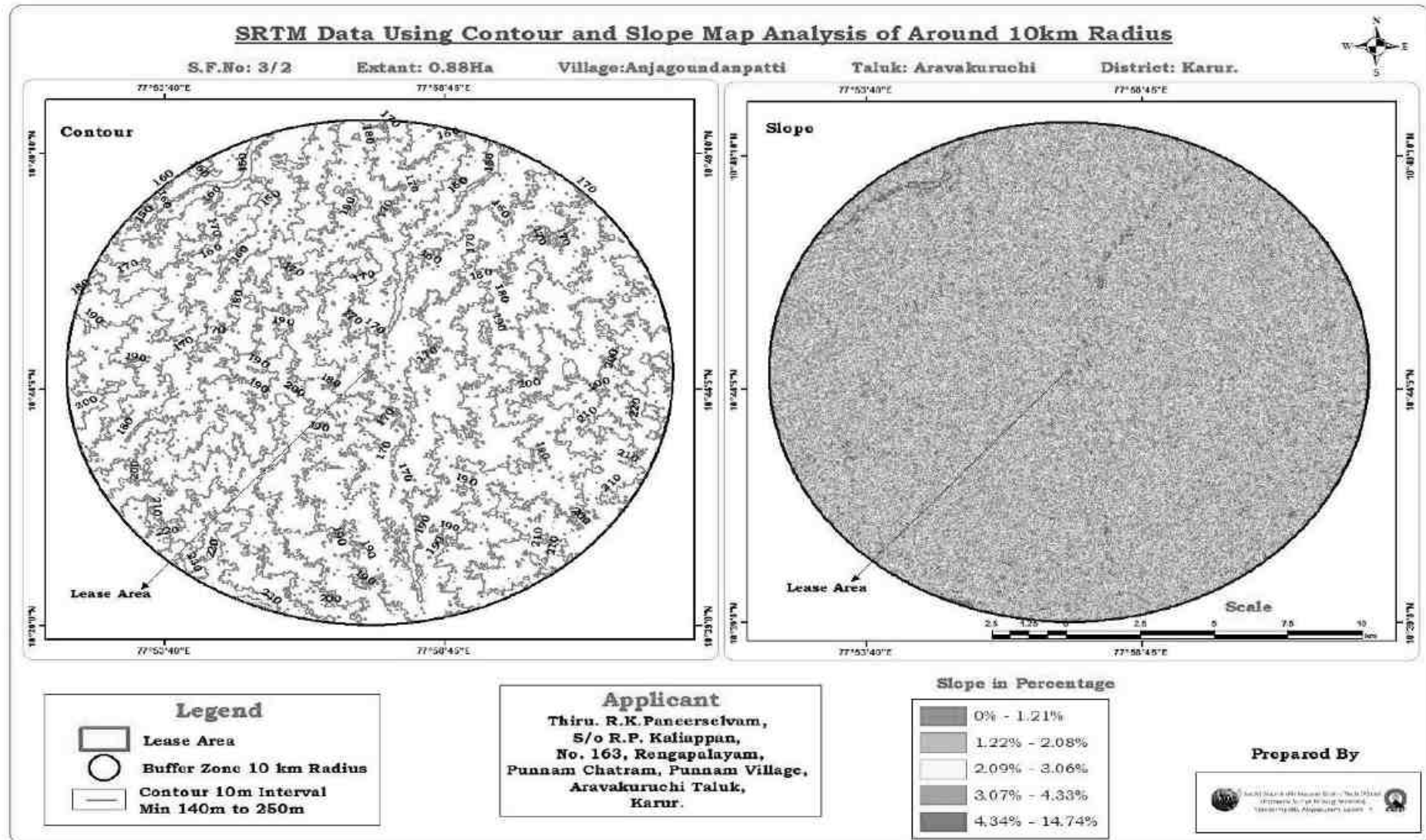


Fig No. 3.36: Image Representing Contour and Slope analysis around 10km radius

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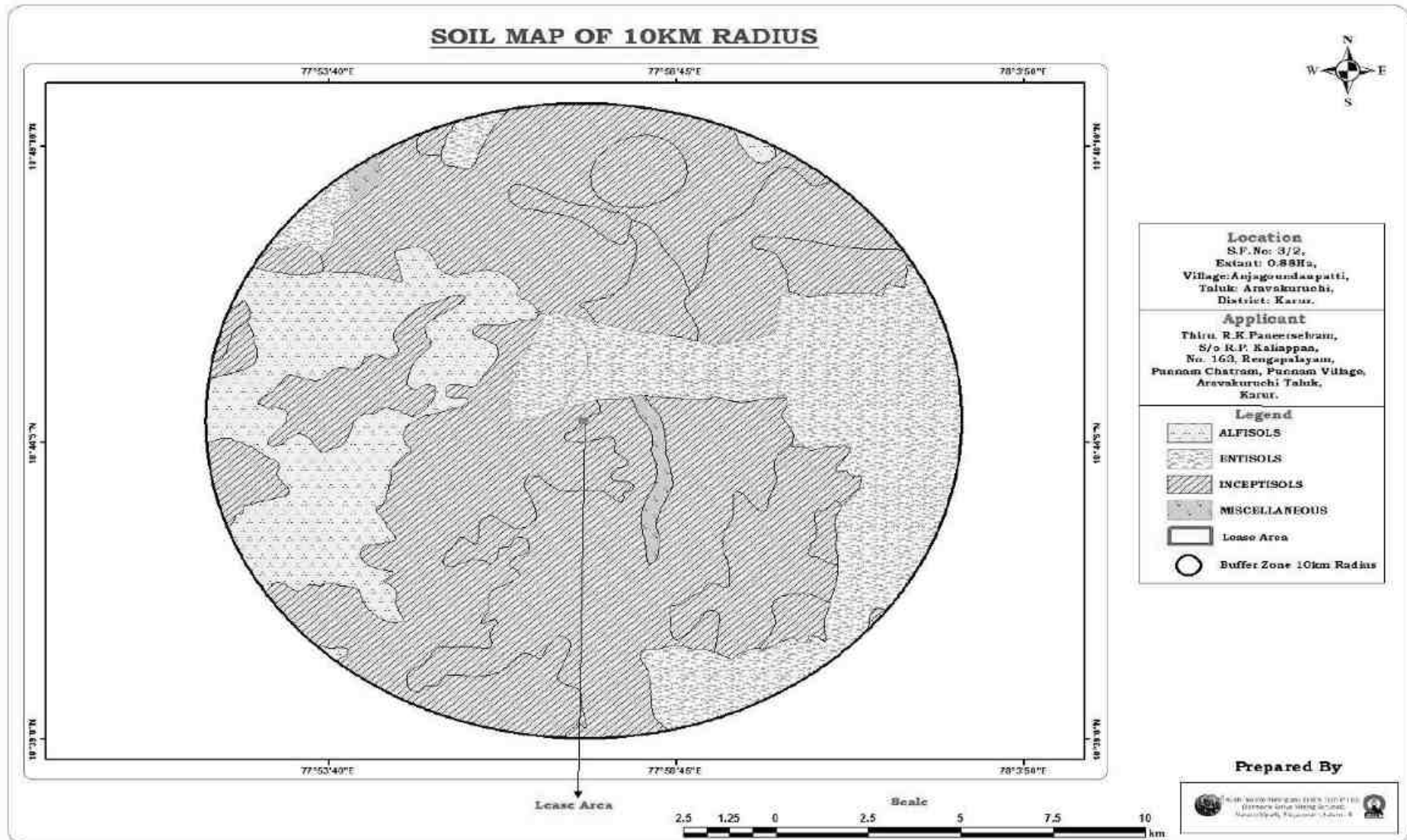


Fig No. 3.37: Image Representing the Soil Characteristics around 10km of the cluster lease area

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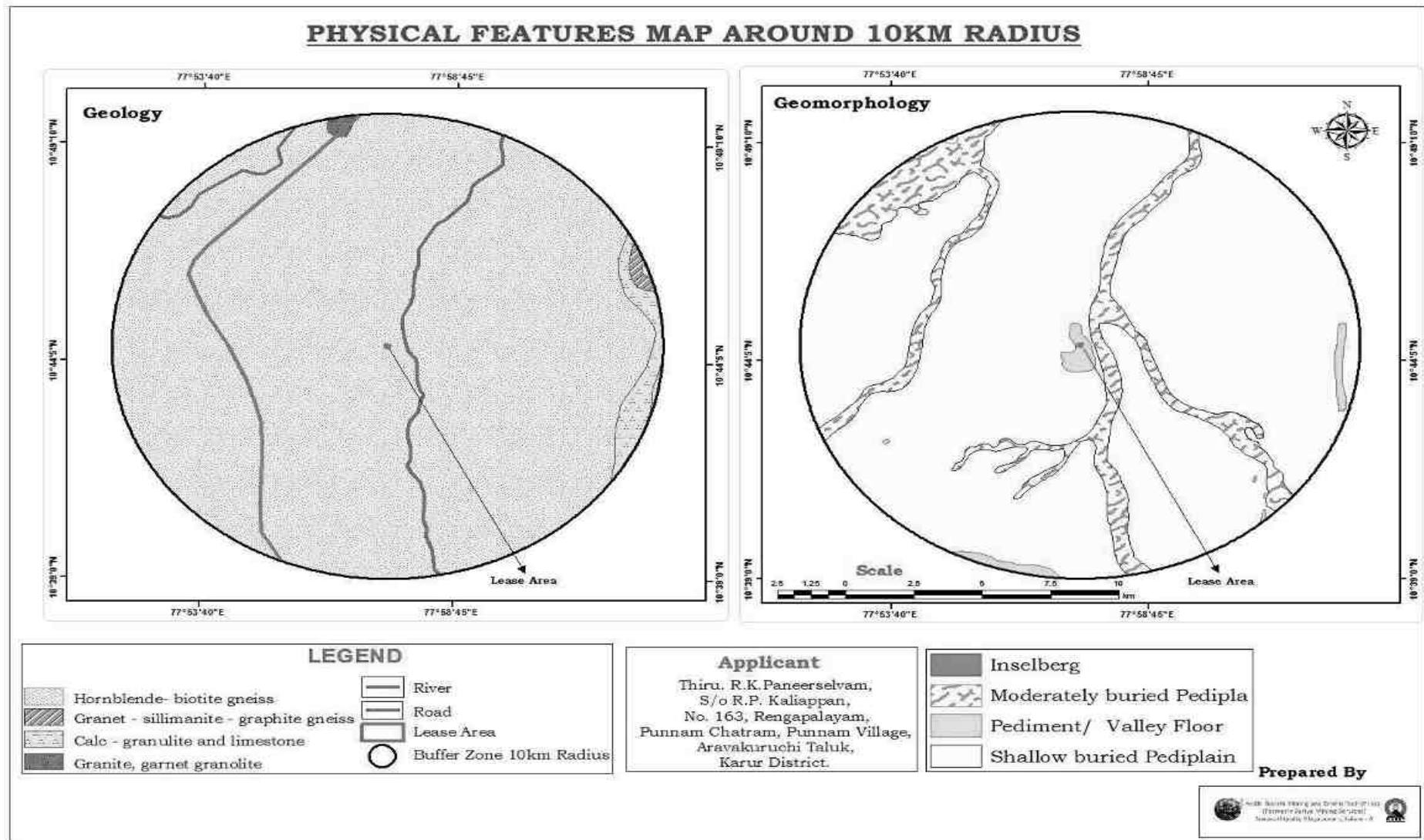


Fig No. 3.38: Image Showing Geology and Geomorphology of the cluster lease area

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Open cast mining is carried out by using excavators and dumpers combination. Scientific mining with proper benches with width and slope will be enabled as per MMR, 1961. Jackhammers with compressors will be deployed for drilling. Manual labors will be engaged for jack hammer drilling, sorting of waste and excavator will be used for loading the ordinary stone and gravel into trucks. Primary blasting will be carried out nonel blasting techniques with minimum vibration or detonating card with electric detonator initiation system. Sizing of materials shall be done by rock breakers or muffle blasting or pop shooting to the required size for better loading into trucks.

All these operations can disturb the environment in various ways, such as removal of mass, change of landscape, flora and fauna of the area, surface drainage, and change in air, water and soil quality. Therefore, it is essential to assess the impacts of mining on different environmental parameters before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. The likely impacts on various environmental aspects and mitigation measures are discussed below.

4.1 Air Environment

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by jack hammer drilling, blasting, excavation, loading and transportation.

4.1.1. Anticipated Impact

The air borne particulate matter generated by handling, operations and transportation of ordinary stone and gravel are the main air pollutant. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO₂) contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal. Prediction of impacts on air environment has been carried out by considering generation of rejects and overburden per annum of the ordinary stone and gravel quarrie of 0.88.0Ha.

4.1.2 Emissions Details

Drilling, Blasting, Loading, unloading and transportation of ordinary stone and gravel and wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities that releasing Particulate Matter (PM₁₀ and PM_{2.5}) affecting ambient air of the area. Emission during blasting, loading and unloading was calculated as the area sources. Transportation of the rough stone by trucks operated on the haul road was calculated as the line sources. Details of emission during loading/unloading

and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

4.1.2.1 Drilling

Drilling is the process of making holes in ordinary stone to carry out smooth blasting. The drilling is most representative for point source. The rate of emission from the drilling process will be very high when compared to loading, unloading, transporting and blasting. So wet drilling will be proposed for the ordinary stone and gravel quarry which completely suppresses the dust emitted during drilling process. Also dust extractor will be used over the wet drilling for the effective emission control system.

4.1.2.2. Loading of ordinary stone

Chakraborty et al. (2002) was used to calculate emission of particulate matter released into the atmosphere during loading of mineral.

$$E = [\{ (100 - m) (m)^{-1} \}^{0.1} \{ (s) (100 - S)^{-1} \}^{0.3} h^{0.2} \{ (u) (0.2 + 1.05)^{-1} \} \{ (xl) (15.4 + 0.87xl)^{-1} \}]$$

Table No. 4.1: Source Parameters (Loading of ordinary stone)

S.No	Description	Symbol	Quantity
1	Moisture content (%)	m	90%
2	Silt content (%)	s	0.1(approx)
3	Wind speed (m s ⁻¹)	u	2.94
4	Drop height (m)	h	1m above the tipper body
5	Size of loader (m ³)	l	1.20
6	Frequency of loading(no.h ⁻¹)	x	12 times
7	Area of Source (m ²)	a	206922 (117631 + 89291)
8	Controlled emission rate (g s ⁻¹)	CE	0.041

Totally 2 tippers and 1 hydraulic excavator will be proposed for proposed ordinary stone quarry. The maximum rate of production per hour is estimated at 14 m³. The loading capacity of excavator is 1.20 m³.

$$x = \text{frequency of loading (no. h}^{-1}\text{)} = 14/1.20 = 12 \text{ times.}$$

4.1.2.3 Loading of Overburden (Gravel)

Chakraborty et al. (2002) was used to calculate emission of particulate matter released into the atmosphere during loading of gravel.

$$E = [0.018 \{ (100 - m) (m)^{-1} \}^{1.4} \{ s (100 - s)^{-1} \}^{1.4} (uhxl)^{0.1}]$$

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Table No. 4.2: Source Parameters (Loading of Gravel)

S.No	Description	Symbol	Quantity
1	Moisture content (%)	m	30
2	Silt content (%)	s	12
3	Wind speed (m)	u	2.94
4	Drop height (m)	h	1m above the tipper body
5	Capacity of tipper (t)	c	1.20
6	Frequency of unloading (no.h ⁻¹)	y	5 times (maximum)
7	Area of Source (m ²)	a	206922 (117631 + 89291)
8	Controlled emission rate (g s ⁻¹)	CE	0.0023

The maximum rate of production of gravel per hour is estimated at 5 m³. The loading capacity of excavator is 1.20 m³.

x = frequency of loading (no. h⁻¹) = 5/1.20 = 5 times

Emission of PM₁₀ during gravel loading was calculated and found to be 0.041 g/s and 0.0023 g/s respectively based on moisture content 90% and 30% respectively and average wind speed was 2.94 m/s as observed with site data.

4.1.2.4 Haul Road

Chaulya (2006) was used to calculate emission of particulate matter released into the atmosphere during transportation of ordinary stone and gravel by truck operated per hour on haul road.

$$E = \{[(100-m) (m)^{-1}]^{0.35} \{(us) (100-s)^{-1}\}^{0.7} \{0.5 + 0.1(f + 0.42v)\} 10^{-3}$$

Table No. 4.3: Source Parameters (During Vehicle Movement on Haul Road)

S. No	Description	Symbol	Quantity
1	Moisture content (%)	m	70
2	Silt content (%)	s	12
3	Wind speed (ms ⁻¹)	u	2.94
4	Frequency of transporting (no. h ⁻¹)	f	10 times (maximum)
5	Average vehicle speed(ms ⁻¹)	v	4.1
6	Haul road area (m ²)	a	80
7	Controlled emission rate (g s ⁻¹)	CE	0.0005

Emission of PM₁₀ due to transportation of ordinary stone and gravel on haul road was 0.0005 g/s based on assumption that silt content spread on road surface was 12% and average

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wind speed of 2.94 m/s as observed with site data. Based on the above consideration there was low emission of PM₁₀ during transportation of ordinary stone and gravel.

4.1.2.5 Blasting

In another scenario when controlled blasting is carried out at the mine site and all the other activities are brought to halt. Significant amount of PM₁₀ is released during blasting at mining site for very short-term.

$$E = E_f \times Q$$

Table No. 4.4: Source Parameters (During Blasting)

S. No	Description	Symbol	Quantity
1	Uncontrolled Particulate matter emissions rate in pounds per year	UE	61
2	Emission factor in unit of pounds of particulate per ton shifted by blasting	E _f	TSP E _f = 0.0001 pounds/ton PM ₁₀ E _f = 0.0008 pounds/ton PM _{2.5} E _f = 0.0008 pounds/ton
3	Amount of material of all types shifted by blasting during the year in tons	Q	80148
4	Control efficiency (%)	c	30
5	Controlled Particulate matter emissions rate in pounds per year	CE	50

(Reference: Mojave Desert Air Quality Management District, 1403 Park Avenue, Victoria, CA 92392 -2310).

Loading and unloading of ordinary stone and gravel, overburden, movement of trucks on haul roads and open pit source were considered as combined action. So the emission during loading, unloading and transportation were taken combined and US EPA based Dispersion AERMOD model was used for prediction of impact with 1-h meteorological data of the study period for the assessment of incremental GLC. Then blasting was considered as separate action and US EPA based Dispersion AERMOD model was used for prediction of impact separately.

4.1.2.6 Summary of calculated Emission Rates

Table No. 4.5: Emissions Rates of PM₁₀

Source type	Controlled Emission Rate (g/s/m ²)
Rough stone loading	2.5 x 10 ⁻⁶
Overburden Loading	1.4 x 10 ⁻⁷
Haul Road	4.5 x 10 ⁻⁶
Blasting	1.7 x 10 ⁻⁷

Table No. 4.6: Emissions Rates of SO₂

Source type	Average Emission rate for HDDV as per EPA	Emission rate (Proposed Project)
Tippers	0.012 g/mile	7.5×10^{-8} g/s/m ²
Excavators	0.012 g/mile	4.2×10^{-7} g/s/m ²
Total Emission Rate		4.9×10^{-7} g/s/m ²

Table No. 4.7: Emissions Rates of NO₂

Source type	Average Emission rate for HDDV as per EPA	Emission rate (Proposed Project)
Tippers	0.725 g/mile	4.5×10^{-6} g/s/m ²
Excavators	0.725 g/mile	2.3×10^{-5} g/s/m ²
Total Emission Rate		2.8×10^{-5} g/s/m ²

4.1.3 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction of dispersion of pollutants with GLC and it is used to find the air pollution control activities which controls the emission rates of different activities.

4.1.3.1 Model Input data

The air pollution modeling carried out represents the normal operating scenarios. As the proposed activity is mining the major source of pollution is particulate matter and gaseous emission. The following data has required as input data for dispersion pattern.

- 1) Baseline data of PM₁₀, SO₂ and NO₂ is needed along with meteorological data. Meteorological data preprocessor (AERMET) needs meteorological data which calculates atmospheric turbulence characteristics, mixing heights, surface heat flux for finding the atmospheric dispersion. Site specific data recorded during post monsoon season (1st March 2022 to 31st May 2022) at project site for executing modeling studies.
- 2) The emission rates of PM₁₀, SO₂ and NO₂ from the various sources was taken.
- 3) Location of the project.

4.1.3.2 Model Results

The Air Quality Impact Prediction has been done by using AERMOD of USEPA". The main sources of air pollution with regard to the proposed project for the purpose of estimation of increase in PM₁₀, SO₂ and NO₂ are identified due to –

1. Scenario 1 – PM₁₀

- (i) Loading/unloading of ordinary stone and gravel rejects and overburden
- (ii) Transportation of ordinary stone and gravel rejects, overburden by trucks on the Haul roads from mining benches.

2. Scenario 2 - PM₁₀

- (i) Due to blasting

3. Scenario 3 – SO₂ and NO₂

- i. From Operation of Excavator and movement of transporting vehicle

Scenario1:

Table No. 4.8: Total predicted GLC of PM₁₀ in core and buffer zone due to combined action of loading, unloading and Transportation of Ordinary stone and gravel by trucks on the haul road, open pit source of the mining lease area.

Location	Location Code	Background value in $\mu\text{g}/\text{m}^3$	Incremental GLC in $\mu\text{g}/\text{m}^3$	Total Predicted GLC in $\mu\text{g}/\text{m}^3$
Mine site	AQ1 - Centre	48	20.07	68.07
Receptor 01	AQ2 – 140m - NE	48	2.39	50.39
National Ambient Air Quality Standards (NAAQS)				100

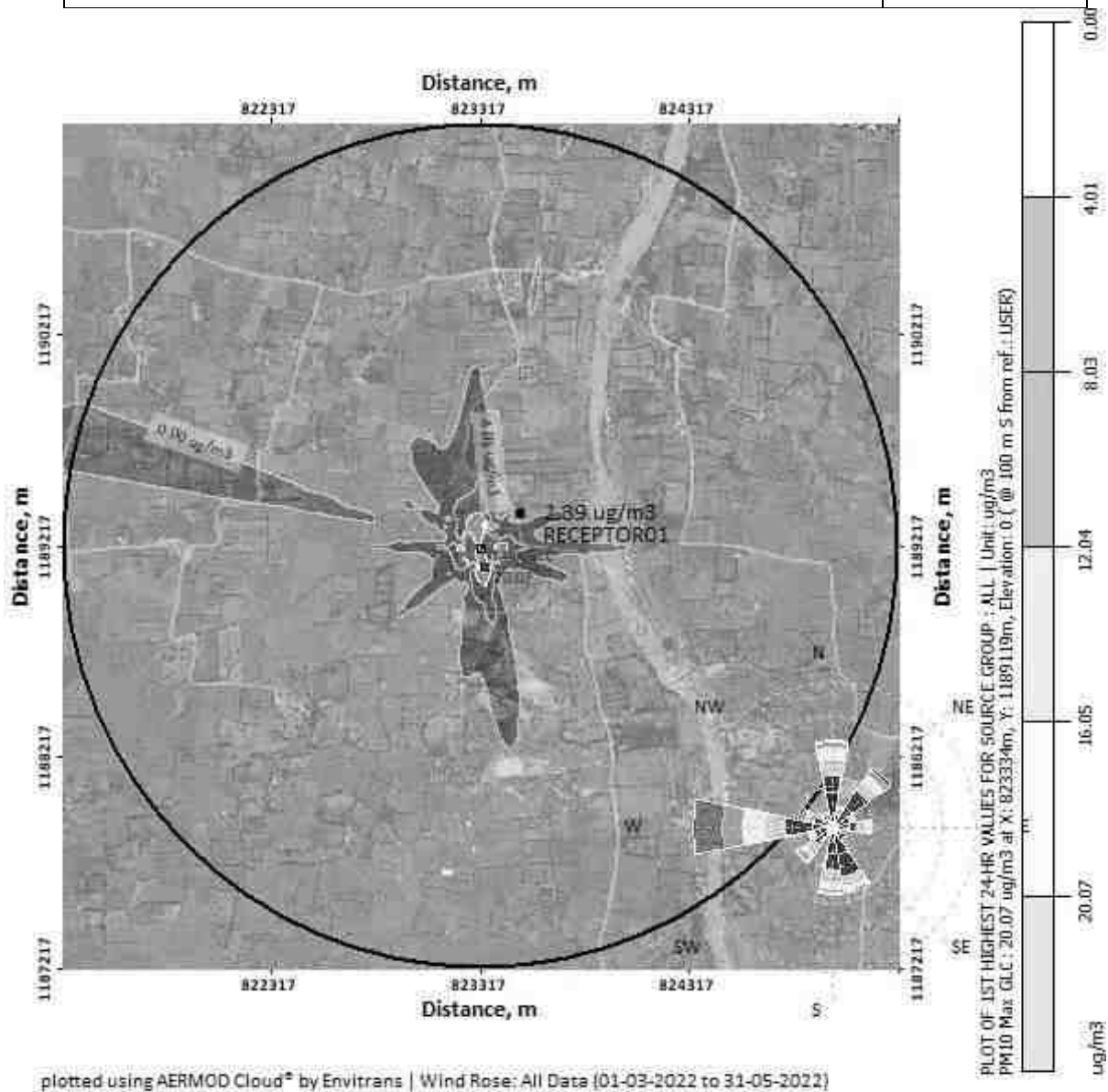


Fig No.4.1: Isopleth indicating Incremental value of PM₁₀ due to combined action of loading, unloading, transportation of ordinary stone and gravel on haul road

Scenario 2:

Table No. 4.9: Total predicted GLC of PM₁₀ in core and buffer zone due to blasting activity in the mining lease area.

Location	Location Code	Background value in $\mu\text{g}/\text{m}^3$	Incremental GLC in $\mu\text{g}/\text{m}^3$	Total Predicted GLC in $\mu\text{g}/\text{m}^3$
Mine site	AQ1 - Centre	48	6.18	54.18
Receptor 01	AQ2 – 140m -NE	48	3	51
Receptor 02	AQ3 – 810m -SW	48	0.46	48.46
National Ambient Air Quality Standards (NAAQS)				100

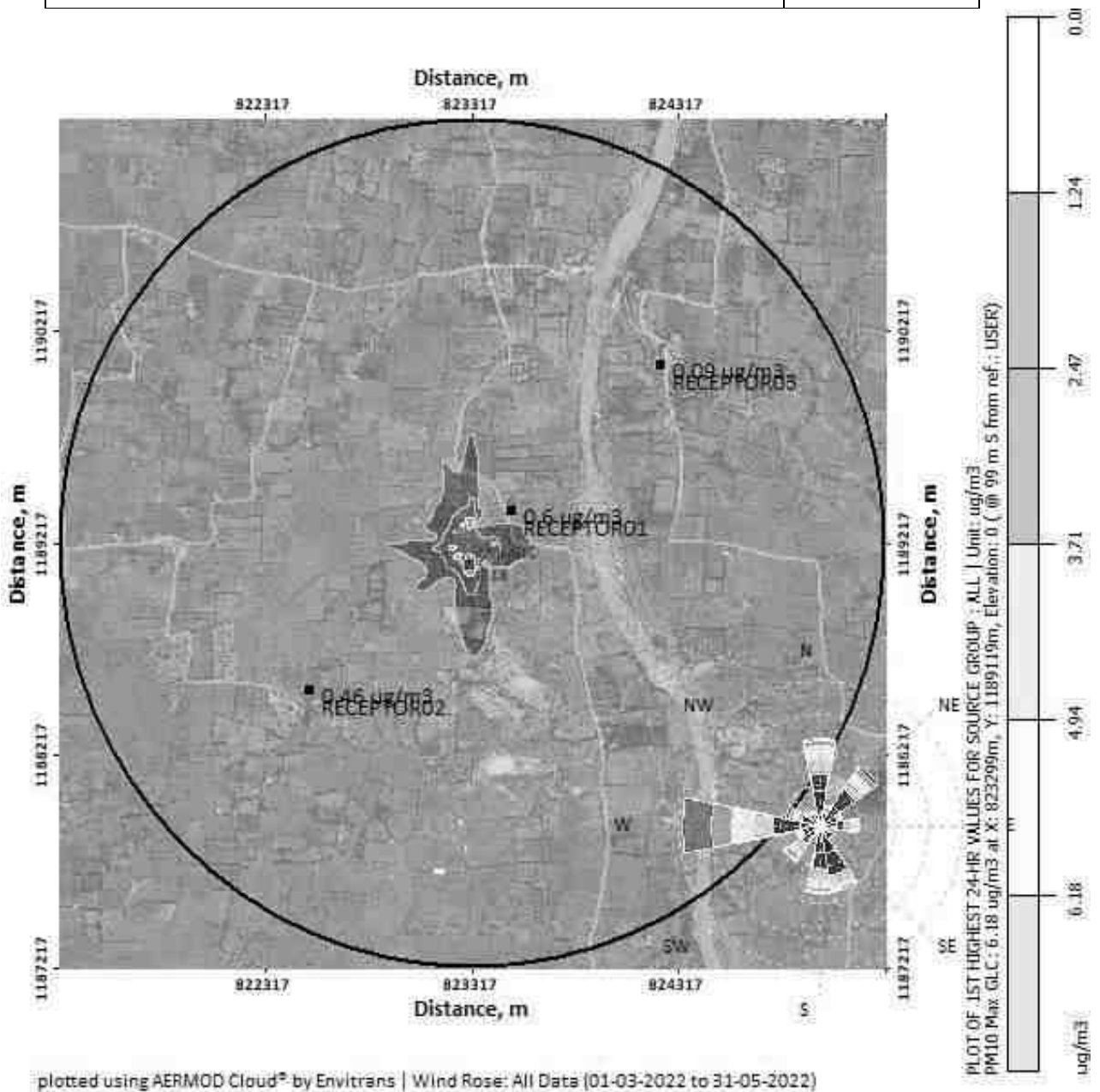


Fig No. 4.2: Chart indicating Incremental value of PM₁₀ due to blasting action.

Scenario 3:

Table No. 4.10: Impact of SO₂ due to Operation of Excavator and Movement of Vehicle in the mining lease area

Location	Location Code	Background value in $\mu\text{g}/\text{m}^3$	Incremental in GLC in $\mu\text{g}/\text{m}^3$	Total Predicted GLC in $\mu\text{g}/\text{m}^3$
Mine site	AQ1 - Centre	9	1.95	10.95
Receptor 01	AQ2 – 140m - NE	9	0.35	9.35
Receptor 02	AQ3 – 810m - SW	7	0.16	7.16
National Ambient Air Quality Standards (NAAQS)				80

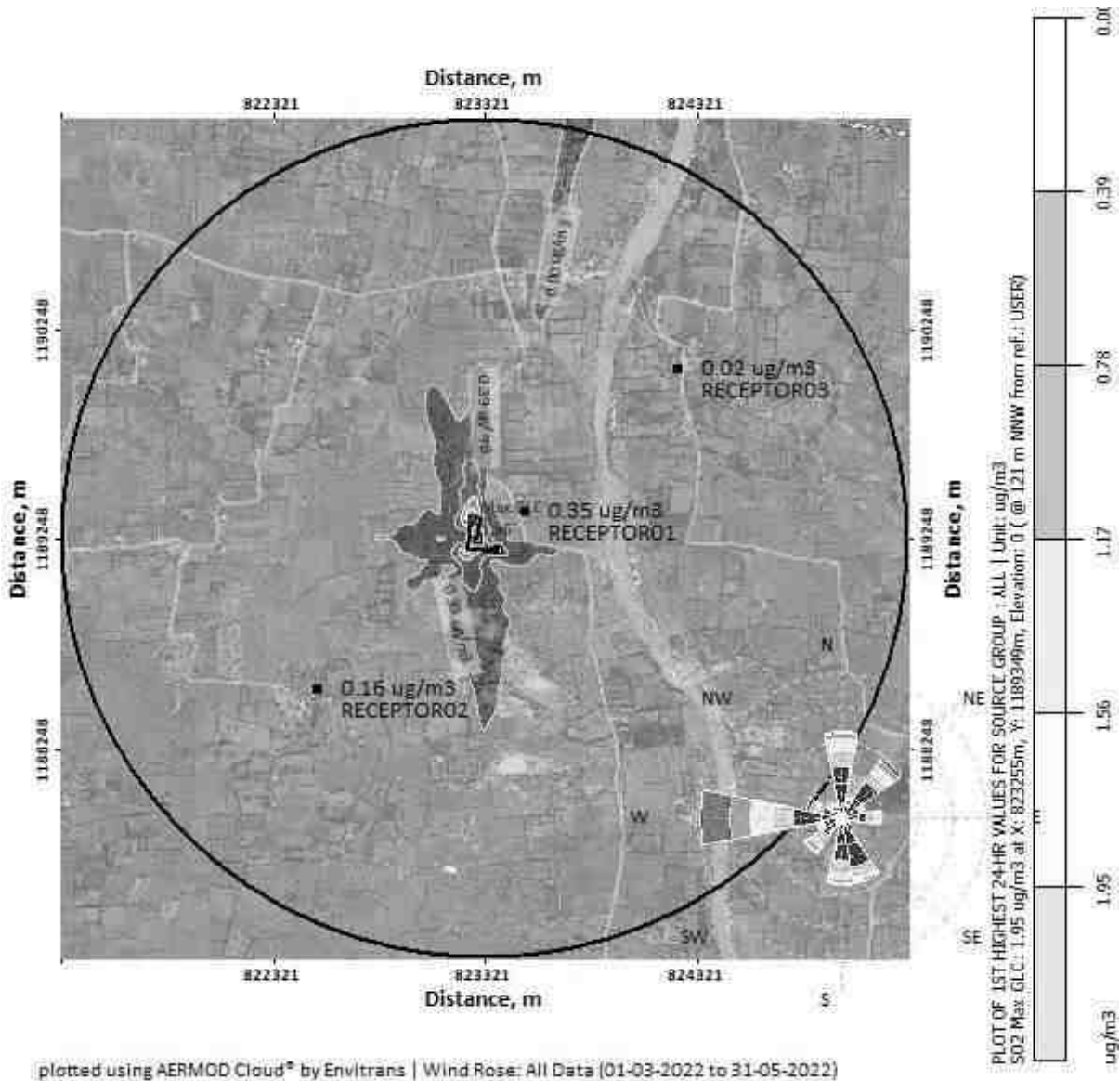


Fig No. 4.3: Chart indicating Incremental value of SO₂ due to movement of vehicle in the project site

Table No. 4.11: Impact of NO₂ due to Operation of Excavator and Movement of Vehicle in the mining lease area

Location	Location Code	Background value in $\mu\text{g}/\text{m}^3$	Incremental GLC in $\mu\text{g}/\text{m}^3$	Total Predicted GLC in $\mu\text{g}/\text{m}^3$
Mine site	AQ1 - Centre	14	3.31	17.31
Receptor 01	AQ2 – 140m - NE	14	0.55	14.55
Receptor 02	AQ3 – 810m - SW	14	0.23	14.23
National Ambient Air Quality Standards (NAAQS)				80

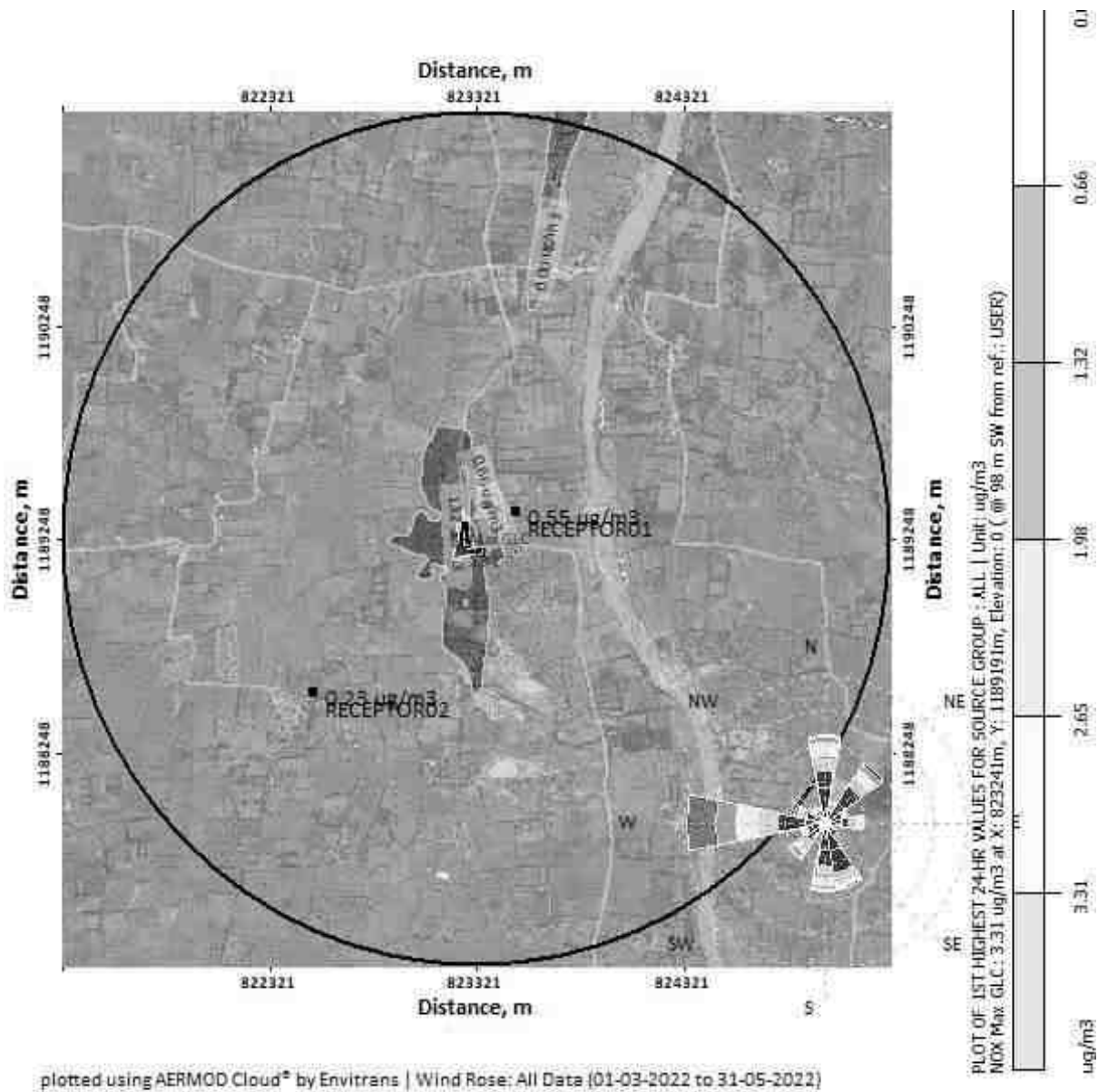


Fig No. 4.4: Chart indicating Incremental value of NO₂ due to movement of vehicle in the project site

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Total predicted 24-h maximum GLC of PM₁₀ at project site for scenario 1 i.e. loading-unloading, transportation and scenario 2 i.e. Blasting was 68.07µg/m³ and 54.18µg/m³ respectively after superposition of base-line value 48µg/m³ over the incremental GLC 20.07µg/m³ and 6.18µg/m³ respectively due to combined impact of loading, unloading, open pit and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO₂ and NO₂ for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³. Therefore the total predicted GLC of SO₂ and NO₂ will be 10.95µg/m³ and 17.31µg/m³ respectively.

Maximum Impact of PM₁₀, SO₂ and NO₂ was observed close to the source within the lease area due to moderate wind speeds.

4.1.3.4 Combined Impact on Air Environment due to proposed quarry and adjacent quarry within 500m radius.

There are two existing quarries namely Thiru.R.K.Panneerselvam and Thiru.M.K.Kungumaraj located within the 500m radius of proposed quarries for Thiru.R.K.Panneerselvam ordinary stone and gravel quarry. The predicted incremental GLC of PM₁₀, PM_{2.5}, SO₂ and NO₂ due to the proposed mining activity is given in below table.

Table No. 4.12: Incremental GLC of PM₁₀, PM_{2.5}, SO₂ and NO₂ due to the proposed mining activity

S. No	Air Pollutants	Incremental GLC due to proposed quarry (Controlled) µg/m ³
1.	PM ₁₀	20.07
2	SO _x	1.95
3.	NO _x	3.31

Assume that emission rate from the various mining activity in adjacent 2 quarries are same as the proposed quarries. So the incremental GLC will also be same as proposed quarry. Therefore the when the proposed quarry and two adjacent quarries are working together, the incremental GLC and total predicted GLC are given below table.

Table No.4.13: Total predicted GLC of PM₁₀, PM_{2.5}, SO₂ and NO₂ due to the combined activity in the cluster

S.No	Air Pollutants	Baseline Value	Incremental GLC due to proposed quarry and two quarries µg/m ³	Total Predicted GLC due to proposed quarry and two adjacent quarry µg/m ³
1.	PM ₁₀	48	60.21	108.21
2.	SO _x	9	5.85	14.85
3.	NO _x	15	9.93	24.93

From the above table it is found that, when the three quarries are working together the Total predicted GLC of SO₂ and NO₂ (Controlled) due to mining activities was found within the NAAQS in the cluster area. PM₁₀ is slightly beyond the limits which shall be controlled by installation of more number of sprinklers in the lease area.

4.1.4. Air Quality Index

An air quality index is defined as an overall scheme that transforms the weighed values of individual air pollution related parameters (for example, pollutant concentrations) into a single number or set of numbers (Ott, 1978). Air quality standards are the basic foundation that provides a legal framework for air pollution control. The basis of development of standards is to provide a rational for protecting public health from adverse effects of air pollutants, to eliminate or reduce exposure to hazardous air pollutants, and to guide national/ local authorities for pollution control decisions.

The objective of an AQI is to quickly disseminate air quality information (almost in real-time) that entails the system to account for pollutants which have short-term impacts. To present status of the air quality and its effects on human health, the following description categories have been adopted for IND-AQI.

AQI breakpoints for eight pollutant parameters considered for AQI and these are summarized below in Table with color scheme to represent the AQI bands.

Table No. 4.14: AQI and its associated Health Impacts

AQI	Associated Health Impacts
Good	Minimal Impact
Satisfactory	May cause minor breathing discomfort to sensitive people
Moderate	May cause breathing discomfort to the people with lung disease such as asthma and discomfort to people with heart disease, children and older adults
Poor	May cause breathing discomfort to the people on prolonged exposure and discomfort to people with heart disease with short exposure
Very Poor	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases
Severe	May cause respiratory effects even on healthy people and seious health impacts on people with lung/heart diseases. The health impacts may be experienced even during light physical activity

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Table No. 4.15: Proposed Breakpoints for AQI Scale 0-500
(Units: $\mu\text{g}/\text{m}^3$ unless mentioned otherwise)

AQI Category (Range)	PM ₁₀ 24-hr	PM _{2.5} 24-hr	NO ₂ 24-hr	O ₃ 8-hr	CO 8-hr (mg/m ³)	SO ₂ 24-hr	NH ₃ 24-hr	Pb 24-hr
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200	0.0-5
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400	0.5-1.0
Moderately polluted (101-200)	101-250	61-90	81-180	101-168	2.1-10	81-380	401-800	1.1-2.0
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200	2.1-3.0
Very poor (301-400)	351-430	121-230	281-400	209-748*	17-34	801-1600	1200-1800	3.1-3.5
Severe (401-500)	430*	230*	400*	748+*	34*	1600*	1800+	3.5*

*One hourly monitoring (for mathematical calculation only)

4.1.4.1. Interpretation of Air quality using IND-AQI:

Table No. 4.16: Computation of AQI with Baseline data

Air pollutants	Total Predicted GLC due to proposed quarry $\mu\text{g}/\text{m}^3$	AQI	Associated Health Impacts
PM ₁₀	68.07	Satisfactory (51-100)	May cause minor breathing discomfort to sensitive people
SO ₂	10.95	Good (0-50)	Minimal Impact
NO ₂	17.31	Good (0-50)	Minimal Impact

The above table shows the AQI quality due to total predicted GLC of quarry in core area. PM₁₀ is between 51-100 and 31-60 of AQI which is satisfactory and may cause minor breathing discomfort to sensitive people. SO₂ and NO₂ are between 0-40 of AQI which is good and may cause Minimal Impact. When all the quarries in the cluster area are working together the incremental GLC will be high and it may cross the prescribed limits by NAAQS. To overcome such situation, cluster committee should be formed and adopt the environmental management plan effectively as per EIA report.

4.1.5. Mitigation Measures

The pollutants from nearby ongoing mining activities, residential and commercial activities are the primary sources of air pollution. However, in the study area adequate control measures will be implemented in future at the time of mining operation. Mitigate measures suggested for air pollution controls are based on the baseline ambient air quality of the area. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that air quality is monitored on a regular basis to check compliance of standards as prescribed by regulatory authorities. However, to further minimize the pollutant

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concentration especially PM₁₀, the following control measure should be adopted by the project proponent.

- ❖ Regular water sprinkling on haul roads, blasted heaps, service roads and overburden dumps at regular intervals will help in reducing considerable dust pollution
- ❖ 1.0 KLD of water will be used for dust suppression of the quarried.
- ❖ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator.
- ❖ Conventional low explosives are being used.
- ❖ The scale of blasting is however very less considering the rate of production.
- ❖ Covering of material when transport through trucks/dumper
- ❖ The drilling and blasting are being carried out as per the proposals laid down in the approved plan.
- ❖ Proposed to follow up muffle blasting so as to prevent fly rock fragments
- ❖ Avoiding blasting during high windy periods and temperature inversion periods
- ❖ Delay blasting under unfavorable wind and atmospheric conditions
- ❖ Use of appropriate explosives for blasting and avoiding overcharging of blast holes
- ❖ The vehicles and machinery will be kept in well maintained condition so that emissions will minimize
- ❖ Provision of green belt all along the periphery of the lease area for control of dust
- ❖ Information on wind direction and meteorology will be considered while planning, so that pollutants, which cannot be fully suppressed by engineering technique, will be prevented from reaching the residential areas
- ❖ Cabins for shovel and dumpers and dust masks to workmen will be provided
- ❖ The dust respirators should be provided to all workers working in dusty environment
- ❖ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act
- ❖ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.

As discussed above under each activity, there will be increase in terms of dust load and gaseous emissions. However, it can be stated that these incremental contributions will remain within the prescribed limits/norms. Further, the mitigation measures will further bring down these concentrations making the mining activities more eco-friendly.

4.2 Carbon emission and carbon sinks due to proposed mining activity

4.2.1 Carbon emissions

There are both natural and human sources of carbon dioxide emissions. Natural sources include decomposition, ocean release and respiration. Human sources come from industrial activities such as cement production, deforestation as well as the burning of fossil fuels like coal, oil and natural gas.

4. 2.1.1 Carbon emission due to natural activity in project site and carbon sinks

a) Carbon from decomposition

As the proposed mining activity is carried out in existing mining pit, there will be no need of cutting of any trees or plants. So the process of decomposition will not take place which emits carbon dioxide into the atmosphere.

b) Carbon from respiration

The carbon dioxide we exhale does not contribute to global warming for the simple reason. Since all the carbon dioxide we exhale captured by plants during photosynthesis, we are not disturbing the carbon dioxide content of the atmosphere by breathing.

4.2.1.2 Carbon emission due to human activity in project site and carbon sinks

a) Carbon from Vehicles

The proposed method of mining is semi mechanized which involves activity of excavator and tippers. The burning of fossil fuels used for the tippers and excavators releases carbon monoxide, carbon dioxide and nitrogen oxide into the atmosphere. When those gases are emitted into the atmosphere it affects the amount of greenhouse gases, which are linked to climate change and global warming. In average based on the production per day, two tippers can travel 21 miles within the lease area for transporting the rough stone. Plants not only absorb carbon dioxide but also absorb other gases and remove the impurities from it.

Table No. 4.17: Emission of carbon monoxide carbon dioxide from vehicle

Source type	Average Emission rate of CO for HDDV as per EPA	Emission rate of CO
Tippers	2.311 g/mile	0.05 kg/day
Excavators	2.311 g/mile	0.23 kg day
Total Emission Rate		0.28 kg/day

Remediation

The project proponent proposed to plant nearly 500 numbers of one year taller tree sapling along the safety zone of mining lease area to overcome the emission of carbon gases and other gases by vehicles in the quarry. Moreover, they will plant trees along the village

road and government schools under CER and CSR schemes. BS –VI model of tippers are proposed to use in the quarry for the controlled emission of gases.

4.3 Soil Carbon stock

Soil carbon sequestration is a process in which CO₂ is removed from the atmosphere and stored in the soil carbon pool. This process is primarily mediated by plants through photosynthesis, with carbon stored in the form of SOC. Carbon is the main component of soil organic matter and helps give soil its water-retention capacity, its structure, and its fertility.

The dense carbon stocks below and above the soil are mostly seen in dense forest where more process of photosynthesis takes place and tons of leaves, branches gets decomposed. The agricultural activity in field can degrade and deplete the SOC levels during the process of tillage in paddy, sugarcane turmeric crop field.

The No Reserve Forest and Wildlife Sanctuaries within 10km Radius and this area do not falls under Wildlife Conservation Act.,

As it is mining project which is carried out within lease area it will not affect any soil carbon stock in the nearest reserve forest.

4.4 Noise Environment

Noise survey has been conducted in the study area to assess the background noise levels in different zones. The anticipated noise level due to proposed mining activity has been assessed considering baseline noise level, distance involving mining site to nearest village and noise generated due to proposed mining activity. Following are the sources of noise in the proposed open cast ordinary stone gravel quarry project.

- Drilling;
- Blasting;
- Vehicular Movement.

The drilling operation is being carried out by Jack hammer operated by compressor mounted with tractor. The noise levels in the working environment are being and will be maintained within the standards prescribed by Occupational Safety and Health Administration (OSHA). These standards were established with the emphasis on reducing the hearing loss. The permissible limits, as laid down by CPCB, are presented in below in table 4.18.

Noise generated from blasting is always instantaneous. The noise produced by blasting is for extremely short duration of around 0.5 seconds, though with a high intensity. Blasting time is generally fixed at lunch interval or after the working shift taking. Noise of blast is site specific and depends on type, quantity of explosives, dimensions of drill holes,

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degree of compaction of explosive in the hole and rock. Blasting, in addition to easing the hard strata, generates ground vibrations and instantaneous noise. The noise levels in many situations will be above Threshold Limit Value. Exposure to noise levels, above Threshold Limit Value may have detrimental effect on the workers' health. The adverse effects of high noise levels on exposed workers may result in Annoyance, Fatigue, Temporary shift of threshold limit of hearing, Permanent loss of hearing and Hypertension and high blood cholesterol, etc.

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

Table No. 4.18: Permissible Exposures in Cases of Continuous Noise (CPCB)

Sound Level (dB A)	Continuous Duration (Hours)
85	8
88	4
91	2
94	1
97	0.5
100	0.25

Table No. 4.19: Noise Exposure Levels & Its Effects

Noise Levels dB(A)	Exposure Time	Effects
85	Continuous	Safe
85-90	Continuous	Annoyance and Irritation
90-100	Short term	Temporary shift in hearing threshold, generally with complete recovery
Above 100	Continuous	Permanent loss of hearing
100-110	Several years	Permanent deafness
110-120	Few months	Permanent deafness
120	Short term	Extreme discomfort
140	Short term	Discomfort with actual pain
150 and above	Single exposure	Mechanical damage to the ear

Source: Hand Book of EIA, Rao & Wooten

4.4.1 Anticipated Impacts due to Noise in cluster core zone

During the operation phase of mining, movement of HEMM also add some noise level whose impact is being minimized by continuous maintenance of vehicle. The likely generations of noise levels due to operation of HEMM are given in table 4.20.

Table No. 4.20: Expected Noise Levels

Equipment's	Expected Noise Levels dB(A)
Mining	
Drilling	90-100
Shovel	75-80
Tipper	75-80
Dozers	85-90
Crusher	85-95

The mine site where heavy earth moving machinery will operate, noise level will be within the stipulated 90 dB (A) norm of DGMS. The protection measures for the operators of this equipment will reduce the impact/exposure.

Predicted noise levels due to mining operations using Mathematical Equations

$L_2 = L_1 - 20 \log_{10} (R_2/R_1)$ Where L_1 dB (A) = Noise level at a distance R_1 (m)

L_2 dB (A) = Noise level at a distance R_2 (m) &

$L = 10 \log_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$

Where L_1 , L_2 and L_n are noise level dB (A)

Table No. 4.21: Predicted Noise levels in Core Zone and buffer zone

Location Code	Distance, km	Source Noise Level, dB(A)	L(Day) dB(A)	L(Night) dB(A)	Noise level at Receptor from Mining sources, dB(A)	Resultant noise level, dB(A) day time	Resultant noise level, dB(A) Night time
Cluster Core Zone	--	100	46.0	36.4	100	100	36.4
Pungambadi	4.2	100	42.2	33.4	37.5	43.5	33.4
Seethapatti	1.7	100	40.4	31.0	45.3	46.5	31.0
Thethupati	4.3	100	45.3	35.1	37.3	45.9	35.1
Thirukooranam	1.3	100	45.6	35.3	47.7	49.7	35.3

Green colour- Baseline Value, **Red Colour** – Noise level due to mining,

Blue colour- Baseline + Noise level due to mining

Although the noise level due to the operation of various mining machineries is 100dB(A), the noise level at different receptors is lower due to the distance involved and other topographical features adding to the noise attenuation. The calculated values at the receptors and resultant noise level are based on the mathematical formula as mentioned above.

The anticipated noise level in buffer villages due to mining activity is calculated by considering operation of one quarry only. **When all the quarries in the cluster work together in same time, the resultant noise level may increase up to 5 decibel.**

To overcome the noise pollution due to operation of quarries in the cluster area the following mitigation measure should be followed.

4.4.2 Mitigation measures for Control of Noise

The following noise mitigation measures are proposed for control of Noise.

- ❖ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas.
- ❖ Limiting time exposure of workers to excessive noise.
- ❖ Proper and regular maintenance of vehicles, machinery and other equipments.
- ❖ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments.
- ❖ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles.
- ❖ Carrying out blasting only during day time and not on cloudy days.
- ❖ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.
- ❖ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
- ❖ Provision of Quiet areas, where employees can get relief from workplace noise.
- ❖ The development of green belts around the periphery of the mine to attenuate noise.
- ❖ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

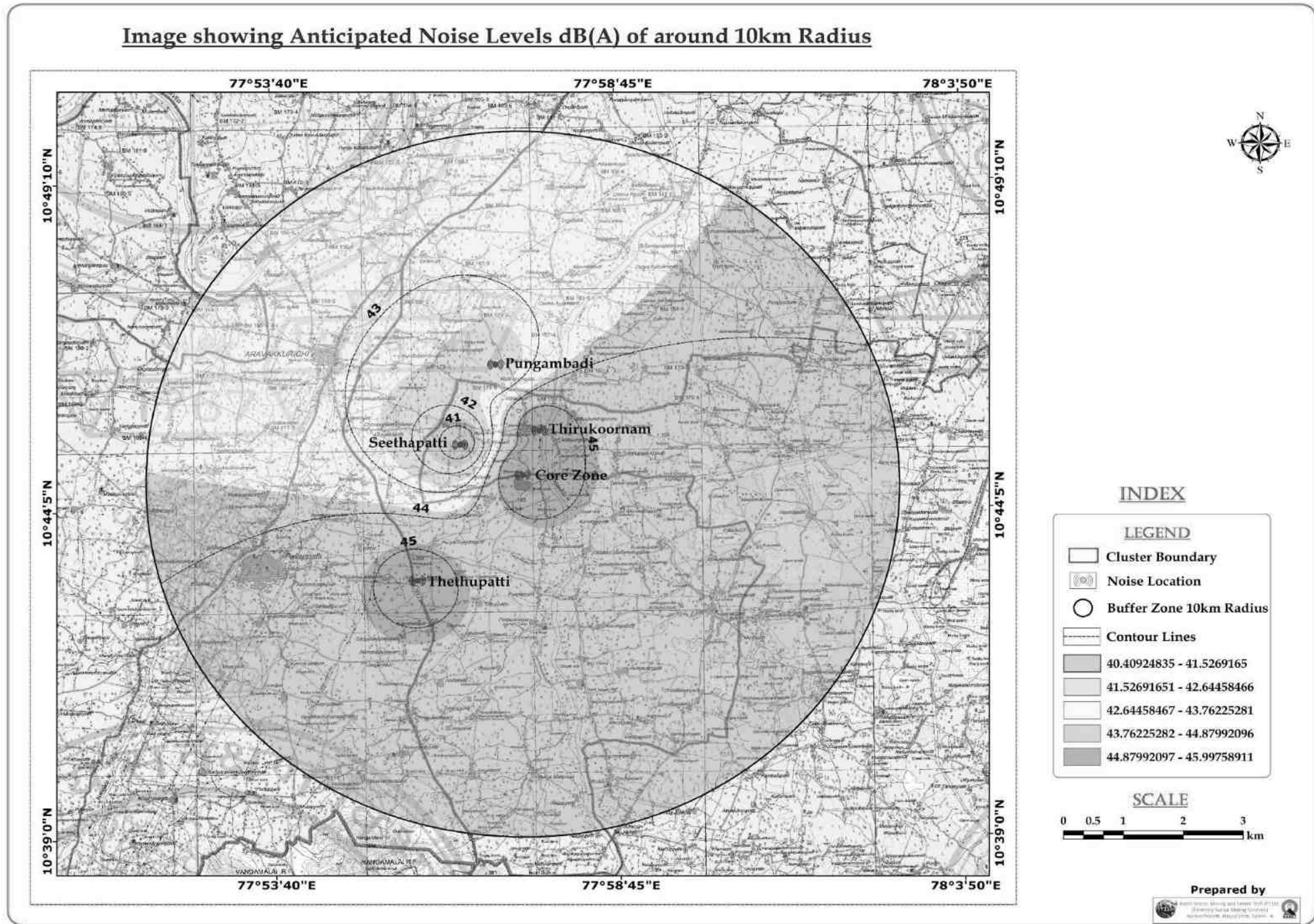


Fig No. 4.5: Noise dispersion in cluster core and buffer zone due to proposed mining activity

4.5 Ground Vibrations

Ground vibration due to mining activities in the area are anticipated due to operation of mining machines like excavators, wheel loaders, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from this mine is blasting. Another impact due to blasting activities is fly rocks. These may fall on the houses or agriculture fields nearby the mining lease area and may cause injury to persons or damage to the structures. The nearest major habitation, Anjagoundanpatti village is located in northeast Side. The study area does not involve any mining activity so anticipated impact has been assessed using the empirical equation. The empirical equation used for assessment of peak particle velocity (PPV) is:

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

Where,

V= Peak particle velocity in mm/s

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

Q=Quantity of explosive per blasting in kg.

The standards for safe limit of PPV are established by Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. Permissible standards of Ground vibration due to blasting as per guidelines of Director General of Mines Safety (DGMS), Dhanbad are given in table 4.23.

Table No. 4.22: Estimated Peak Particle velocities for different Explosive Charges (Thiru. R.K.Panneerselvam -0.88.0 Ha)

Nearest Habitation	Quantity of Explosive/Blast, Kg	PPV, mm/s
140m -NE	6	2.5
140m -NE	4	1.9
140m -NE	8	3.2
140m -NE	13	4.0
140m-NE	20	5.3
810m –SW	6	0.2
810m -SW	100	0.5
810m-SW	250	2.8

Quantity of broken rock per hole = 0.45x2.6 = 1.17 m3

Blasting efficiency @ 90% = 1.17x90% = 1.05m3/hole

Charge per hole = 140gm of 25mm dia. Ctg

Quantity of rock broken per day = 24m3 or 60 M.T

Requirement of explosive per day = 6kg @ 10 M.T per kg of expl.

No. of holes to be drilled per day = 60/1.05 = 63 holes

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Table No. 4.23: Permissible Peak Particle Velocities (mm/s)

S. No	Type of Structure	Dominant excitation Frequency		
		< 8 Hz	8 – 25 Hz	> 25 Hz
A)	Buildings/structures not belonging to the owner			
1	Domestic houses/structures (Kuchcha brick and cement)	5	10	15
2	Industrial Buildings (RCC and framed structures)	10	20	25
3	Objects of historical importance and sensitive structure	2	5	10
B)	Buildings belonging to the owner with limited life span			
1	Domestic houses/structures (Kuchcha brick and cement)	10	15	25
2	Industrial buildings (RCC & framed structures)	15	25	50

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

From the above results in table 4.22, it can be seen that the charge per blast of 6kg is well below the Peak particle Velocity of 5mm/s for the habitation located at the distance of 140m.

4.5.1 Mitigation measures for Control of Vibration

Blasting is the major source of vibration and fly rocks. The following mitigation measures are proposed for control of vibration and fly rocks.

- ❖ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios.
- ❖ Milli second detonators shall be used preferably 25–50ms per delay to control vibrations.
- ❖ Inclined holes shall minimize back brake and intensive shocks.
- ❖ In case of development work if any, cushion blasting and Deck loading system shall be adopted to minimize throw of fragments and ground vibration.
- ❖ Air blast due to usage of Detonating Cord with 10gms/m shall be reduced to 5gms/m to minimize air reverberation.
- ❖ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone.
- ❖ No deep hole blasting shall be practiced.
- ❖ Heavy machineries with high ground pressure shall not be used in the mines.
- ❖ Proper warning signals should be used.

- ❖ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring.

Though all mitigation measures are pointed out, as such no adverse effects on human life, wild life and other biotic system.

4.6 Water Environment

Mining operations can affect groundwater quality in several ways. The most obvious occurs in mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water.

Whereas Impacts on surface water include the build-up of sediments or other toxic products, short and long-term reductions in pH levels (particularly for lakes and reservoirs), destruction or degradation of aquatic habitat, and contamination of drinking water supplies and other human health issues. The water balance for the proposed project is presented in fig 4.6.

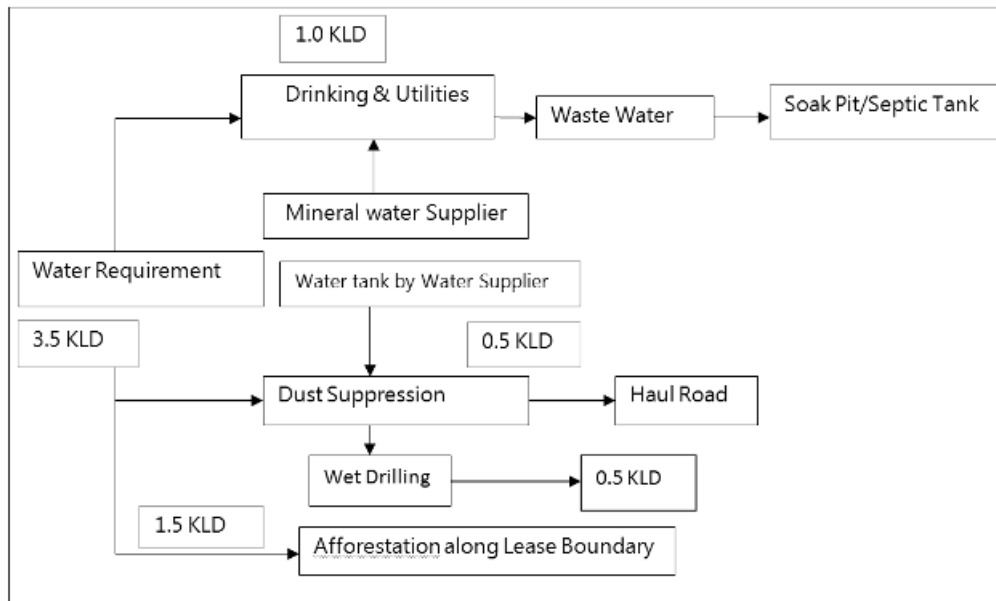


Fig. No. 4.6: Water Balance chart for proposed quarry

Drinking & Utilities = 1.0 KLD

Wastewater = (1.0 KLD * 75%) = 0.75 KLD

Water required For Dust Suppression, Green Belt, wet drilling = 2.5 KLD

Total Water Requirement = 3.5 KLD

There are no probable sources of liquid effluents in this project. The 0.75 KLD of domestic effluent/ wastewater generated from office will be discharged into soak pit via septic tank.

4.6.1. Anticipated Impact on Surface Water body due to proposed projects

There is no nalla or water body location within the leasehold area. There are one lake, one small odai, one check dam and three rivers located within the five km radius of the proposed project site. The details of river body are given below.

1. Godavanar River – 700m – E
2. Godavanar Check dam – 750m – E
3. Alamarathupatti lake – 1.3km – NE
4. Small odai – 1km – NE
5. Amaravathi river – 8.2km – NW
6. Nanganji River – 5.1km - W

It is noted that that Godavanar River and Godavanar check dam is situated within one 1km radius which may sensitive to proposed mining activities. Based on the drainage map given in the fig 4.7 it is found that there is no stream order connects the lease area to the nearest Godavanar River. From the proposed mining project, 5% of rejects will be generated which is planned to dump within the mining lease area. Even though the streams order not connecting with the nearest river, there will be chance of siltation of river bed during raining season due to mining activity. To over such siltation in the river the following mitigation measure will be followed.

4.6.1.1 Mitigation Measures:

- i. The garland drainage will be provided around the dump to prevent the escape of runoff along with silt and stone from the dump.
- ii. The repair works of the machineries are strictly prohibited within the lease area to prevent the spillage of grease, oil etc.

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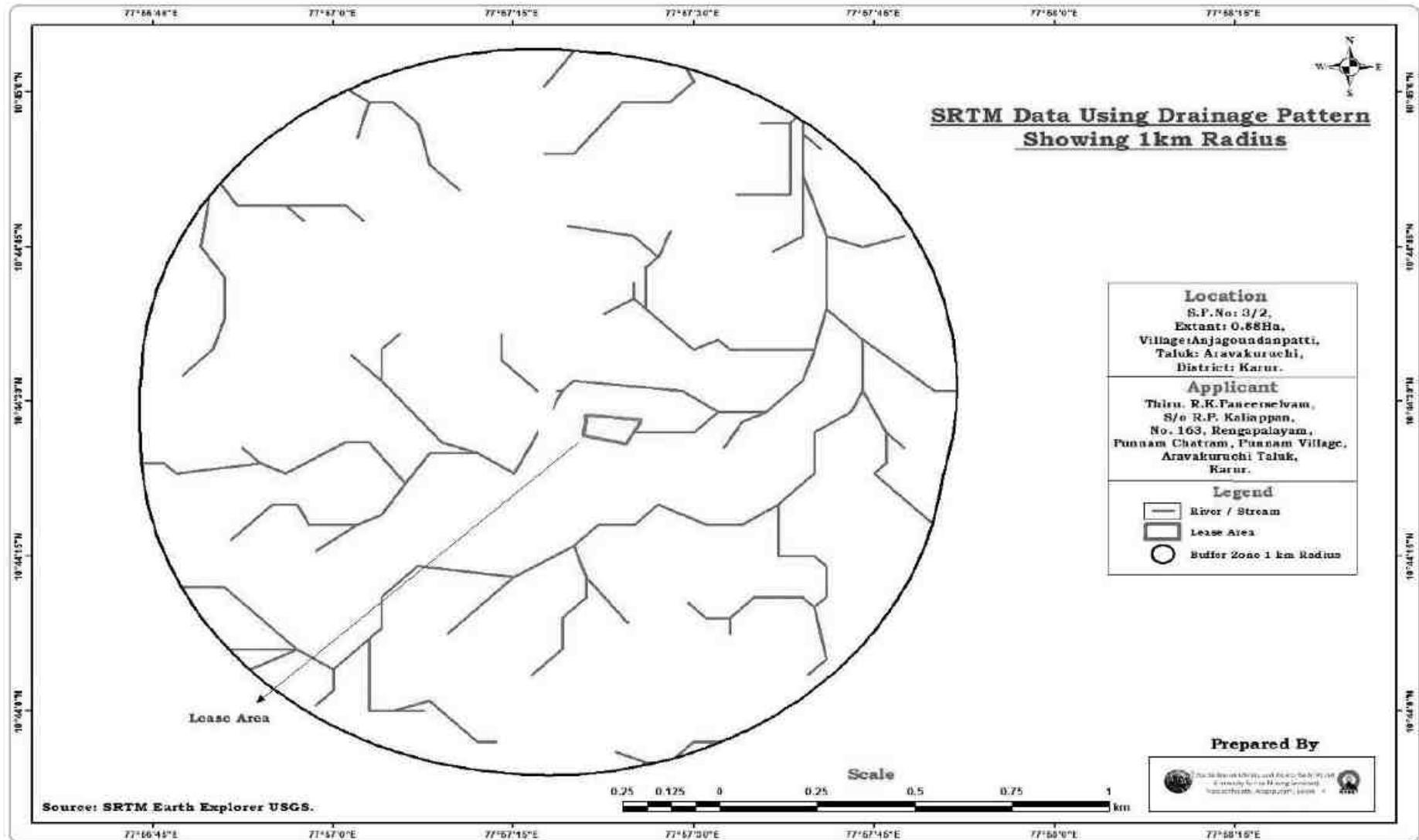


Fig No. 4.7: Map showing drainage pattern within 1km radius of the project site

4.6.2 Anticipated Impact on Ground water due to proposed project

The water table in this region is about 30 to 36m bgl. The proposed depth of mining for quarry is 33m bgl. Thus, the mining activity will not intersect ground water table. No chemical having toxic elements will be used for carrying out mining activity. Also ordinary stone does not contain any kind of toxic element which can contaminate the water. So the rain water or water used for drilling purposes which infiltrates into the ground in the lease area does not affect the quality of ground water. The schematic representation of depth of mining and water table is given in fig 4.8.

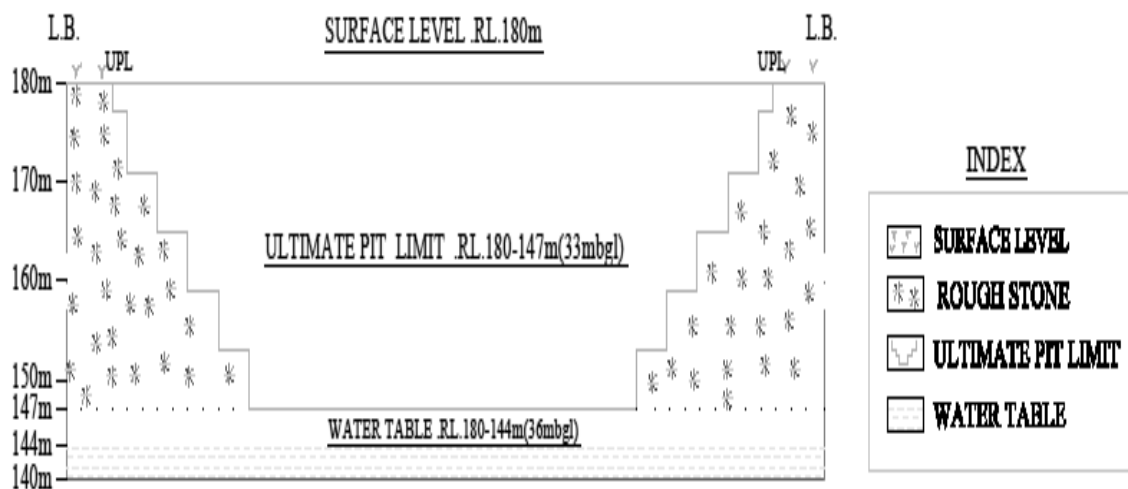


Fig No. 4.8: Schematic representation of depth of mining and water level

4.6.3 Management of rain water in the pit during Monsoon Season

During monsoon season, the rain water gets stored in the quarried out pit. For the working purpose, rain water will be pumped and allowed to store in the surface setting tank constructed outside the lease area to remove suspended solids if any. After the sedimentation process, the water from the settling tank will be used for dust suppression, and green belt development within the lease area.

4.6.4 Water Quality Index

Water Quality Index value has been calculated for the observed values and compared with drinking water specification as per IS 10500:2012 and results were discussed. The WQI has been calculated by using the standards of drinking water quality recommended by the World Health Organization (WHO), Bureau of Indian Standards (BIS) and Indian Council for Medical Research (ICMR). The weighted arithmetic index method (Brown et. al.,) has been used for the calculation of WQI of the water body.

$$\text{Water Quality Index} = \frac{\sum q_n W_n}{\sum W_n}$$

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Further quality rating or sub-index (qn) was calculated using the following expression.

$$qn = 100 * [Vn - Vio] / [Sn - Vio] \text{ Where,}$$

qn = Quality rating for the nth water quality parameter.

Vn = Estimated value of the nth parameter at a given sampling station.

Sn = Standard permissible value of the nth parameter.

Vio = Ideal value of nth parameter in a pure water.

Ideal value in most cases $Vio = 0$ except in certain parameters like PH and dissolved oxygen.

Vio for PH = 7 and Vio for DO = 14.6

Wn = Unit weight for the nth parameter.

The overall Water Quality Index (W.Q.I.) was calculated by aggregating the quality rating with the unit weight linearly.

Table No. 4.24: Unit weight of the water quality parameters

Parameters	Water quality standard (WHO/BIS)	Assigned weight (AW)	Unit weight (UW)
pH	6.5-8.5 (8)	3.66	0.1628
EC (μ S/cm)	250	2.50	0.1112
TDS (mg/l)	500	3.33	0.1481
TH (mg/l)	200	3.33	0.1481
Ca ²⁺ (mg/l)	75	3.0	0.1334
Mg ²⁺ (mg/l)	30	2.66	0.1183
Cl ⁻ (mg/l)	250	4.0	0.1779
Total	-	22.48	1.0

Table No. 4.25: Water quality index of water samples

Sampling Site Name	Water Quality Index Value	Water Quality Index Status
Cluster Core	167.3	Unfit for Drinking
Pungambadi	60.2	Poor water quality
Seethapatti	77.9	Very Poor water quality
Thethupatti	320.9	Unfit for Drinking
Thirukooranam	322.4	

Note: Water Quality is calculated only for Physical and Chemical Parameters

Table No. 4.26: Water quality scale

Water quality	WQI Yadav et al 2016	WQI Ramakrishnaiah 2004	WQI Mohanty 2001
Excellent	0–25	<50	<50
Good	26–50	50–100	50–100
Poor	51–75	100–200	100–200
Very Poor	76-100	100–200	200–300
Unsuitable	Above 100	<300	<300

Note: Water Quality is calculated only for Physical and Chemical Parameters

The WQI of the samples collected from the study area are given in table 4.25. It can be seen that the study area has water quality index value ranging from 60.2 to 322.4 which reflects the Poor water quality to unfit for drinking status of the groundwater quality. The findings demonstrate the varying consistency of groundwater at different locations. All the groundwater samples under poor to unfit for drinking category; it may be due to the absorption of fertilisers, geological condition, channel water, solid waste, sewer drainage, septic tanks, and agricultural waste. The water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate.

4.6.5 Impact on Hydrogeology

In general the groundwater prospects are less in hard rock areas, especially in Hard rock terrains. The deeper aquifers in hard rock terrains have potential only when they are fed by fractures and thick weathered layer. In the present study, to know the subsurface Lithology and layer thickness of groundwater potential zone were carried out vertical electrical soundings (VES). The resistivity signal dimensions were collected by using DDR-3 model resistivity meter. AB/2 electrode spacing of 100m is used by Schlumberger configuration. The data were analyzed by curve matching techniques. From the apparent resistivity data, the interpreted resistivity curve obtained using the software it is observed that 3 layer curves shown in the fig 4.9. Data collection is another important factor for the success of resistivity method. The interpretation of resistivity data four layer master curve matching technique has been used. Interpreted Resistivity and layer thickness of various layers shown in table 4.27.

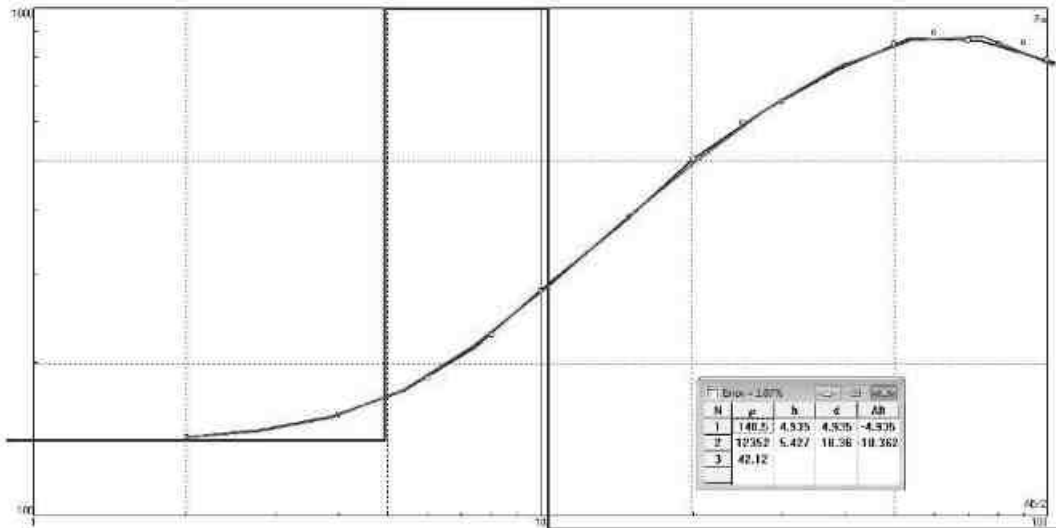


Fig No.

4.9: Interpreted resistivity curve matching technique

Table No. 4.27: Interpreted layer parameters from Geo-electric resistivity soundings

Resistivity (Ωm)	Depth in (m)	Formation
140.5	4.93	Dry loose sand formation/Red soil
12352	5.42	Massive rock
42.12		Fracture water bearing formation

From the results of Resistivity Survey, it is understood that the study area is composed of ordinary stone deposit, with little geological disturbances by folding. There is no any seepage in this lease area.

4.7 Soil Environment

4.7.1 Impact on Soil Environment

For the mining plan period of five years, the generation of top soil is estimated at 12672 m³. It will be dumped along mining lease boundary as earth bund and it will be utilized for green belt development within the lease area. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected.

4.7.2 Mitigation measures for Soil Conservation

- ❖ Low height retaining wall will be provided along the toe of dumps to prevent the soil along the slopes being carried away by the rain water.
- ❖ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises.

4.8 Waste Dump Management

The proposed rate of production of ordinary stone for five years is about 54378m³ at the rate of 95% recovery up to permissible depth. The 5% reject of 2862m³. The rejects materials are dumped along lease and backfilled at the end of mine life.

4.8.2 Mitigation measures

The mineral rejects and waste shall be dumped systematically with proper repose angle and stabilization as given below,

- ❖ The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention, trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation.
- ❖ Gradation of dump shall be done automatically as coarser materials go to the bottom and finer at the top and therefore drain of rain water flow freely to the bottom without endangering the stability of dump,
- ❖ More over the dump height shall be less than 6m with natural repose angle and hence dump will be more stable.
- ❖ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse.
- ❖ The runoff from the slopes of dump will be collected by garland drainage around the dump and it will be taken up to settling tank to settle down the suspended solids. After that the water will be used for greenbelt development and dust suppression purposes.

4.9 Municipal solid waste management

The human waste shall be treated by temporarily built septic tank and soak pit within the mine lease area. The municipal solid waste generated by workers will be properly segregated into biodegradable and non-biodegradable and disposed through garbage collector of particular location in Karur District.

4.10 Ecology and Biodiversity

4.10.1 Impact on Ecology and Biodiversity

The details and list of flora, fauna, reserved forest and cropping pattern within the 10km radius of study area is given in chapter 3. The impact on ecology and biodiversity due to the proposed mining activity has to be studied in detail to prepare the management plan to safeguard the flora, fauna, forest products and aquatic living organism etc.

A detailed anticipated impact of Ecology and Biodiversity due to mining activity is described in table 4.28 & 4.29.

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Table No. 4.28: Ecological Impact Assessments and Its Mitigations -Part 1

Sl. No	Issues	Assessment	Mitigations
1	Proximity to national park/ wildlife sanctuary / reserve forest / mangroves / coastline/estuary/sea	No forests are situated within 10km radius. The proposed project does not attract Forest Conservation Act, 1980. There is no wild life sanctuaries found around 10km radius. Quarry area is 154km (SE) away from the Bay of Bengal. Hence the area does not attract Wildlife Protection Act, 1972 and C.R.Z. Notification, 1991.	-
2	Activities of the project affects the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in mining lease site. The fauna sighted mostly migrated from buffer area. The fauna in the buffer zone may be affected by noise generated due to mining activity.	The noise due to the mining activity will be controlled developing green belt all along the lease boundary, regular maintenance of tippers, excavators, transporting the empty tipper within the speed the 20 km/hr.
3	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area and also in buffer zone.	Nil
4	Proposed project restricts access to waterholes for wildlife	No waterholes are in core zone. No Wild life sanctuary within 10km radius.	Nil
5	Proposed mining project impact surface water quality that also provide water to wildlife	'NO' scheduled or threatened wildlife animal sighted regularly in core area.	Nil
6	Proposed mining project increase siltation that would affect nearby Biodiversity area.	Yes, the runoff from the dump which carries the solid materials may get silt in the adjacent agricultural land and affect the cropping pattern. Also it may get silt in the adjacent river bed and reduce its water carrying capacity	Garland drainage will be excavated around the dump to arrest the runoff from dump. The drainage will be desilted after every precipitation.
7	Risk of fall/slip or cause death to wild animals due to project activities	'NO'. No Wild life sanctuary within 10km radius.	Nil

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8	The project release effluents into a water body that also supplies water to a wildlife	As the proposed project is mining activity there will be no possibilities of release of effluents. Also no Wild life sanctuary within 10km radius.	Nil
9	Mining project effect the forest based livelihood/ any specific forest production which local livelihood depended	Rengamalai R.F and Vadamalai R.F are located beyond 10km. Hence the proposed mining activity will not affect the nearest forest.	-
10	Project likely to affect migration routes	No migration route observed during monitoring period.	Nil
11	Project likely to affect flora of an area, which have medicinal value	No flora having medicinal value found within the lease area	The flora such as neem having medicinal value found in the study area of buffer zone. Those floras will not be affected by the proposed mining activity at it will be carried out only within the lease area.
12	Forestland is to be diverted, has carbon high sequestration	'NO'. There is no forest land within the lease area.	Nil
13	The project likely to affect wetlands, fish breeding grounds, marine ecology	'NO'. No wetland, fish breeding grounds, marine ecology present in core mining area.	Nil

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

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Table No. 4.29: Ecological Impact Assessments – Part 2

Ecological Criteria	Identified Impacts	Ecological significance of Impact	Magnitude	Duration /Timing/ Frequency	Reversibility	Mitigation	Cumulative Impact
Zone of Influence	Project site Habitat due to Site Clearance.	The proposed mining lease is located in Anjagoundanpatti Village. Since it is a fresh area, some shrubs will be cleared before the commencement of the project. The fauna which depends on the shrubs for habitat will be disturbed. No clearance of vegetation in the buffer zone	Low Impact	-	Irreversible in quarry area	During the clearance, it will find the alternate habitat in the buffer zone. During the operation of quarry, the proponent will develop the green belt along the lease boundary. This afforestation will provide the habitat for the migrated fauna.	No Cumulative Impact
Zone of Influence	Ecological Impact Surrounding habitat due to fugitive emission	The fugitive emission due to the mining activities such as drilling, blasting, loading and transportation on the haul road will be deposited on the flora and crop field in the buffer zone which affects growth and its productivity.	Temporary Impact	During the mining plan period	Reversible	Before loading the rough stone & gravel will be moisturized to minimize the emission. The sprinkling of water over the haul road will be done. Then completely wet drilling will be take place. The transportation vehicles	No Cumulative Impact

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						will be maintained and serviced Properly.	
Accessibility	Ecological Impact due to road construction	No Road construction is required to assess the project site. The existing village road connects the project site to the existing MDR road.	No Impact		-	-	No Impact
Zone of Influence	Ecological Impact On Surrounding/ Eco sensitive habitat due to waste water generated from the project activity.	Since the proposed project is a mining activity no waste water generation is expected. Human waste and municipal solid waste will be generated due to the workers.	No Impact	-	-	Human waste will be properly treated by septic tank and soak pit in the lease area and dispose periodically. The municipal solid waste generated by workers will be properly segregated into biodegradable and non-biodegradable and disposed through garbage collector of Coimbatore Corporation.	No Impact

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Zone of Influence	Ecological Impact on Surrounding / Eco sensitive habitat due to Noise generated from the project activity.	During drilling or blasting, transportation of ordinary stone and gravel, noise will be generated and it may slightly affect the movement of fauna around the lease area.	Temporary impact	Only during drilling, blasting operation and transportation period. (5 years)	No	Avenue trees will be planted along the lease area to minimize the noise level. Milli second detonators shall be used preferably 25–50ms per delay to control vibrations. Regular maintenance of vehicles and driving the empty tipper within 20km/hr speed also control the noise generations.	No Impact
Zone of Influence	Ecological Impact On Surrounding/ Eco sensitive habitat due to Transportation	There is no eco sensitive habitat found around the lease area. The fugitive emission from drilling, blasting, vehicle movement will form layer in leaves thus reducing the gaseous exchange process. This Ultimately affects the growth of plants. The animals like dog, cattle may get accident due to truck movement.	Temporary impact	During Operation Phase	No	The truck driver will be advised to drive the vehicle within 20km/hr inside the lease area and 40km/hr outside the lease area. Before loading the rough stone & gravel will be moisturized to minimize the emission. The sprinkling of water	No Impact

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						over the haul road will be done. Then completely wet drilling will be take place.	
Zone of Influence	Ecological Impact on Natural ecosystem, the soil micro flora and fauna and soil seed banks.	There are no forests and wild life sanctuary within 10km radius of the project site. The Godavanan river is located at the distance of 700m in east direction. During raining season the runoff from the lease may affect the habitants in the river and reduce river carrying capacity	Temporary Impact	Nil	--	The garland drainage will be around the quarry pit and dump to prevent the escape of runoff from the lease area to the river. The maintenance of vehicle will be strictly prohibited in the lease area to prevent the spillages of oil, grease.	No Impact
Zone of Influence	Fish habitats and the Food web/food chain in the water body and Reservoir	The Godavanan river is located at the distance of 700m from the lease area in east direction.	No Impact	Nil	--	The garland drainage will be around the quarry pit and dump. The maintenance of vehicle will be strictly prohibited in the lease area	No Impact

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Table No. 4.30: Afforestation Plan of proposed quarry

Year	Place	Type of Trees	Number	Spacing	Rate of survival
I	Lease Boundary	Neem, Panai,casuarinas and other regional trees	30	5m X 5m	80%
II	Lease Boundary	Neem, Panai,casuarinas and other regional trees	30	5m X 5m	80%
III	Lease Boundary	Neem, Panai,casuarinas and other regional trees	30	5m X 5m	80%
IV	Lease Boundary	Neem, Panai,casuarinas and other regional trees	30	5m X 5m	80%
V	Lease Boundary	Neem, Panai,casuarinas and other regional trees	30	5m X 5m	80%

4.11 Socio Economic

4.11.1 Anticipated Impact

This project will generate direct and indirect employment for more than 100 persons. Preference will be given to the local population for employment in all categories including semi-skilled and unskilled. The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations.

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

- Impact on human settlement: Overall, due to employment generation and economic progress, there will be positive changes in the socio-economic condition of the people residing in the vicinity of the project site. The local population will have preference to get an employment. No resettlement has occurred due to mining activity. Built up land has been increased marginally.
- Impact on Population Growth: Population rate grows annually and demand of primary needs and employment will increase due to population growth. It will provide some direct and indirect employment to the people in and around the villages.
- Impact on Vegetation: No decline in agricultural land. It has been increased over a period of time by utilizing the water stored in the working pits. No deforestation will be happened.

Therefore due to mining, per capita income of local people will be improved. The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other welfare amenities such as Sanitary facilities, Solar Lighting to Govt school, Health Care to the villages in buffer zone, Maintenance of village road or Providing funds to local body or Prime minister's fund on Socio economic Development and relief measures. The job/business opportunities will improve the economic condition of the persons. They are in a position to utilize this money for purchase of tractors, trucks, etc. which may be put into use for business purposes. Many **positive impacts** can be resulted from a long-term mine unit. In this context, provision of job opportunities, business, transport and communication, laborer etc are the major ones. Thus, this unit is highly favorable to poor and landless people.

4.11.2 Mitigation Measures

- Good maintenance practices will be adopted for plant machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Drilling, blasting etc at specified location will be followed with proper schedule.
- Appropriate air pollution control measure will be taken so as 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 has been provided which meet 'BIS' (Bureau of Indian Standards).

Thus, no significant impact on health and safety will be occurred due to this project.

4.12 Land Environment

4.12.1 Anticipated Impact on Land Use / Land Cover

Ordinary Stone and Gravel Quarry project will result in disturbance of the land use pattern of the mine lease area. The impact on the topography in the form of changed landscape is unavoidable during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs. So reclamation of mined out land will be given due importance as a step for sound land resource management. There is no release of toxic elements into the ground. No adverse impact is anticipated on land use of buffer zone associated due to the mining activity, as all the activities will be confined within the project site. The mining operations will impact the land usage and land aesthetics of quarry lease area.

The land use analyses show that the Tree plantation was done around the mining lease area of Thiru.R.K.Panneerselvam. The rate of plantation increases over a period of time due to quarry activity. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing Tree plantation around the mining lease area. It will improve the livelihood of village people. The evaporation rate of the water in the pit is given detail in the report.

4.12.2 Mitigation measures

- ❖ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil.
- ❖ Provision of Garland drainage around the dumps
- ❖ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land
- ❖ Appropriate measures will be taken for Green belt development.
- ❖ The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.

4.13 Occupational Health Risks

4.13.1 Anticipated Impact

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

4.13.2 Anticipated occupational and safety hazards

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

4.13.3 Anticipated health impacts on people in nearby villages

The mining activity not only causes health hazards to quarry workers but also affect the health of nearby village people. The fugitive emission during heavy wind period travel along the predominant wind direction and people in village located along predominant wind direction gets affected. The chances of changing water quality in villages due to mining activities lead to causes various diseases in the nearby village people.

4.13.4 Mitigation measures

For the safety of workers at site, the following mitigation measures are proposed

- ❖ Excavators, dumpers, drills other automated equipments will be enclosed
- ❖ Use of personal breathing protection will be made compulsory
- ❖ Spraying with water on all working faces & haul roads, by water-sprinkler
- ❖ Regular health monitoring of workers once in 6months for silicosis
- ❖ Random health check up village people around the lease area for identify diseases if any due to mining activity
- ❖ No employee will be exposed to a noise level greater than 75 dB(A) for a duration of more than 8 hours per day without hearing protection
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 75 dB(A).
- ❖ During mining operations, all the statutory provisions of the Indian Electricity Rules 1956, and Indian Standards for installation and maintenance of electrical equipment etc. will be observed.
- ❖ Care will be taken to evacuate the mining area completely at the time of blasting operations.
- ❖ A blasting SIREN will be used at the time of blasting for audio signal
- ❖ Before blasting and after blasting, red and green flags will be displayed as visual signals.
- ❖ Warning notice boards indicating the time of blasting and NOT TO TRESSPASS are displayed prominently.
- ❖ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955
- ❖ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A).
- ❖ Insurance will be taken in the name of the labourers working in the mines.

4.14 Agricultural Environment

4.14.1 General

The general impacts on agricultural lands will be dust pollution, as volume of dust is discharged into the air during the process of quarrying. Dust gets deposited on the leaves of plants, flowers and soil. This affects the photosynthetic and fruiting ability of the crops. Silt from the excavation, screening process and reject during monsoon season gets washed and chokes the agricultural fields, rendering them useless for the growth of crops. Due to blasting, fly rocks may fall on agricultural fields making it difficult for the farmer to cultivate.

There is a need for dust control on haul road movements. Vehicles emit fugitive gases during transportation of materials. Those gases enter the plants through the stomata pores; it destructs chlorophyll and affects photosynthesis leading to stunted growth or death of crops. The pumping of water from the ground for the mining activity will reduce the availability of water for the agricultural purposes.

4.14.2 Anticipated Impacts of Proposed project on Agriculture, Horticulture and livestock

The land use analyst sighted that the agricultural land are surrounded around the project site. Field crops such as maize, groundnuts are cultivated and the plantation crops such as coconut trees are planted within 1km radius of the project site. The field crop paddy are cultivated along the Amaravathi River which is located more 8k away from project site. Other than coconut plantation, maize, groundnuts mostly shrubs are identified within 1km.

As the villages are located around the project site, the people in the villages are farming animals like goat, cow, and sheep for their livelihood. The above mentioned impact may be observed on the nearest agricultural farm during the quarrying activity. So the following mitigation measures will be suggested to protect the nearest farm. The requirement of water for the proposed project will be taken from bottom of the existing pit and water vendors. The ground water for the proposed project site will not be extracted at the same place and the proposed mining activity is 4-10m above ground water table. So the proposed mining activity does affect the ground water resource.

4.14.3 Mitigation Measures

- Spraying of water on the haul roads will be done to suppress the dust in the source itself. Interval of sprinkling depends on the environmental factors such as temperature, rainfall and humidity of the proposed site.
- The trees having tolerance to different air pollutants will be planted along the boundary to prevent the escape of dust to the surroundings.

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- Garland drainage will be provided around the lease area to prevent the leach of silt into the farm.
- Regular check and proper maintenance of Vehicles will be carried out to minimize the emission of pollutants.
- Adequate Blast shield or blast mats will be provided wherever necessary for fly rock protection during blasting, thus to prevent the accident on the nearest farms.
- During monsoon season the dust deposited on the surface of plant body is washed out naturally.
- Making two bore holes which have direct conduit with the water table in the lease area will help ground water recharge during monsoon seasons. It helps the agricultural activity in the buffer area of project site.

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Fig No. 4.10: Agricultural land within 1km radius of project site

4.15 Post COVID Health Management Plan

- The vaccinated persons only will be given employment.
- The labors and other skilled, semi skilled employees will be given a new mask daily.
- The body temperature of the labors will be checked using the temperature monitoring gun while getting into the quarry and getting out from the quarry.
- The labors will be advised to maintain the social distance of at least 10m and also advised to sanitize the hand.
- The general awareness program will be conducted about the handling of COVID-19 in two weeks once.
- The board referring the “Wear mask” and “Maintain social distance” will be placed in two sides of entrance of the quarry in local language.



Fig No. 4.11: Maintain social distance of 2m in work place



Fig No. 4.12: Sanitizing Hand Frequently



Fig No. 4.13: Wear Mask at the work place

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

Consideration of alternatives to a project proposal is a requirement of the EIA process. During the scoping process, alternatives to a proposal 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 environment friendly and cost effective options. Analysis of alternatives should be similar to the content of the approved mining plan.

The selection of the site is based on the following considerations which are feasible in terms of location, deposit characteristics, availability of reserves, percentage recovery, road facilities, labor availability, requirement of health and safety and environmental concerns, production scheduling, scope of mechanization/automation, land reclamation, and operating and capital cost estimates.

Karur District is Geologically, the entire district can be classified into hard rock and sedimentary formations. Hard rock Formation: - More than 90 percent of the district is underlain by hard rock of Archaean age. The gneissic type of Formation is the major formation among the various types of hard rocks. Charnockite occurs in this district as pockets in Karur and Aravakurichi taluks. Quartzites which are resistant to weathering are also seen as patches in Charnockite and gneissic varieties and the above rock Sedimentary Formation: - Recent alluvial deposits such as sand, silt, clay, gravel etc. which are transported sediments by river are found on either side of Cauvery river in Karur, Krishnarayapuram and Kulithalai blocks. These formations are overlying the hard rock.

The entire area of the district is a pediplain. The Rangamalai hills and Kadavur hills occurring in the southern side of the district constitutes the remnants of the much denuded Eastern Ghats and rise to heights of over 1031m above mean sea level. The district general slopes gently towards north east and forms a vast stretch of plain country till the eastern boarder of the district. There are numerous small residual hills represented by Ayyarmalai, Thanthonimalai and Velayuthampalayam hills. The general elevation of the area is ranging between 100 m and 200m above mean sealevel. The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Structural hill, 2) Pediments, 3) Shallow Pediments, 4) Buried Pediments and 5) Alluvial plain.

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The geological formation of the district are given as under,

Quaternary	Recent	Laterite and soil Pegmatite veins/ quartz veins
Proterozoic	Acid intrusives	Pink augen gneiss and migmatite
	Pink	Pink medium grained granite/ pegmatoidal granite
	Pink Migmatite	Hornblende biotite gneiss/ Garnet biotite gneiss Garnetiferous quartzofeldspathic granulite
Archaean	Charnockite Group and Khondalite Group	Pyroxene Granulite Charnockite (acid to intermediate) Calc granulite/ Crystalline limestone Garnetiferous sillimanite gneiss/ Quartzite

The quarry site is dependent on the geology and Charnockite Formation of the area. This project is mineral and site specific, hence no alternative site or technology is considered for this project.

CHAPTER – 6: ENVIRONMENTAL MONITORING PROGRAMME

Environmental Monitoring program is mandatory to check the impact of the mining activity in the core and buffer zone. Hence regular monitoring of various environmental parameters helps in maintaining sound operating practices of the mining in line with mining and environmental regulations. Environmental Monitoring program will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

6.1 Measurement methodologies

The following instruments will be used for environment monitoring for various environmental parameters.

Table No. 6.1: Instruments used for Monitoring

S. No	Instruments	Purpose of Monitoring
1	Respirable Dust Sampler	Air Pollution
2	Fine Particulate Sampler	Air Pollution
3	Sound level meter	Noise level
4	Digital Seismograph	Vibration monitoring
5	Water level indicator	Water level
6	Geophysical Instruments (DDR3)	Water table
7	Camera, Binocular & Lens	Flora, Fauna
8	GPS & DGPS	For fixing the coordinates of sampling location
9.	Electronic Total station	Reduced level & topography monitoring

In addition to the above, Primary data on land use, socio economics will be collected by visiting the field and secondary data will be collected from Government Department and other sources.

6.2 Monitoring Schedule and Frequency

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB). Monitoring program will be followed till the mining operation ceases as per the schedule below.

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Table No. 6.2: Monitoring Schedule

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – PM _{2.5} , PM ₁₀ , SO ₂ and NO _x	5 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, one station on the downwind direction and one in cross wind direction)	8 hours	Once in six months	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in the vicinity.	–	Once in six months	Physio-chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in six months	Water level monitoring devices may be used.
5	Noise	Mine Boundary, high noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Once in six months	Physical and Chemical characteristics

6.3 Data Analysis

Data analysis will be done by MoEF&CC/NABL approved laboratory as per CPCB guidelines & compliance reports shall be submitted to concerned authority (specified in Environment Clearance Letter issued by SEIAA, Tamil Nadu and Consent issued by TNPCB, Karur on regular basis.

6.4 Emergency procedures

The mines manager monitors the emergencies that may occur in opencast mining operations and prepares an emergency plan to deal with emergency situations during the operation of the mine. Preparation of a preventive maintenance schedule program based on recommendations given and maintenance schedules for all equipments and instruments as per recommendations of the manufacturers user manuals.

6.5 Detailed Budget

Detailed budgetary provisions for monitoring program are detailed in the following table 6.3.

Table No. 6.3: Environment monitoring budget for Thiru. R.K.Panneerselvam, an extent of 0.88.0Ha, Anjagoundenpatti Village, Aravakuruchi Taluk, Karur District

S. No	Environmental Monitoring Program	No. of samples per year	Cost per sample	Cost per year
1	Ambient Air Quality monitoring	5	Rs. 4,000	Rs. 20,000
2	Water quality	2	Rs. 2,500	Rs. 5,000
3	Soil quality	2	Rs. 2,500	Rs. 5,000
4	Noise monitoring	10	Rs. 1,000	Rs. 10,000
5	Hydro geology	5	Rs. 1,000	Rs. 5,000
	Total			Rs. 45,000

CHAPTER – 7: ADDITIONAL STUDIES

7.1. Public Consultation

The Draft EIA report has been prepared for conducting public hearing only.

7.2 Risk assessment and Disaster Management Plan

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The mining operation is carried out under the management control and direction of a qualified mines manager. The DGMS have been issuing a number of standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any.

To overcome such risks, help/aid would be sought from emergency services providers like Police station, fire station, Hospital, Ambulance services in the vicinity of the mine site. Their telephone numbers and communication facilities are to be provided and displayed on the board at the mine office as well as mine site. Responsibility of coordinating rescue activities is entrusted to quarry-in-charge at the quarry site in addition to quarry-in-charge is also looking after statutory obligatory under Mines Act,1952. Name and Address of Contact Person coordinating in case of Eventuality is stated below:

Name and Address of the Proponent	Thiru. R.K.PANNEERSELVAM, S/o. Thiru. R.P.Kaliappan, No.163, Rengapalayam, Punnam chatram, Punnam village, Aravakuruchi Taluk, Karur District-639 136.
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However, the following natural/industrial hazards may occur during normal operations.

- i. Operational Phase,
- ii. Inundation of mine pit due to flood/excessive rains,
- iii. Accident due to transport & other equipments,
- iv. Safety and Environmental aspects.

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Table No. 7.1: Risk Assessment and Disaster Management Plan

S.No	Hazards	Mitigation measures
1	Surface Fire	➤ Fire Extinguishers and Sand Buckets
2	Explosives/Blasting	➤ The applicant is directly purchasing explosives from an authorized dealer and they are blasting with help of certified blaster. Agreement is made with License holder in Form-22 for store, use and sale of explosives. ➤ Only mild blasting will be carried out to affect a perfect pre-determined crack to release the block from the parent rock.
3	Flooding of Rain water	➤ Escape Routes will be provided to prevent inundation of storm water ➤ Garland drains will be provided at the toe of dump
4	Radioactive hazard	➤ Not Anticipated
5	Failure of Mine Benches and Pit Slope	➤ Ultimate or over all pit slope shall be 45° and each bench height shall be 6m height equal to the boom height of excavator and vertical. ➤ During working normally 3-6m will be maintained as per the plan.
6	Failure of Waste Dumps	➤ Stabilization of dump with top soil and tree plantation shall make the dump more stable. ➤ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse.
7	Dust	➤ Periodical wetting of land by spraying MgCl ₂ solutions. ➤ Regular water sprinkling on haulage roads ➤ Provision of Dust mask to workers ➤ Green Belt shall be carried out within the mine premises by planting trees, to improve the aesthetics of the area and also to reduce the pollution outside the activity area
8	Noise	➤ Rotation of workers to minimize exposure time of noise ➤ The equipments and machineries shall be maintained properly ➤ Provision of earmuffs to workers
9	Transportation	➤ Convex 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 ➤ Regular checking of brakes to avoid failures ➤ Periodical maintenance of vehicles
10	General measures	➤ No entry for any unauthorized persons ➤ S1 type fencing as per DGMS circulars ➤ Provision of Personal Protective Equipments ➤ In case of any closure of mine the compensation under Industrial Dispute Act will be paid as per law

7.2.1 Care and Maintenance during temporary discontinuance

Watch and ward are provided permanently in the Mine premises to monitor the Mine openings to prevent inadvertent entry. Top soil bund is made partly and Stone fencing is proposed all around lease boundary to safe guard the mine and the adjacent livings. Temporary discontinuance will be minimal as there is good demand for this material in tiles industries.

7.2.2 Economic repercussions of closure of mine and manpower retrenchments

7.2.2.1 Number of local residents employed in the mine, status of continuation of family occupation and scope of joining occupation back

Total of 20 Persons get employment from the existing quarry Thiru. R.K.Panneerselvam (0.88.0Ha). Most of labors are Agriculturist. In case of closure of mine, they may continue their own work or join in the neighbor mines as there are few ordinary stone quarries around this area within 500m. Since the quarry is deposited with high resources immediate retrenchment may not arise.

7.2.2.2 Compensation given or to be given to the employees connecting with sustenance of himself and their family members

In case of any closure of mine the compensation under Industrial Dispute Act will be paid as per law. All workers shall get retrenchment benefits as per labour laws under enforcement.

7.2.2.3 Satellite occupations connected to the mining industry – number of persons engaged therein – continuance of such business after mine closes

The quarrying activity shall lead to development of several ancillary units and business, which are explained below:

- i. Other than mine employment, workshops, spare parts, hotels, tea shop and related several self-employment opportunities.
- ii. Several shops and service providers shall grow in the public adjacent to mines.
- iii. Schools and city development shall also be possible owing to the fact of economic growth in the village.

7.2.2.4 Continued engagement of employees in the rehabilitate status of mining lease area and any other remnant activities.

In the event of closure of mine, the mine worker shall get alternate work or business like agriculture etc. No serious repercussions envisaged in the event of cessation of mining activity, as they will be provided employment in other mines belong to the company.

7.2.2.5 Envisaged repercussions on the expectation of the society around due to closure of mine

Persons on roll at the time of closure will get benefit as per State Govt. guidelines as applicable at the time of retrenchment

7.2.3 Time Scheduling for abandonment

The following works are scheduled before abandoning the mine,

- i. Parapet wall of 2m height will be constructed around the pit,
- ii. Planting and monitoring of Afforestation program.

There is no proposal for closure of mine for the next 5 years. The parapet and plantations will be done during operation of mine. In case of any abandonment the following time is required,

Activities	Days for schedule
Time schedule for fencing	6 months
Time schedule for reclamation of mined out area	1 year

7.3 Social Impact Assessment, R&R Action Plans

The ordinary stone and gravel quarry project of Thiru. R.K.Panneerselvam does not involve any kind of displacement of the population since the mining will be concentrated only in the mining area only. Not much disturbance in respect of fauna, flora and human settlement of the villages. The impact of mining activity on the population will be insignificant. Hence, Rehabilitation of settlements is not anticipated under this project as it will not be required. Thus R&R Action Plans not proposed.

The project proponent will help in uplifting the poor section of the society as part of CSR activity by undertaking social welfare programs. The Project proponent contributes 2.5% of profit towards CSR activities. This project will have a positive impact on the socio economic as it will provide considerable employment to the families in the nearby villages. Improved health care facilities are expected to come-up in the area for catering to the health needs of the miners. The impact of mining on the civic amenities will be substantial after the commencement of mining activities. The local people who are currently depending on forest and agriculture will have new avenue from the mine.

7.4 Detail study of Rainwater harvesting

7.4.1 Rain water harvesting after the completion of proposed project of Thiru. R.K.Panneerselvam Ordinary Stone and Gravel Quarry

I.	Total Pit Area	= 4136m ²
II.	Annual rainfall of the area	= 0.694 m
III.	Total rainwater available to store in pit area	= 2870 m ³
IV.	Total volume of quarried pit	= 136488 m ³

Since the rainwater directly getting stored in the quarried pit, the runoff will not take place. The Quarried Pit will be act as **Artificial Ground Water Recharge Pond**. After the rainwater getting stored in quarried pit, the water slowly infiltrates into the ground and reaches the ground water table. This will greatly increase the ground water table around the lease area.

By electrical resistivity survey it is found that there is massive rock formation from 33m bgl. So the infiltration rate of rain water is very less. If the rain water stored in pit for long period the evaporation loss will take place.

Meyer's Formula (1915) is used to find the loss of water in pit due to natural evaporation process.

Meyer's Formula (1915)

$$E_L = K_M (e_w - e_a) (1 + u_9/16)$$

Where

- E_L = Evaporation Rate (mm/day)
- e_w = the saturation vapor pressure at the water temperature in mm of mercury
- e_a = the actual vapor pressure in the air in mm of mercury
- u_9 = monthly mean wind velocity in km/h at about 9 m above ground
- K_M = coefficient accounting for various other factors with a value of 0.36 for large deep and 0.50 for small shallow waters.

Here,

e_w = 31.83 mm of Hg (considered average temperature in Karur district during March month of 2022)

e_a = 0.59 x 31.83 = 18.7 mm of Hg.

u_1 = 15.12 km/hr

u_9 = 20.69 km/hr

Substitute the above parameters in Meyer's equation,

$$E_L = 0.36(26.75 - 17.4) (1 + 10.84/16)$$

$E_L = 5.6 \text{ mm/day}$

Evaporated Volume per day = $4136 \times 0.0056 = 23.16\text{m}^3/\text{day}$ or 23 KLD

The total quantity of rain water to be stored in quarried pit is 2870m^3 . The evaporation rate of water per day is 23 m^3 based on the average temperature during May month in Karur district. It takes nearly 4 to 6 months for the complete evaporation of water. Before that the stored water will be used to irrigate the crop around the quarry area.

Other benefits are that the water will be used for the domestic purposes after the water properly treated by Sedimentation-Filtration processes. A higher quantity of about 20 liters **per capita per** day should be assured to take care of basic hygiene needs and basic food hygiene.

Thereby this existing quarry benefits the daily needs of water to so many families around the quarry area for every year. This is very important **positive impact** of the proposed ordinary stone quarry of **Thiru.R.K.Panneerselvam**.

7.5 Plastic/Micro plastic waste Management Plan

This is ordinary stone and gravel quarry. So the project does not need any plastic related material for quarry operations. The plastic materials will be used by the employee and labours in the form of carry bags, water bottles, etc. To avoid such situations the employees and labours will be strictly instructed to avoid the plastic materials in the lease area. Moreover they will be advised to use cloth bags, jute bags and bring the food by Steel Tiffin box.

Water will be provided by the project proponent for both drinking and domestic purposes. So the dustbins will not be needed in the quarry. To manage the unavoidable situations, Dustbins will be placed in the quarry for both decompose and non-decompose waste separately of Municipal solid waste. The collected waste will be disposed periodically as instructed by TNPCB. The board with the instruction “**Avoid plastics**” is placed in the two sides of quarry and awareness program will be conducted to the labours monthly once.

Micro plastics are small pieces of plastics less than 5mm. As usage of plastics is totally devoid in the quarry premise, the chance of Micro plastic pollution is negligible inside the lease area.



CHAPTER – 8: PROJECT BENEFITS

Mining activity will help in improving the socio-economic benefits in areas like employment, communication and infrastructure development etc.

8.1 Physical Infrastructure

The ordinary stone and gravel quarry project located in Anjagoundenpatti Village of Karur District has well established roads, communications and other facilities. The impact on the civic amenities will be substantial after increasing the mining capacity.

The following physical infrastructure facilities will further improve due to mine.

- ❖ Afforestation
- ❖ Road Transport facilities
- ❖ Communications
- ❖ Housing facilities
- ❖ Water supply and sanitation
- ❖ Medical, Educational and social benefits will be made available to the nearby Civilian population in addition to the workmen employed in the mine.

Under plantation program, it is suggested to develop green belt further all along the boundary of mining lease area. The species to be grown in the areas will be dust tolerant and fast growing species so that a permanent green belt is created. Apart from the green belts and aesthetic plantation for eliminating fugitive emission and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community.

8.2. Social Infrastructure

The mining activity will create rural employment. It has been observed that local people mainly depend upon agricultural, where the income is irregular and low. The mining activity in the region will have positive impact on the social economic condition of the area by way of providing employment to the local in-habitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture by improving the life style of the people. 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. Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village, District Mineral Fund @ 30% of the Royalty shall be given to the Department of Geology and Mining, Karur District. The State

Government will also benefit directly from the mine, through increased revenue from royalties, excise duty and etc.,

8.3 Employment Potential

The quarry proponent employed about 20 persons for carrying out the mining operations of which 2 are skilled, 7 semi-skilled, 9 unskilled workers and 2 Management and supervisory staff personnel. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of ordinary stone and gravel to destinations, supply of goods and services to the mine and other community services, etc., the local population will have preference to get an employment. The economic status of the local people will be enhanced due to mining project.

8.4 Other tangible benefits

8.4.1 Corporate Social Responsibility

Corporate Social Responsibility (CSR) refers to voluntary actions undertaken by the project proponent either to improve the living conditions (economic, social, environmental) of local communities or to reduce the negative impacts of mining activity. By definition, voluntary actions are those that go beyond legal obligations, contracts, and license agreements.

CSR programs usually invest in infrastructure (potable water, electricity, schools, roads, hospitals, hospital equipment, drainage repairs, etc.), building social capital (providing high-school and university education, providing information on HIV prevention, workshops on gender issues, information on family planning, improving hygiene, etc.), and building human capital (training local people to be employed by the mining enterprise or to provide outsourced services, promote and provide skills on micro business, aquaculture, crop cultivation, animal rearing, textile production, etc.)

8.4.2 CSR activities

The following activities which may be included by companies in their Corporate Social Responsibility Policies are notified as CSR activities under Schedule VII ((See section 135) of the Companies Act 2013:

- i. Eradicating extreme hunger and poverty;
- ii. Promotion of education;
- iii. Promoting gender equality and empowering women;
- iv. Reducing child mortality and improving maternal health;

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- v. Combating human immunodeficiency virus, acquired immune deficiency syndrome, malaria and other diseases;
- vi. Ensuring environmental sustainability;
- vii. Employment enhancing vocational skills;
- viii. Social business projects;
- ix. Contribution to the Prime Minister's National Relief Fund or any other fund set up by the Central Government or the State Governments for socio-economic development and relief and funds for the welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women; and
- x. Such other matters as may be prescribed.

The Board of every company referred to in sub-section (1), shall ensure that the company spends, in every financial year, at least 2% of the average net profits of the company made during the three immediately preceding financial years, in pursuance of its Corporate Social Responsibility Policy. Provided that the company shall give preference to local area and areas around it, where it operates for spending the amount earmarked for Corporate Social Responsibility activities. Provided further that if the company fails to spend such amount, the Board shall report under clause (o) of sub-section (3) of section 134, specify the reasons for not spending the amount.

Explanation: For the purposes of this section “average net profit” shall be calculated in accordance with the provisions of section 198.

8.4.2.1 CSR Cost Estimation for proposed project of R.K. Panneerselvam (an Extent of 0.88.0 Ha), Ordinary stone and gravel quarry.

CSR activities will be taken up in the nearby villages mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.(As per the Companies Act, 2013 and CSR Rules, 2014)

Under this programme, the project proponents will take-up following activities for social and economic development of villages through local panchayat.

- ✚ Employment to eligible persons during operational phase of the mine
- ✚ Conducting Medical Camps
- ✚ Infrastructure Development like repair of roads, renovation of ponds, rainwater harvesting schemes, etc...

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- ✚ Financial grant to the existing educational institutions for development of physical infrastructures
- ✚ Training for Self Employment
- ✚ Plantation in villages and all along roads.
- ✚ Providing solar lamps to nearby schools and villages by going eco-friendly.

8.4.3 Corporate Environment Responsibility (CER) for proposed project of R.K.Panneerselvam (an Extent of 0.88.0 Ha), Ordinary Stone and Gravel Quarry.

CER Activity	Project Cost (Rs. In Lakhs)	CER Cost (Rs in Lakhs)
Developing Sanitary facilities and Library Facilities, RO Water supply system, tree plantation and environmental awareness sign Boards to Government Boys High School, Anjagoundanpatti Village.	11.0	5
Total Cost Allocation	11.0	5

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

9.0 PROJECT COST

After making exhaustive study, it is considered that the mining project may be implemented.

Project cost for the proposed ordinary stone and gravel quarry over an area of 0.88.0Ha falling in Village Anjagoundanpatti, District Karur is Rs. 11,00,000/- and EMP Cost is Rs. 4,00,000/-

This project provides direct employment to 20 people and indirect employment to nearly 20 people. In a family 4 persons (average), totally 160 persons will get benefit because of the project.

The quarrying activity will definitely benefit the people (directly as well as indirectly) as follows

- ✚ It is mainly used in fencing stone and building Stone which are mainly used in fencing and building basement purpose. So Surrounding dealer and building contractor get Ordinary stone easily with less transportation cost.
- ✚ The Management will ensure good production and in turn there will be good revenue to the Government of Tamil Nadu and Government of India through taxes. The industry is an asset to the nation.
- ✚ At the end of the project the pit will act as rain water harvesting tank which is useful for agricultural purpose. Thereby it will increase the survival of people around the quarry.

CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN

The **Environment Management Plan (EMP)** is required to ensure sustainable development in the study area. Hence it needs to be a comprehensive plan for which the industry, Government, Regulating agencies likes Pollution Control Board working in the region and more importantly the population of the area need to extend their co-operation and contribution.

It has been evaluated that the project area will not be affected significantly due to mining activity. Mitigation measures at the source level and an overall Management Plan at the site level are elicited so as to improve the surrounding environment.

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Table No. 10.1: Environmental Management Plan

S.No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	<ul style="list-style-type: none"> ○ Dust extractor or wet drilling to be followed to control dust at source of emission ○ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	<ul style="list-style-type: none"> ○ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	<ul style="list-style-type: none"> ○ Water sprinkling be done before loading by making it moist
		Transportation	<ul style="list-style-type: none"> ○ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ○ Overloading will be prevented ○ Trucks/Dumpers covered by tarpaulin covers
		DG Sets	<ul style="list-style-type: none"> ○ DG sets will be used only during power failure ○ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	<ul style="list-style-type: none"> ○ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ○ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS. ○ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act ○ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	<ul style="list-style-type: none"> ○ Wastewater discharge from mine if any will be treated in settling tanks before using for dust suppression and tree plantation purposes.

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		Ground water	<ul style="list-style-type: none"> ○ The mining activity will not intersect the ground water table ○ De silting will be carried out before and immediately after the monsoon season
		Stormwater	<ul style="list-style-type: none"> ○ Pit will be used for Storage of rainwater ○ Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. ○ The proponent will collect and judicially utilize the rainwater as part of rain water harvesting
		General measures	<ul style="list-style-type: none"> ○ Regular monitoring and analyzing the quality of water
		3	Noise Environment
		Blasting	<ul style="list-style-type: none"> ○ Carrying out blasting only during day time and not on cloudy days ○ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes. ○ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
		Transportation	<ul style="list-style-type: none"> ○ Proper and regular maintenance of vehicles, machinery and other equipments. ○ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. ○ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles. ○ Adequate silencers will be provided in all the diesel engines of vehicles. ○ Minimum use of horns and speed limit of 10 km/hr in the village area. ○ It will be ensured that all transportation vehicles carry a valid PUC

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			<p align="center">Certificates</p> <ul style="list-style-type: none"> ○ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas ○ Provision of Quiet areas, where employees can get relief from workplace noise. ○ The development of green belts around the periphery of the mine to attenuate noise. ○ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting	<ul style="list-style-type: none"> ○ No deep holes blasting envisaged. ○ Small dia shot holes are used for breaking boulders. ○ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. ○ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave’s movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone ○ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none"> ○ Humus top soil shall be preserved for reuse in afforestation and agriculture ○ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises ○ Garland drains will be provided around the mine and dumps to arrest any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of	<ul style="list-style-type: none"> ○ The rejects\ waste dump shall be properly terraced in to 1.5m benches

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		Dumps	<p>with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation.</p> <ul style="list-style-type: none"> ○ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse ○ Dump should be terraced for every 5m height and stabilized
7	Plantation	Mine lease boundary and waste dump	<ul style="list-style-type: none"> ○ Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise ○ Stabilization of Dump with plantation ○ It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. ○ The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		<ul style="list-style-type: none"> ○ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. ○ Provision of Garland drainage around the dumps ○ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land ○ Appropriate measures will be taken for Green belt development. ○ The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.
9	Socio Economic		<ul style="list-style-type: none"> ○ Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems. ○ Green belt will be developed in and around the project site as per

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		<p>Central Pollution Control Board (CPCB) guidelines.</p> <ul style="list-style-type: none"> ○ Drilling, blasting etc at specified location will be followed with proper schedule. ○ Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. ○ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication. ○ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). ○ As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socio economic development
10	Occupational Health	<ul style="list-style-type: none"> ○ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 ○ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). ○ Insurance will be taken in the name of the labourers working in the mines ○ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...

10.1 Description of the administrative aspects of R.K.Panneerselvam (0.88.0 Ha), Ordinary stone and gravel quarry ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of EIA

Regular monitoring network to maintain environmental quality will be implemented.

Table No. 10.2: EMP Budget for Plan period

S. No	Description	Budget (Rs.)
1.	Personal protective equipment	75,000
2.	Environmental Monitoring	2,00,000
3.	Occupation Health	75,000
4.	Green Belt & Dust suppression	50,000
	Total (Rs.)	4,00,000

Table No. 10.3: Budget Allocation for Mine Closure Plan as per ToR

S. No	Description	Budget (Rs.)
1.	Parapet wall around dump (1m = Rs 500)	1,00,000
2.	Fencing around mines	2,00,000
3.	Making Pit for pond after the activity of mines	50,000
4.	Green belt development	1,00,000
	Total (Rs.)	4,50,000

Apart from the afforestation plan given in Mining plan, the above table depicts the budget allocated for additional green belt development as specified by ToR.

CHAPTER – 11: SUMMARY AND CONCLUSIONS

11.0 Introduction

The Applicant, Thiru. R. K. Panneerselvam have applied for grant of permission for quarrying Ordinary Stone and gravel quarry over an extent of 0.88.0 hectares in S.F.N: 3/2 located in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for a period of Ten years and 5 years (From the date of execution).

The Assistant Director, Department of Geology and Mining, Karur has directed the applicant, Thiru. R. K. Panneerselvam, S/o Thiru. R. P. Kaliappan, to get mining plan is approved vide letter No. Rc. No. 60/Mines/2021, dated 10.10.2022 for obtain Environmental clearance from the State Environment Impact Assessment Authority (SEIAA) as per the EIA Notification, 2006 and its amendments for grant of quarrying lease to Ordinary stone and gravel quarry in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for the period of Ten years and 5 years (From the date of execution).

The mining plan for Ordinary stone and gravel quarry of four applicants has been prepared as per the Assistant Director's Precise area communication letter under Rule 41& 42 of Tamil Nadu Minor Minerals Concession Rules, 1959 for quarrying Ordinary Stone and gravel and it has been approved by Assistant Director, Department of Geology and Mining, Karur.

As per the cluster letter issued by Assistant Director, Department of Geology and Mining, Karur vide Rc.No.60/Mines/2021, dated 31.10.2022 for Thiru. R. K. Panneerselvam (0.88.0 Ha) the lease area of above said 6 applicants comes in cluster of 500m radius. The total area of cluster is 10.74.25 Ha. The extents of lease area of all individual as per cluster letter are given below.

Proposed Quarries

1. Thiru. R. K. Panneerselvam – 0.88.0 Ha
2. Thiru. P.Prabhakaran – 0.70.93 Ha
3. Thiru. M.K.Kungumaraj – 3.00.0 Ha

Existing Quarries

1. Thiru. R. K. Panneerselvam – 1.59.32 Ha
2. Thiru. D. Sivajeeganesan – 3.41.0Ha

Abandoned Quarries

1. Thiru.K. Palanisamy – 1.15.0 H

As the projects comes under B1(cluster) category, the applicant made TOR application individually the Ordinary PARIVESH website for carrying out EIA Studies for obtaining Environmental clearance. The details are given in below Table 1.1.

Table No. 11.1: Details on Terms of Reference

S. No	Name of Applicant	ToR Application No	SEAC and SEIAA Meeting No	TOR Letter No
1	R.K.Panneerselvam	SIA/TN/MIN/406955/2022 dated 19.11.2022	346 th SEAC Meeting, dated 12.01.2023 and 591 st SEIAA Meeting dated 10.02.2023.	Lr.No.SEIAA-TN/F.No.9586/SEAC/ToR-1333/2022 dated 10.02.2023

In TOR letters, it is mentioned that public hearing needs to be conducted for the proposed Ordinary stone and gravel quarry of four project proponents for obtaining EC. As per MOEF&CC SO 141 (E) dated 15.01.2016-Appendix XI, there shall be one public consultation for entire cluster after which the final Environmental Impact Assessment Report or Environmental Management Plan report for the cluster shall be prepared. Based on the OM issued by MOEF & CC, the Draft EIA/EMP report has been prepared for the quarried in the cluster of 10.74.25 Ha for conducting public hearing. The points raised in the public hearing and the commitments of the project proponent will be given detail in the Final EIA Report which will be submitted to SEAC/SEIAA, TN for obtaining environmental clearance.

11.1 Details of Project and Project Proponent

Table No. 11. 2: Details on Project and Project Proponent

A. Proposed Projects to Conduct Public Hearing	
1. Thiru.R.K. Panneerselvam	
Particulars	Details
Address of the Project Proponent	Thiru.R.K. Panneerselvam S/o. Thiru. R.P. Kaliappan, No. 163, Rengapalayam, Punnamchatram, Punnam Village, Aravakuruchi Taluk, Karur District-639 136, Mobil No: 9442626411 Email id: rkpanneer@gmail.com
Lease Area	0.88.0 Hec (Patta Land)
Site Location	S.F.No: 3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
Geographical Co-ordinates	Latitude: 10° 44'25.88" N to 10° 44'28.69"N Longitude: 77°57'20.81"E to 77°57'25.60"E.
Toposheet No.	58F/14
Elevation	Elevation of the area is 180m above MSL.
Precise Area Communication	Roc.No.60/Mines/2021, dated 26.08.2022
Period of Lease	10 years from the date of execution.
Mining Plan Approval Details	Mining plan approved by AD, Dept of Geology and Mining Vide Roc.No.60/Mines/2021, dated 10.10.2022
AD Cluster letter	Rc.No.60/Mines/2021, dated 31.10.2022
B. Proposed Quarries – Public Hearing Completed Files and Granted EC	
1. Thiru. M.K.Kungumaraj	
Address of the Project Proponent	Thiru. M. K. Kungumarajh S/o. Thiru. M. Kumaresan, No.32, M.G.R Nagar, Chinna Andan kovil street, Karur District, Tamil Nadu -639301 Mobile No: 9489682473
Lease Area	3.00.0Hec (Consent Patta Land)
Site Location	S.F. No: 182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu

Precise Area communication	Roc.No.23/2022, dated 18.03.2022.
Period of Lease	10 Years (To be granted).
Mining Plan Approval Details	Mining plan approved by DD, Dept of Geology and Mining, Vide Roc.No.23/2022, dated 24.03.2022
Public Hearing date	13.07.2023
EC Proposal No & Status	SIA/TN/MIN/67675/2019 & Granted EC
C. Existing Quarries	
1. Thiru. R. K. Panneerselvam	
Lease Area	1.59.32Ha
Site Location	S.F. No: 2/4B, 3/3(P), 3/4, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
2. Thiru. D. Sivajeeganesan	
Lease Area	3.41.0 Ha
Site Location	S.F. No: 27/2, 28, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
D. Abandoned Quarry	
1. Thiru. K. Palanisamy	
Lease Area	1.15.0 Ha
Site Location	S.F. No: 2/3, 2/4A, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

11.2 Scope of the Project

The proposal for Environmental Clearance of ordinary stone and gravel of R. K. Panneerselvam, (0.88.0 Ha) requires EIA/EMP Report as per respective Terms of Reference for conducting public hearing and obtaining for environmental clearance from SEAC/SEIAA.

11.3 Environmental Settings and Mining Details

Table No. 11.3: Environmental Settings

Accessibility																									
Nearest Village	Anjagoundanpatti Village <ul style="list-style-type: none"> • For lease area of R.K. Panneerselvam – 1.8km – SE 																								
Nearest Settlement	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">S. No</th> <th style="width: 30%;">Village Name</th> <th style="width: 25%;">Total population as per 2011 census</th> <th style="width: 35%;">Distance with Direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Anjagoundanpatti</td> <td style="text-align: center;">220</td> <td>1.8-SE</td> </tr> <tr> <td style="text-align: center;">2</td> <td>E Alamarathupatti</td> <td style="text-align: center;">3113</td> <td>1.5 km-NE</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Thirukooranam</td> <td style="text-align: center;">6487</td> <td>1.6 km -N</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Seethapatti</td> <td style="text-align: center;">364</td> <td>1.5 km- NW</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Senthampatti</td> <td style="text-align: center;">1628</td> <td>3.9 km -E</td> </tr> </tbody> </table>	S. No	Village Name	Total population as per 2011 census	Distance with Direction	1	Anjagoundanpatti	220	1.8-SE	2	E Alamarathupatti	3113	1.5 km-NE	3	Thirukooranam	6487	1.6 km -N	4	Seethapatti	364	1.5 km- NW	5	Senthampatti	1628	3.9 km -E
	S. No	Village Name	Total population as per 2011 census	Distance with Direction																					
	1	Anjagoundanpatti	220	1.8-SE																					
	2	E Alamarathupatti	3113	1.5 km-NE																					
	3	Thirukooranam	6487	1.6 km -N																					
	4	Seethapatti	364	1.5 km- NW																					
5	Senthampatti	1628	3.9 km -E																						
Nearest Town	Aravakurichi – 6.0 km -NW																								
Nearest Railway station	Palayam – 20 km -E																								
Nearest Airport	Tiruchirappalli International Airport – 82 km - E																								
Environmental Sensitiveness																									
Interstate Boundary	Tamil Nadu –Kerala Interstate boundary – 93 km (W)																								
Coastal Zone	Bay of Bengal – 155km –E																								
Reserve Forest	1. Rengamalai Reserve Forest– 10 km 2. Vadamalai Reserve Forest – 1.5 km The proposed projects site does not attract Forest Conservation Act, 1980.																								
Wildlife sanctuary	Nil within 10km radius. The Proposed projects site does not the Wildlife (Protection) Act, 1972.																								
Water bodies	1. Godavanar River – 700m – E 2. Godavanar Check dam – 750m – NE 3. Alamarathupatti lake – 1.6km – NE 4. Small odai – 1.3km – NE 5. Amaravathi river – 8.4km – NW 6. Nanganji River – 5.2km – W 7. A lake near ponnambatti – 5.00km -N																								
Defense Installations	Nil within 10km radius																								
Critically Polluted area	Nil within 10km radius																								
Seismic zone	Zone-III, Moderate damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002																								

Table No. 11.4: Mining Details

R.K. Panneerselvam Ordinary Stone and Gravel Quarry	
Method of Mining	Open cast -Mechanized method of mining
Geological resources (95%)	89291 m ³
Mineable reserves (95%)	54378m ³ @ 95% up to depth 33m and 12672m ³ of gravel up to a depth of 3m after leaving necessary safety distance from the lease boundary.
Production (95%)	Ordinary Stone – 35283m ³ for five years or 7057 m ³ PA
Top soil	Gravel – 12672m ³
Ore: Waste ratio	1: 0.52
Depth of Mining	33m bgl
Water Table	36 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years (From the date of execution)
Project Cost	Rs 11.0 Lakhs
EMP Cost	Rs 4.00 lakhs
CER Cost	Rs.5 lakhs

11.4 Description of the environment

11.4.1 Base line environmental study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during 1st March 2022 – 31st May 2022 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the cluster core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

Table No. 11.5: Baseline Data

Particulars	Details	Standards
Meteorology (1st March 2022 – 31st May 2022)		
Rainfall (Avg.)	45.2 mm	--
Temperature (Avg.)	22-38°C	--
Wind speed	2.2 m/s	--
Wind Direction	Predominantly from West to East	
Ambient Air Quality (NAAQS)		
PM ₁₀	39-52 µg/m ³	100 µg/m ³
PM _{2.5}	18-33 µg/m ³	60 µg/m ³
SO ₂	4-14 µg/m ³	80 µg/m ³
NO _x	6-18 µg /m ³	80 µg/m ³

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Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Cluster Core zone – 46.0 dB (A) Buffer zone – 40.4- 45.6 dB (A))	Industrial Area Day Time - 75 dB (A) Residential Area Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Cluster core zone – 36.4 dB (A) Buffer zone – 31.0-35.3 dB(A)	Industrial Area Night Time – 70 dB(A) Residential Area Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.24-8.4	6.5 to 8.5
TDS	493-3722 mg/l	500 mg/l
Electrical conductivity at 25°C	882-5794 micromhos/cm	
Total Hardness as CaCO ₃	95-1676 mg/l	200 mg/l
Total suspended solids	2-20	IS 3025:P.17: 1984:R.2017
Chlorides Cl	668-2003mg/l	250
Total iron Fe	0.01-2mg/l	0.3mg/l
Sulfates SO ₄	13-107mg/l	200 mg/l
Soil Quality		
pH	6.65-8.92	Neutral to slightly alkaline
Bulk density	1.00-1.27 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Water Table	32 to 48 m bgl	

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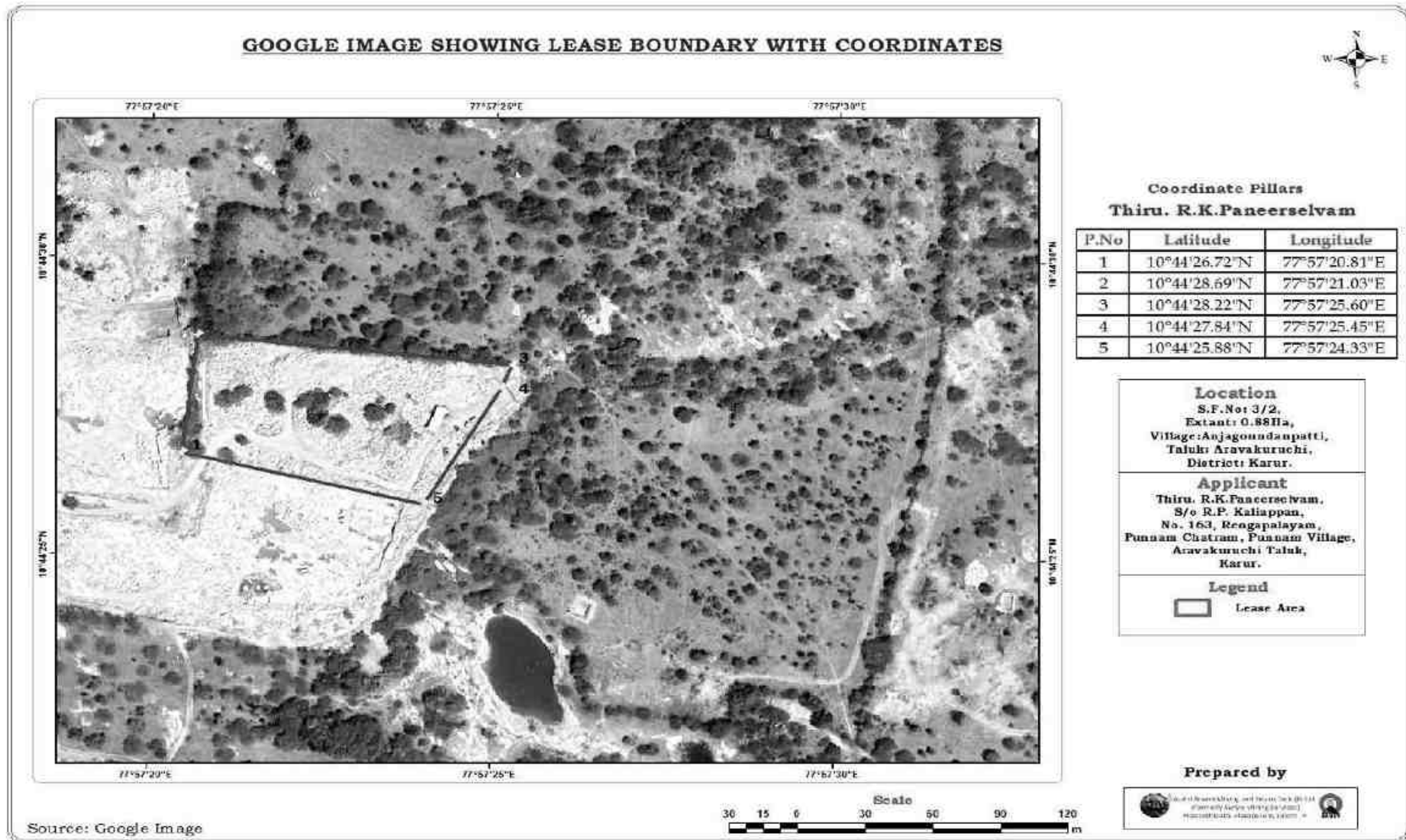


Fig No. 11.2: Map Showing the Location and Accessibility of Quarry Lease Boundary

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Fig No. 11.3: Google Earth Image showing 300m and 500m radius around lease area

11.5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.5.1 Air Environment

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by adopting mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.

AERMOD - Model was used for prediction of impact of PM₁₀ during conditions i) Loading/unloading and transportation of ore by trucks on Haul roads ii) Blasting by using area source model to predict GLC of PM₁₀ during these conditions. Total predicted 24-h maximum GLC of PM₁₀ at project site for scenario 1 i.e loading-unloading and transportation and scenario 2 i.e blasting was 68.07µg/m³ and 54.18 µg/m³ respectively occurred at the project site after superposition of base-line value 48 µg/m³ over the incremental 20.07 µg/m³ and 6.18 µg/m³ respectively due to combined impact of loading and unloading and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO₂ and NO₂ for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³. Therefore the total predicted GLC of SO₂ and NO₂ will be 10.95µg/m³ and 17.31µg/m³ respectively

Maximum Impact of PM₁₀, SO₂ and NO₂ was observed close to the source within the lease area due to moderate wind speeds

When all the quarries in the cluster area are working together the incremental GLC will be high and it may cross the prescribed limits by NAAQS. To overcome such situation, cluster committee should be formed and adopt the environmental management plan effectively as per EIA report.

11.5.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. The sources of noise in the proposed open cast ordinary stone and gravel quarry are such as Drilling, Blasting, and during movement of vehicles.

The noise generated by the mining activity is dissipated within the cluster core zone. This is because of distance involved and other topographical features adding to the noise attenuation. From the results, it can be seen that the ambient noise levels (day time and night time) at all the locations will remain within permissible limits prescribed by CPCB and 90dB (A) norms of DGMS. At present there is no mining activity carried out. However, the expected noise levels are not likely to have any effect. Precaution will be made to keep down the noise

exposure level of 85 dB (A) to the operating personnel for 8 hrs duration. However, as per statutory requirement additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

11.5.3 Ground Vibration

The charge per blast of 6kg is well below the Peak Particle Velocity of 5mm/s for the habitation located at the distance of 140m.

11.5.4 Water Environment

Mining operations can affect groundwater quality in several ways. The most obvious occurs in the mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water. But this ordinary stone mine is devoid of any such impacts.

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during mining process. The mining activity will not intersect ground water table and it is 36m below ground level. The water sample from all the locations including cluster core zone except Thethupatti has high TDS and TH exceeds the permissible limit. Chlorides were found to be high in all the five locations.

The WQI of the samples collected from the study area are given in tables 4.25 and 4.26. It can be seen that the study area has water quality index value ranging from 60.2 to 322.4 which reflects the Poor water quality to unfit for drinking status of the groundwater quality. The findings demonstrate the varying consistency of groundwater at different locations. All the groundwater samples under poor to unfit for drinking category; it may be due to the absorption of fertilisers, geological condition, channel water, solid waste, sewer drainage, septic tanks, and agricultural waste. The water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate.

11.5.5 Soil Environment

For the mining plan period of five years, the generation of top soil is estimated at 12672 m³. It will be dumped along mining lease boundary as earth bund and it will be utilized for green belt development within the lease area. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected.

11.5.6 Waste Dump

The proposed rate of production of ordinary stone for five years is about 54378m³ at the rate of 95% recovery up to permissible depth. The 5% reject of 2862 m³. The rejects materials are dumped along lease and backfilled at the end of mine life.

11.5.7 Biological Environment

There are no notified endangered species in the area, which may be affected due to the quarry activities; therefore the biological environment will not have significant impact due to quarrying activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around the quarry lease area.

11.5.8 Land Environment

Ordinary stone and gravel quarry project will result in disturbance of the land use pattern of the mine lease area. The impact on the topography in the form of changed landscape is unavoidable during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs. So reclamation of mined out land will be given due importance as a step for sound land resource management. There is no release of toxic elements into the ground. No adverse impact is anticipated on land use of buffer zone associated due to the mining activity, as all the activities will be confined within the project site. The mining operations will impact the land usage and land aesthetics of quarry lease area. The land use analyses show that the tree plantation was done around the mining lease area of Thiru. R.K. Panneerselvam. The rate of plantation increases over a period of time due to quarry activity. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing coconut, mango and groundnut plantation around the mining lease area. It will improve the livelihood of village people. The evaporation rate of the water in the pit is given detail in the report.

11.5.9 Socio Economic Environment

The quarrying activity will definitely increase the employment opportunity (directly as well as indirectly) in the project area. Some of these impacts would be beneficial. The expectation of the people of area is concerned towards employment, education, road and health facilities. The literacy rate may be increased with the economic benefits which may arise from the quarrying activities.

Direct Employment - 30persons

Indirect Employment - 20 persons

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Table No. 11.6: Environmental Management Plan

S. No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	<ul style="list-style-type: none"> ✚ Dust extractor or wet drilling to be followed to control dust at source of emission ✚ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	<ul style="list-style-type: none"> ✚ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	<ul style="list-style-type: none"> ✚ Water sprinkling be done before loading by making it moist
		Transportation	<ul style="list-style-type: none"> ✚ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ✚ Overloading will be prevented ✚ Trucks/Dumpers covered by tarpaulin covers
		DG Sets	<ul style="list-style-type: none"> ✚ DG sets will be used only during power failure ✚ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	<ul style="list-style-type: none"> ✚ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ✚ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, goggles as per the MMR, 1961 amendments and circulars of DGMS. ✚ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act ✚ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.

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2	Water Environment	Surface water	<ul style="list-style-type: none"> ✚ Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	<ul style="list-style-type: none"> ✚ The mining activity will not intersect the ground water table ✚ Desilting will be carried out before and immediately after the monsoon season
		Storm water	<ul style="list-style-type: none"> ✚ Pit will be used for Storage of rainwater ✚ Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. ✚ The proponent will collect and judiciously utilize the rainwater as part of rain water harvesting
		General measures	<ul style="list-style-type: none"> ✚ Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling	<ul style="list-style-type: none"> ✚ Limiting time exposure of workers to excessive noise
		Blasting	<ul style="list-style-type: none"> ✚ Carrying out blasting only during day time and not on cloudy days ✚ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes. ✚ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
		Transportation	<ul style="list-style-type: none"> ✚ Proper and regular maintenance of vehicles, machinery and other equipments. ✚ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. ✚ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles.

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			<ul style="list-style-type: none"> ✚ Adequate silencers will be provided in all the diesel engines of vehicles. ✚ Minimum use of horns and speed limit of 10 km/hr in the village area. ✚ It will be ensured that all transportation vehicles carry a valid PUC Certificates
		General measures	<ul style="list-style-type: none"> ✚ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas ✚ Provision of Quiet areas, where employees can get relief from workplace noise. ✚ The development of green belts around the periphery of the mine to attenuate noise. ✚ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting	<ul style="list-style-type: none"> ✚ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. ✚ Milli second detonators shall be used preferably 25–50ms per delay to control vibrations ✚ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave’s movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone ✚ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none"> ✚ Humus top soil shall be preserved for reuse in afforestation and agriculture ✚ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises ✚ Garland drains will be provided around the mine and dumps to arrest

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			any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none"> ✚ The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation ✚ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse
7	Plantation	Mine lease boundary and waste dump	<ul style="list-style-type: none"> ✚ Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise ✚ Stabilization of Dump with plantation ✚ It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. ✚ The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		<ul style="list-style-type: none"> ✚ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. ✚ Provision of Garland drainage around the dumps ✚ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land ✚ Appropriate measures will be taken for Green belt development. ✚ The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.

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9	Socio Economic		<ul style="list-style-type: none"> ✚ Good maintenance practices will be adopted for 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. ✚ Drilling, blasting etc at specified location will be followed with proper schedule. ✚ Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. ✚ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication. ✚ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). ✚ As a part of CSR activities community welfare measures will be taken by Proponent through local Panchayat
10	Occupational Health		<ul style="list-style-type: none"> ✚ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 ✚ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). ✚ Insurance will be taken in the name of the labourers working in the mines ✚ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...

11.6 Analysis of Alternatives

The quarrying site is dependent on the geology and mineral deposition of the area. Hence, this project is, mineral and site specific and no alternative site considered for this project.

11.7 Environmental Monitoring Program

Success of any environmental management programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in the Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

Table No. 11.7: Post Project Environmental Monitoring Program

S. No	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – PM _{2.5} , PM ₁₀ , SO _x and NO _x	5 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind direction)	8 hours	Once in six months	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in the vicinity.	–	Once in six months	Phyiso–chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in six months	Water level monitoring devices may be used.
5	Noise	Mine Boundary, high noise generating areas within the lease and at the	24 hours	Monthly Once	Sound level meter

		nearest residential area			
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Once in six months	Physical and Chemical characteristics

11.8 Project Benefits

The proponent Thiru. R.K. Panneerselvam is very much conscious of his obligations to society at large. Under plantation programme, it is suggested to develop green belt further all along the boundary of the quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community. The quarrying activity will create rural employment. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of ordinary stone and gravel to destinations, sanitation, supply of goods and services to the quarry and other community services etc. The local population will have preference to get an employment. The proponent will help in socio economic development of the village by providing educational facilities to children, and welfare amenities like drinking water to school; road and medical facilities to villages and employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

11.9 Conclusion

As discussed, it is safe to mention that the project is not likely to cause significant impacts on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operations shall be carried out with ease & minimum risk to the workers. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Plantation will substantiate the impact due to the quarrying activity. Quarrying activity will help in improving the socio-economic benefits in areas like employment, communication and infrastructure development.

CHAPTER - 12: DISCLOSURE OF CONSULTANTS ENGAGED

AADHI BOOMI MINING AND ENVIRO TECH (P) LTD, a QCI/NABET Accredited EIA Consultant Organization having its Registered Office at Salem and Branch at Porur, Chennai were promoted by a team of professional Geologists\ Mining\ Environment\ Civil\ Mechanical\ Chemical Engineers\ Scientists. The company has vast experience in various disciplines including Exploration and mining of minerals and was incorporated in 2002 in the name of Suriya Mining Services providing expert advice and solutions for clients' requirement in the field of Mineral prospecting, Exploration, Mining, Geo-technical, Techno economic Feasibility reports\evaluation, Mineral Engineering, Environment Impact Assessment (EIA), Environment Management Plan (EMP), Environment Monitoring and related liaison jobs like Environment Clearance, Wild life and Forest clearance from SEAC/SEIAA/NBWL/CRZ, MoEF& CC etc of all accredited sectors.

12.1 Scope

- EIA & EMP for all accredited sectors and Monitoring as per SPCB/CPCB/MoEF & CC
- Environment/ Wild life/ CRZ/ Forest Clearance
- Social Impact Analysis (SIA) and Eco-Biodiversity studies for Mine Closure Plan
- Remote Sensing & GIS including Satellite data processing, ASTER, DEM etc for application in Forest, Agriculture, Disaster, Mineral Exploration, Environment Modelling, Town planning etc
- Geological Surveying, Mapping, Exploration and Project Management
- Geophysical, Geochemical & Geotechnical studies to locate concealed deposit\ formation including structural studies
- Noise and Vibration studies as per DGMS\MoEF&CC to design controlled blasting where inhabitations are located within 300m
- Mine Design and costing, selection of Machineries and Project Evaluation
- Statutory Mine Plans & Sections, Mining Plan and other mandatory projects
- Design and development of Mineral Beneficiation Plant including mineral separation studies.

12.2 Infrastructure

- Our Human resources are well expertise in all functional areas as per Ver. 3 of NABET\QCI. Our Hi Tech ISO certified Office and Lab are accredited by NABL and MoEF&CC.

- And have latest field Investigation devices like Respirable and Fine Dust Samplers, Digital Seismograph, DDR3 Resistivity Meter, Echo sounder, DGPS, Total Station, Water level monitoring meters, GPS 62S, Sound Level Meter etc.

12.3 Disclosure of Consultant for EIA Study

The Applicants, Thiru. R.K. Panneerselvam appointed Aadhi Boomi Mining and Enviro Tech (Private) Ltd, having its office at 3/216, K.S.V Nagar, Narasothipatti, Alagapuram, Salem – 636 004, Tamil Nadu, for preparation of EIA/EMP report for obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu.

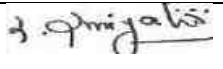
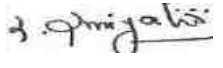
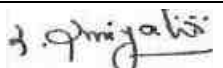
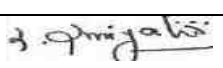
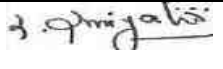
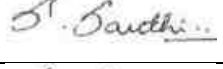
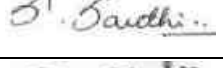
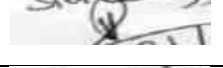
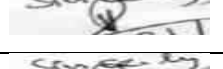

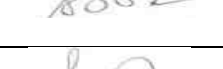
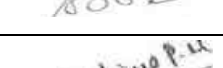
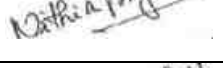
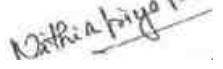
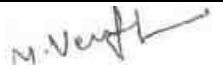
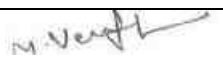
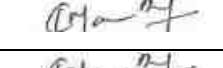
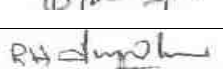
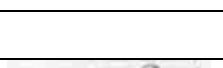
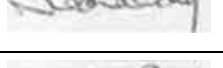

Aadhi Boomi Mining and Enviro Tech (Private) Ltd has MOU with Ekdant Enviro Services (P) Ltd laboratory at Chennai and has own Laboratory named ABM Environmental and Analytical Laboratory, accredited by NABL for sampling and testing of air, water, noise and soil samples. Ekdant Enviro Services are recognized by the Ministry of Environment and Forests, Government of India under the relevant provision of Environment (Protection) Act 1986 and Accredited by NABL and NABET, Quality Council of India, New Delhi.

S. No.	Study	Consultants/LAB
1	Generation of Base Line Data	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem
2	Remote Sensing and Land use/Land cover Studies	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem
3	Preparation of EIA and EMP Report	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem



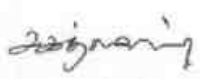
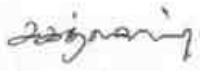




12.4 Declaration of Experts Involved In the EIA Report Preparation

Names of the EIA coordinator, Functional Area Experts and other Team Members engaged and nature of consultancy rendered is provided in NABET Annexure –VII of EIA report. The multidisciplinary team comprises of Environmental Engineers, Geologists and Geographers who involved in preparation of Environmental Impact Assessment Report and Environment Management Plan for various functions like Air quality, Water quality, Noise levels, Soil Conservation, Hydro geology, Ecology and bio-diversity, Land use and Socio–Economics.

Table No. 12.1: Declaration of Experts- NABET Annexure –VII

S. No	Name of the Expert	Category	Functional Areas	Signature
In-House Experts				
1.	Mr.S.Suriyakumar	A	EIA Co-ordinator	
		A	Solid and Hazardous Waste SHW*- HW* only	
		A	Risk Assessment and Hazard Management (RH)	
		A	Land Use (LU)	
		A	Soil Conservation (SC)	
2.	Mrs. S. Santhi	B	Land Use (LU)	
		B	Socio Economics (SE)	
3.	Mr.K.Thirumeni	B	EIA Co-ordinator - Building and Construction	
		B	EIA Co-ordinator - Highways	
		B	Land use (LU)	
4.	Mr.R.R Prakash Babu	B	Air Pollution, Monitoring, Prevention and Control (AP)	
		B	Noise and Vibration (NV)	
5.	Dr. Nithia Priya P.M	B	Air Pollution, Monitoring, Prevention and Control (AP)	
		B	Water Pollution Monitoring, Prevention and Control (WP)	
6.	Mr. M. Venkatesh Prabhu	B	Meteorology, Air Quality Modelling & Prediction (AQ)	
		B	Noise and Vibration (NV)	
7.	Mr. K. Manuraj	B	Geology (GEO)	
			Hydrogeology (HG)	
8.	Mrs.V. Sudha	B	Ecology and Biodiversity	
Empanelled Experts				
9.	Dr. Nallathambi Varadarajan	A	Geology (Geo)	
		A	Hydrology, ground water and water conservation (HG)	

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 Proponent: R.K.Panneerselvam, Ordinary Stone and Gravel Quarry, Karur District

10.	Bidisha Roy	B	Meteorology, Air Quality Modelling & Prediction (AQ)	Bidisha Roy
Team Member Involved in Report Preparation				
11.	Mrs. S. Sri Vidhya	Team Member	Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
			Meteorology, Air Quality Modelling & Prediction (AQ) under FAE - Mr. M. Venkatesh Prabhu	
12.	Mr. S. Sagath Srikrishnan	Team Member	Solid hazardous Waste (SHW) under FAE Mr. Suriyakumar. S	
			Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
13.	Mrs. A. Nagadevi	Team Member	Water Pollution Monitoring, Prevention and Control (WP) under FAE - Dr. Nithia Priya P.M	
			Ecology and Biodiversity (EB) under FAE – V. Sudha	
14.	Mr. A. Jagadeesh Kumar	Team Member	Noise and vibration under FAE - Mr. M. Venkatesh Prabhu	
			Meteorology, Air Quality Modelling & Prediction (AQ) under FAE - Mr. M. Venkatesh Prabhu	



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

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU

3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.

Phone No. 044-24359973

Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.9586/SEAC/ToR-1333/2022 Dated:10.02.2023

To

Thiru. R.K.Panneer selvam
S/o. Thiru.R.P.Kaliappan,
No.163, Rengapalayam,
Punnam chatram, Punnam Village,
Aravakuruchi Taluk,
Karur District - 639136.


Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference (ToR) with Public Hearing for the Proposed Ordinary Stone and Gravel Quarry lease over an extent of 0.88.0Ha S.F.No.3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District by R.K.Panneer Selvam - under project category – “B1” and Schedule S.No.1(a) – ToR issued along with Public Hearing - preparation of EIA report – Regarding.

- Ref:**
1. Online proposal No. SIA/TN/MIN/406955/2022 dt 19.11.2022.
 2. Your application submitted for Terms of Reference dated: 28.11.2022
 3. Minutes of the 346th SEAC meeting held on 12.01.2023.
 4. Minutes of the 591st SEIAA meeting held on 10.02.2023.

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

The proponent, Thiru. R.K.Panneer selvam has submitted application for Terms of Reference (ToR) on 28.11.2022, in Form-I, Pre- Feasibility report for the Proposed Ordinary Stone and Gravel Quarry


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lease over an extent of 0.88.0Ha S.F.No.3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

Proposed Ordinary Stone and Gravel Quarry lease over an extent 0.88 ha at S.F.Nos.3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu by Thiru. R.K.Panneer Selvam - For Terms of Reference.

(SIA/TN/MIN/406955/2022 Dt:19.11.2022).

The proposal was placed in the 346th SEAC Meeting held on 12.01.2023. The details of the minutes are available in the website (parivesh. nic. in).

The SEAC noted the following:

1. The project proponent, Thiru. R. K. Panneer Selvam has applied for Terms of Reference for the proposed Ordinary Stone and Gravel Quarry lease over an extent 0.88 ha at S.F.Nos.3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining of Minerals Projects" of the Schedule to the EIA Notification, 2006.
3. As per the precise area communication the lease period is for 10 Years. The mining plan is for 5years. The production for 5 years not to exceed 35283 cu.m of Ordinary stone (95% Recovery) & 1857 cu.m of Ordinary stone (5% Reject), 12672 cu.m of Gravel & Weathered Rock with an ultimate depth of 33m below ground level.

Based on the presentation and details furnished by the project proponent, **SEAC decided to grant Terms of Reference (TOR) with Public Hearing** subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc.
2. The study on impact of the dust & other environmental impacts due to proposed quarrying operations on the Rose flowers being cultivated through greenhouse nearby.
3. The Proponent shall furnish photographs of greenbelt, fencing and garland drain around the boundary of the proposed quarry.
4. The proponent shall furnish a revised EMP budget for entire life of proposed mining.


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5. The revised and corrected version of the Production & Development Plan shall be produced with showing the safety berm width of 2m is maintained for the bench height of 2m distinctly in the gravel formation and it shall be duly signed by the concerned QP & approved by the concerned AD (Geology & Mining).
6. The EIA report shall spell out the possible amalgamation activities to be proposed in the existing cluster area and implications due to the amalgamation.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease during the time of appraisal for obtaining the EC.
8. The Proponent shall submit a conceptual 'Slope Stability Plan' indicating the mitigating measures for the proposed quarry during the appraisal while obtaining the EC, as the depth of the proposed quarry working is extended beyond 30 m below ground level.
9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
 - a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
 - b. Quantity of minerals mined out.
 - c. Highest production achieved in any one year
 - d. Detail of approved depth of mining.
 - e. Actual depth of the mining achieved earlier.
 - f. Name of the person already mined in that leases area.
 - g. If EC and CTO already obtained, the copy of the same shall be submitted.


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- h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
13. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
 14. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,
 15. The PP shall furnish the revised manpower including the statutory & competent persons as required under the provisions of the MMR 1961 for the proposed quarry based on the volume of rock handled & area of excavation.
 16. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.
 17. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.
 18. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
 19. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
 20. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
 21. The Proponent shall carry out the Cumulative impact study due to mining operations carried


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- out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
22. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
 23. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
 24. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
 25. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
 26. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
 27. Impact on local transport infrastructure due to the Project should be indicated.
 28. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
 29. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
 30. Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.
 31. The Public hearing advertisement shall be published in one major National daily and one most


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circulated vernacular daily.

32. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
33. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
34. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
35. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site-specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
36. A Disaster Management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
37. A Risk Assessment and Management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
38. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
39. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
40. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible,

quantitative dimensions may be given with time frames for implementation.

41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
42. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
43. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
44. The PP shall prepare the EMP for the entire life/lease of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
45. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

Discussion by SEIAA and the Remarks:-

The proposal was placed in the 591st Authority meeting held on 10.02.2023. The authority noted that this proposal was placed for appraisal in the 346th meeting of SEAC held on 12.01.2023. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the conditions in '**Annexure B**' of this minute.

1. The EMP should include mine closure plan using Ordinary Stone reject and weathered rock. It should be used for site restoration.
2. Details of fencing & plantation for the proposed project site.
3. Details of approved layout/Structures/buildings, reservoir, Canal, High ways, Railway lines, Water Bodies, Reserve Forest, Village Road, Cart track, Stream Courses within /outside the radius of 50m, 100m, 150m, 200m, 250m, & 300m of the proposed mining area.

Annexure 'B'

Cluster Management Committee

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

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

Impact study of mining

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

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- 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


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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

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

Climate Change

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

Mine Closure Plan

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

EMP

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

Risk Assessment

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

Disaster Management Plan

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

Others


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

A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.


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- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared


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- to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
 - 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
 - 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
 - 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
 - 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
 - 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
 - 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
 - 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with


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budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

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

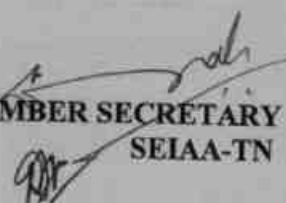

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- quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
 - 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
 - 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
 - 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
 - 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
 - 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
 - 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
 - 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis


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- on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
 - 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
 - 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
 - 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
 - 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
 - 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
 - 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
 - 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
 - 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
 - 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

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


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



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

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

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

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

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


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- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
 - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
 - The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

MEMBER SECRETARY
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Copy to:

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.

5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Karur District.
7. Stock File.





ந.க.எண். 60/கனிமம்/2021

மாவட்ட ஆட்சியர் அலுவலகம்
புலியியல் மற்றும் சுரங்கத்துறை

கரூர்

நாள்.26.08.2022.

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - கரூர் மாவட்டம் - அரவக்குறிச்சி வட்டம் - அஞ்சாகவுண்டன்பட்டி கிராமம் - புல எண்.3/2-இல் 0.88.0 ஹெக்டேர்ஸ் பரப்பு பட்டா நிலத்தில் - சாதாரணகல் மற்றும் கிராவல் குவாரி குத்தகை உரிமம் வேண்டி திரு.ஆர்.கே.பன்னீர்செல்வம் என்பவர் விண்ணப்பம் செய்தது - உரிமம் வழங்க பரிந்துரை செய்யப்பட்டது - தகுதியான நிலப்பரப்பாக கருதி ஏற்பளிக்கப்பட்ட சுரங்க திட்டம் மற்றும் மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய இசைவினை பெற்று சமர்ப்பிக்கக் கோருதல் - தொடர்பாக - தொடர்பாக.

- பார்வை:**
1. திரு.ஆர்.கே.பன்னீர்செல்வம், த/பெ.ஆர்.பி.காளியப்பன், கதவு எண்.163, ரெங்கபாளையம், புன்னம்சத்திரம், புகளூர் வட்டம், கரூர் மாவட்டம் என்பவரின் மனு நாள்: 10.02.2021
 2. வருவாய் கோட்டாட்சியர், கரூர் அவர்களின் கடிதம் ந.க.எண். அ1/728/2021, நாள்:08.04.2022
 3. உதவி புலியியலாளர், புலியியல் மற்றும் சுரங்கத்துறை கரூர் என்பவரது புலத்தணிக்கை அறிக்கை நாள்:13.05.2022.
 4. அரசாணை (பல்வகை) எண். 169, தொழில் (எம்.எம்.சி-) துறை நாள்: 04.08.2020 இணைத்து வரப்பெற்றுள்ளது. (தமிழ்நாடு அரசிதழ் சிறப்பு வெளியீடு எண். 315 நாள்: 04.08.2020).

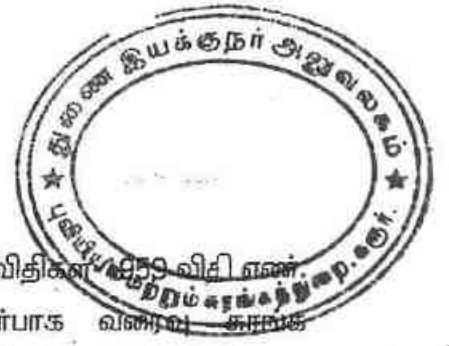
கரூர் மாவட்டம், அரவக்குறிச்சி வட்டம், அஞ்சாகவுண்டன்பட்டி கிராமம், பட்டா புல எண்.3/2-இல் 0.88.0 ஹெக்டேர்ஸ் பரப்பு நிலத்திலிருந்து பத்து ஆண்டுகளுக்கு சாதாரண கற்கள் மற்றும் கிராவல் வெட்டியெடுக்க கரூர் மாவட்டம், புகளூர் வட்டம், புன்னம்சத்திரம் கிராமம், ரெங்கபாளையம், கதவு எண்.163 என்ற முகவரியில் வசிக்கும் திரு.ஆர்.கே.பன்னீர்செல்வம் என்பவர் பார்வை 1-இல் கண்டுள்ளவாறு விண்ணப்பம் செய்துள்ளார்.

மேற்படி விண்ணப்பம் தொடர்பாக, வருவாய் கோட்டாட்சியர், கரூர் மற்றும் உதவிப் புலியியலாளர், புலியியல் மற்றும் சுரங்கத்துறை, கரூர் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு கரூர் மாவட்டம், அரவக்குறிச்சி வட்டம், அஞ்சாகவுண்டன்பட்டி கிராமம், பட்டா புல எண்.3/2-இல் 0.88.0 ஹெக்டேர்ஸ்

பரப்பில் மட்டும் தமிழ்நாடு சிறு கனிமச்சலுகை விதிகளில் விதி எண்கள்.19-(1), 20 மற்றும் 22-இன் கீழ் திரு.ஆர்.கே.பன்னீர்செல்வம் என்பவருக்கு சாதாரணக்கல் மற்றும் கிராவல் குவாரி உரிமம் வழங்க கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

1. விண்ணப்ப புலத்தின் கிழக்கில், தென்வடலாக செல்லும் வாரிக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு யாதொரு சேதமுமின்றி முறையாக குவாரி பணி செய்ய வேண்டும்.
2. விண்ணப்ப புலத்திற்கு அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் மற்றும் புறம்போக்கு நிலத்திற்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
3. குத்தகைக்காலத்தில் கைத்துளைப்பான் கருவி கொண்டு பாறைகளை துளையிட்டும், மிதமான வெடிபொருள் பயன்படுத்தியும், பொதுமக்களுக்கோ, பொது சொத்துக்களுக்கோ யாதொரு சேதமுமின்றி விதிமுறைகளின்படி குவாரிப்பணி செய்ய வேண்டும்.
4. குவாரித் தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்ய Metalliferous Mines, விதிகளின்படி அகலமானதும், பாதுகாப்பானதுமான Benches அமைத்து பாதுகாப்பான முறையில் குவாரிக்குள் வாகனங்கள் சென்றுவரவும் மற்றும் குவாரி தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்தும் குவாரிப்பணி செய்ய வேண்டும்.
5. குவாரி குத்தகை வழங்க ஏதுவாக துணை இயக்குநர் (சுரங்கம்) அவர்களால் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினையும், மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (SEIAA) அனுமதி பெற்று மாவட்ட நிர்வாகத்திற்கு விண்ணப்பதாரரால் சமர்ப்பிக்கப்பட வேண்டும்.

எனவே, வருவாய் கோட்டாட்சியர், கரூர் மற்றும் உதவிப் புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, கரூர் ஆகியோரின் பரிந்துரைகள் மற்றும் நிபந்தனைகளின் அடிப்படையில் கரூர் மாவட்டம், அரவக்குறிச்சி வட்டம், அஞ்சாகவுண்டன்பட்டி கிராமம், பட்டா புல எண்.3/2-இல் 0.88.0 ஹெக்டேர்ஸ் பரப்பில் 1959-ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண். 19(1), 20 மற்றும் 22-இன்படியும் மேலும் மேற்கண்ட நிபந்தனைகளுக்கும் உட்பட்டு 10 (பத்து) வருட காலத்திற்கு திரு.ஆர்.கே.பன்னீர்செல்வம் என்பவருக்கு சாதாரணக்கற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.



அதற்கிணங்க, தமிழ்நாடு சிறு கனிம சலுகை விதிகள் 1959 விதி எண். 41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வளைவு தாங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு திரு.ஆர்.கே.பன்னீர்செல்வம் என்பவர் கேட்டுக்கொள்ளப்படுகிறார். மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-இன்படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

[Handwritten Signature]
26/08/22
ஆணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
கரூர்.

பெறுநர்

திரு.ஆர்.கே.பன்னீர்செல்வம்,
த/பெ.ஆர்.பி.காரியப்பன்,
கதவு எண்.163,
ரெங்கபாளையம்,
புன்னம்சத்திரம்,
புகளூர் வட்டம்,
கரூர் மாவட்டம்.

[Handwritten Signature]
26/08/22

[Handwritten Signature]
26/08/2022

நகல்:-

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

[Handwritten Signature]
S. SURIYAKUMAR
M.Sc. M.Phil (Geo.) F.C.C (Mining)
Qualified Person



கடிகா மாநில அரசாங்கத்தின் அனுமதி பெற்றுள்ள நிலத்தில் கரிம வள மேம்பாட்டுக் கழகத்தின் கீழ் கரிம வள மேம்பாட்டுத் திட்டம் செயல்படுத்தப்பட்டு வருகிறது. கரிம வள மேம்பாட்டுத் திட்டம் கரிம வள மேம்பாட்டுத் திட்டத்தில் உள்ளிட்ட கரிம வள மேம்பாட்டுத் திட்டம் செயல்படுத்தப்பட்டு வருகிறது.

மல எண் 3/2 கரிம வள மேம்பாட்டுத் திட்டம்

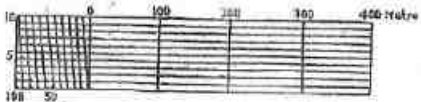
- மல எண் 3/3,4 கரிம வள மேம்பாட்டுத் திட்டம் உட்கட்டு வடிகால்
- மல எண் 3/1 உட்கட்டு கட்டுவது கட்டுவது
- மல எண் 4/1 அரசு மதுகாங்கு கட்டுவது
- மல எண் 2/3, 2/4A கரிம வள மேம்பாட்டுத் திட்டம் கட்டுவது

மாண்புமிகு
 சிவசுப்பிரமணியன்
 கருமார்பட்டி கிராமம்
 சிவசுப்பிரமணியன் கரிம வள மேம்பாட்டுத் திட்டம்
 சிவசுப்பிரமணியன் கரிம வள மேம்பாட்டுத் திட்டம்
 கருமார்பட்டி

S. Suriyakumar
S. SURIYAKUMAR
 M.Sc. M.Phil (Geo). F.C.C (Mining)
 Qualified Person

No. 90
ANJAGAVANDANPATTI
KARUR TALUK
TIRUCHIRAPPALLI DISTRICT

Area by { Traverse 319 Hectares 51-0 Area
Fields 320 Hectares 44-5 Area
Scale : 5000

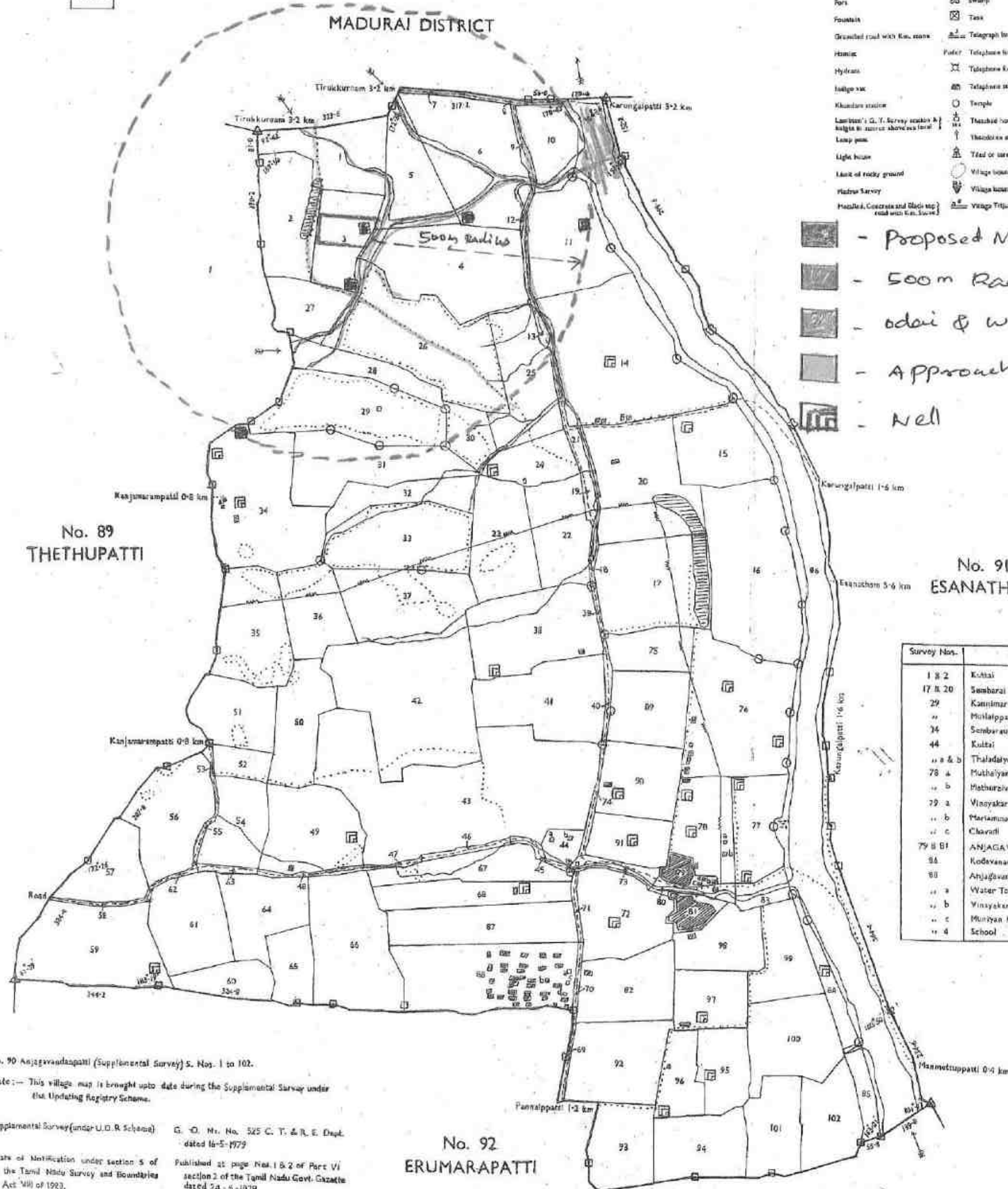


1 Hectare

STANDARD REFERENCE SHEET

- Boundary of the units in the ground village
- Railroad
- Canals
- Cart track
- Chain Survey Station (Town Survey)
- Church
- Columns and bridge
- Electric road
- Electric Power House
- Electric substation
- Electric Transmission Line
- Ferry
- Field Survey Station (Town Survey)
- Foot Path
- Forest gate or pillar
- Fort
- Fountain
- Gravelled road with Km. mark
- Hamlet
- Hydrant
- Indigo vat
- Khandara station
- Lambton's G. T. Survey station & height in feet or above sea level
- Lamp post
- Light house
- Limit of rocky ground
- Madras Survey
- Metalled, Concrete and Blot top road with Km. mark
- Minor canal station
- Mobile wire
- Postage
- Private village
- Railway line
- River, Canal and aqueduct
- River and stream with water
- Rock work
- Round well
- Salt pan
- SMA. land
- Springs and wells
- Stairs
- Square well
- Survey field boundary
- Swamp
- Tank
- Telegraph line
- Telephone line
- Telephone exchange
- Telephone station
- Temple
- Thatched house
- Thodara station (Town Survey)
- Tidal or normal level
- Village boundary
- Village boundary station
- Village Telephone station

- Proposed Mining Lease area
- 500m Radius
- Odai & water bodies
- Approach road
- Well



Survey Nos.	Name of details
1 & 2	Kuttai
17 & 20	Sembarai Odai
29	Kannimar Kovil
34	Mullappara
44	Sembrauththupatti
44	Kuttai
a & b	Thaladaiyan Kovil
78 a	Muthaiyan Kovil
b	Muthaippanan Kovil
79 a	Vinayakar Kovil
b	Mariamman Kovil
c	Chavadi
79 B B1	ANJAGAVANDANPATTI
84	Kodavanan River
88	Anjagavandanpatti Colony
a	Water Tank
b	Vinayakar Kovil
c	Munayan Kovil
d	School

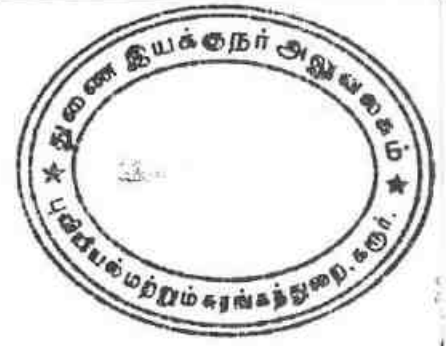
V. No. 90 Anjagavandanpatti (Supplemental Survey) S. Nos. 1 to 102.
Note: - This village map is brought up to date during the Supplemental Survey under the Updating Registry Scheme.
Supplemental Survey (under U.D.R. Scheme) G. O. No. 525 C. T. & R. E. Dept. dated 16-5-1979
Date of Notification under section 5 of the Tamil Nadu Survey and Boundaries Act VIII of 1923. Published at page Nos. 1 & 2 of Part VI section 2 of the Tamil Nadu Govt. Gazette dated 24-5-1979
Date of Notification under section 13 of the Tamil Nadu Survey and Boundaries Act VIII of 1923. Published at page Nos. 11 & 12 of the District Gazette of Tiruchirappalli District dated 19-9-1984

No. 92
ERUMARAPATTI
S. Suriyakumar
S. SURIYAKUMAR
M.Sc. M.Phil (Geo) F.C.C (Mining)
Qualified Person
Published by Thiru B. SRIRAM, I. A. S.,
Director of Survey and Settlement, Madras.
Thiru K. K. PRASAD, M. A. B. L.,
Additional Director of Survey and Land Records, Madras
in behalf of the Government of Tamil Nadu, 1986 (Thiruvattu Andu 2016)

Reduced from the original village map of 1923 brought up to date by embodying the changes as per the Supplemental Survey done under the Updating Registry Scheme processed and printed under the supervision of Thiru K. S. BAGHAVAN, M. A. B. L., Deputy Director of Survey and Land Records, by Vaidyan, at the Photo-Zinc Press, Central Survey Office, Madras-5. Year of first publication 1921 (Thiruvattu Andu 1921) Price Rs. 57/- © Copyright reserved by the Government of Tamil Nadu.



தமிழக அரசு
வருவாய்த் துறை



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

மாவட்டம் : கரூர்

வட்டம் : அரவக்குறிச்சி

வருவாய் கிராமம் : அஞ்சகவுண்டன்பட்டி

பட்டா எண் : 404

உரிமையாளர்கள் பெயர்

1. காளியப்பன்

மகன்

பன்னீர்செல்வம்

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
3	2	0 - 88.00	1.76	--	--	--	--	2018/0103/14/059530- --- 11-06-2018
		0 - 88.00	1.76					

குறிப்பு 2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/02/047/00404/40768 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 09-02-2021 அன்று 01:54:05 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

அ-பதிவேடு விவரங்கள்



மாவட்டம் : கரூர்

வட்டம் : அரவக்குறிச்சி

கிராமம் : அஞ்சகவுண்டன்பட்டி

1. புல எண்	3	9. மண் வயனமும் ரகமும்	8 - 3
2. உட்பிரிவு எண்	2	10. மண் தரம்	5
3. பழைய புல உட்பிரிவு எண்	3-2,	11. தீர்வை (ரூ - ஹெ)	2.00
4. பகுதி	P	12. பரப்பு (ஹெக்டேர் - ஏர்)	0 - 88.00
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	1.76
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	404
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	1	16. பெயர்	1.பன்னீர்செல்வம்

குறிப்பு 1:



1.

மேற்கண்ட நகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 30768 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.



ம. எண்.	சலம் எண்.
1. தற்போதைய + வெப்ப நெம்பர் சப்டிவிஷன் நம்பரும்.	6. யஸ் வயஸ்
2. பழைய சாவே நெம்பர் லெட்டர் அல்லது பைமாஷ் நெம்பர் பெயர்.	7. தரம்.
3. ரயத்துவாரி (ர) சர்க்கார் (ச) அல்லது இனாம் (இ).	8. ஹெக்டேர் ஒன்றிக்கு தீர்வை, விவிதம்.
4. புஞ்சை (பு), மானவாரி (மா), நஞ்சை (ந), தீர்வை ஏற்படாத தரிசு (தி.ஏ.த.) புறம்போக்கு (பு), நஞ்சை யானால் பாசன ஆதாரமும் அதன் வகுப்பும்.	9. விஸ்தீரணம்.
5. இரூபோக நஞ்சையானால் மொத்த தீர்வை விவிதம்.	10. தீர்வை.
	11. பட்டா அல்லது உரிமக்கான நெம்பரும் ரிஜிஸ்டர் செய்யப்பட்ட நிலச் சுவர் தாரரின்பெயரும்.
	12. ஷரா.

1	2	3	4	5	6	7	8	9	10	11	12
								குபை ஹெக்ட. ஏ.	கு. பை.		
1-1	1-1	ர	4	..	8.3	5	2.00	1 48.0	2 96	45. வை. ரெங்கசாமி நாயக்கர்.	
-2	1-2	ர	4	..	8.3	5	2.00	0 03.0	0 06	58. வை. ரெங்கசாமி நாயக்கர் (1). வை. எல்லப்ப நாயக்கர் (2)	
-3	1-3	ர	4	..	8.3	5	2.00	2 25.5	4 50	46. பெ. ரங்கசாமி நாயக்கர்.	
								3 76.5	7 52		
2-1	2-1	ர	4	..	8.3	5	2.00	1 72.5	3 45	45. வை. ரெங்கசாமி நாயக்கர்	
-2	2-2	ர	4	..	8.3	5	2.00	0 20.0	0 40	58. வை. ரெங்கசாமி நாயக்கர் (1) வை. எல்லப்ப நாயக்கர் (2)	
③	2-3	ர	4	..	8.3	5	2.00	0 20.0	0 41	16. கோ. சின்னசாமி நாயக்கர்.	
④	2-4	ர	4	..	8.3	5	2.00	1 66.0	3 32	16. கோ. சின்னசாமி நாயக்கர்.	
								3 78.5	7 58		
3-1	3-1	ர	4	..	8.3	5	2.00	0 91.5	1 84	47. வி. ரெங்கசாமி நாயக்கர்.	
-2	3-2	ர	4	..	8.3	5	2.00	0 88.0	1 76	40. வை. எல்லப்ப நாயக்கர்.	கி.என்.

ம. எண் 90
ச. எண் 17
ச. எண் 18
ச. எண் 19
ச. எண் 20
ச. எண் 21
ச. எண் 22
ச. எண் 23
ச. எண் 24
ச. எண் 25
ச. எண் 26
ச. எண் 27
ச. எண் 28
ச. எண் 29
ச. எண் 30

உணர்ச்சி மூலம்
கிராம நிர்வாக அலுவலர்
எடுமாம்பட்டி கிராமம்
சிஞ்சாக்கலம் கிராமம்
அரங்குறுதி கிராமம்
கனம் மாண்புமிகு



1	2	3	4	5	6	7	8	9	10	11	12
3-3	3-3	ர	11	8.3	5	2.00	0	46.5	0	93	16. கோ. சின்னசாமி நாயக்கர்.
4	3-4	ர	11	8.3	5	2.00	0	43.0	0	86	40. வை. எல்லப்ப நாயக்கர்.
5	3-5	ர	11	8.3	5	2.00	0	07.0	0	14	58. வை. ரெங்கசாமி நாயக்கர். (1)
							2	70.0	5	53	வை. எல்லப்ப நாயக்கர். (2)
4-1	4-1	ர	11				0	23.5			
2	4-2	ர	11	8.3	5	2.00	2	69.5	5	39	
3	4-3	ர	11	8.3	5	2.00	3	59.0	7	18	15. து. சகுந்தலா.
							6	52.0	13	57	47. வீ. ரெங்கசாமி நாயக்கர்.
5-1	5-1	ர	11	8.3	5	2.00	2	01.5	4	03	47. வீ. ரெங்கசாமி நாயக்கர்.
2	5-2	ர	11	8.3	5	2.00	1	20.0	2	40	15. து. சகுந்தலா.
							3	21.5	6	43	
6-1	6-1	ர	11	8.3	5	2.00	1	75.5	3	52	47. வீ. ரெங்கசாமி நாயக்கர்.
2	6-2	ர	11	8.3	5	2.00	0	04.5	0	09	15. து. சகுந்தலா.
3	6-3	ர	11	8.3	5	2.00	4	79.0	9	59	47. வீ. ரெங்கசாமி நாயக்கர்.
							6	59.0	13	20	
7	7	ர	11				0	14.0			
8	8	ர	11				0	17.5			
9	9	ர	11				0	28.5			
10	10	ர	11	8.3	5	2.00	2	35.0	4	71	28. பழனிச்சாமி பிள்ளை
11-1	11-1	ர	11	8.3	5	2.00	2	22.5	4	45	40. வை. எல்லப்ப நாயக்கர்.
2	11-2	ர	11	8.3	5	2.00	1	07.0	2	15	59. நா. நாராயணசாமி நாயக்கர் (1).
3	11-3	ர	11	8.3	5	2.00	1	33.0	2	66	ஆ. சீமுத்தா நாயக்கர் (2)
							4	62.0	2	26	40. வை. எல்லப்ப நாயக்கர்.



செல் ரிஃகர்டரி கம்பனி லிமிடெட், சேலம்
SAIL REFRACTORY COMPANY LTD., SALEM.
(A Govt. of India Enterprises)
(A Subsidiary of Steel Authority of India Limited)

Annexure - VI
XVII
DATE: 18.09.2018

SRCLP&A/2017/0380 /1935

EMPLOYMENT CERTIFICATE

Employee Details :

Name : S.SURIYAKUMAR
Employee No : 100045
Grade : E-2
Designation : Asst. Manager (Geology)
Department : Mines

This is to certify that Sri. S.SURIYAKUMAR F.S.No.100045 was in the employment of this organisation from 20.03.1981 to 31.07.1992 and he has resigned & released with effect from 31.07.1992 AN.

At the time of his resignation on 31.07.1992, he was employed as Assistant Manager in the capacity of II class Mines Manager.

S. Srividharan

18/09/18
S.SRIDHARAN

Asst. General Manager (Prsl & Admn)

Post Box No. 565 Salem - 636 005. Phone : +91427-2341403/4/5/6 Fax : +91427-2341407

पोस्ट बॉक्स नं.: 565, सैलम - 636 005. फोन +91427-2341403/4/5/6 फैक्स +91427-2341407

E-mail : srclsalem@gmail.com CIN No. : U14200TZ2011GO1017357

002646.



University of Madras

FACULTY OF SCIENCE

The Senate of the *University of Madras* hereby makes known that..... *S. Suriyakumar*..... has been admitted to the Degree of Master of Science, he having been duly certified to be qualified to receive the same, and awarded an Overall Grade..... *0*..... at the Examination held in the month of..... *May*..... *1979*..... in Branch..... *VII A - Special Geology*
Given under the seal of the University, at Madras this..... *28th*... day of..... *September*..... *1979*.....

Registrar



S. S. Srinivasan
B. Sc. Engg., C. Engg., F.I.E.E. (Lond.),
F.L. Dip. E. (Lond.), F.I.E. (Ind.).

Vice-Chancellor



155

UNIVERSITY OF MADRAS

FACULTY OF SCIENCE

The Senate of the University of Madras hereby
makes known that S. Saniyakumar
has been admitted to the Degree of Master of Philosophy
in Geology, he having been certified by duly
appointed Examiners to be qualified to receive the same, and
having been by them placed in the First Class
at the Examination held in September 1988

Given under the seal of the University.

Senate House
September 21, 1988

[Signature]
Registrar

[Signature]
F.N.A., F.N.A.Sc.,
Vice-Chancellor.

Government of India
Ministry of Labour
DIRECTORATE-GENERAL OF MINES SAFETY



No. Exam/MNGR-I/Field/Metal/R/ 113/91 /Dated, Dhanbad, the 19

To

Shri S. Suriya Kumar,
Assistant Manager,
Mangnesite Mines, Burn Standard Co, Ltd.,
SALEM-636005, TAMIL NADU.

MEMORANDUM

Ref:-His application dated, 18-7-90

By virtue of Govt. Notification
No.S.O.712(E) dated 13.12.1974 Shri S. Suriyakumar
son of Shri A. Sarban has become
eligible to work in a capacity requiring the possession
of First Class Manager's certificate,
restricted to mines having opencast workings only, under
the Metalliferous Mines Regulations, 1961 with effect
from 19th March, 1991 till the above notification
remain in force.

Encl:-

Secretary,
Board of Mining Examinations &
Director of Mines Safety (Exam)





தமிழ்நாடு தமில்நாடு TAMILNADU 21.11.2008

CU 299646

R.k. panneerselvam

Punnam Chathiram.

K.MOHAN, S.V.S.No.21/08
R.DIS.No.3184/A2/08
KARUR WEST

AFFIDAVIT TO SEIAA, TAMIL NADU

I, Thiru.R.K.Panneerselvam S/o.Thiru.R.P.Kaliappan residing at No. 163, Rengapalayam, Punnam chathiram, Punnam Village, Aravakuruchi Taluk, Karur District-639 136, Tamil Nadu state do hereby solemnly declare and sincerely affirm that,

I have applied for getting Environmental Clearance to SEIAA, Tamil Nadu for Ordinary Stone & Gravel quarry lease over an extent of 0.88.0 at S.F.No.3/2 of Anjagoundanpatti village, Aravakurichi Taluk, Karur District.

- I swear to state that within 10kms radius of the mines which I have applied for environmental clearance, none of the followings are situated as per the General Conditions of EIA Notification, 2006
 - Protected area notified under the Wildlife (Protection) Act, 1972.
 - Critically polluted area as identified by CPCB constituted under Water (Prevention and Control of Pollution) Act, 1974
 - Eco Sensitive areas identifies by the Forest Dept/State Govt
 - Inter-state boundaries and International boundaries within 10Km Radius from the proposed site.

Cell: 99944 45789

K. KANMANI, B.A.B.L.,
Advocate & Notary Public
Govt.of India-Regd No:6877/08
Pudur, Andan Kovil Post,
KARUR - 639 008. T.N



complete the following Corporate Environment Responsibility (CER) activities before commencement of the quarrying activities in addition to CSR and EMP.

CER Activity	Project Cost (Rs. In Lakh)	CER Cost (Rs in Lakhs)
1. Developing Facilities such as Water Purifier, Fan, Cot and Bed to the Aravakuruchi village Dispensary 2. Developing facilities such as Water Purifier and Computer facilities to the Govt. School.	11.00	5.0
Total Cost Allocation	11.00	5.0

3. Quarries located within 500m radius from the periphery of our quarry

i) Details of Existing Quarries

S. No.	Name of the Owner	S.F. No	Extent in Ha	Lease Period	Remarks
1.	Thiru.D.Sivajeeganesan, S/o.Duraisamy,No.53F, Periyakadai Street, Aravakurichi Taluk, Karur District.	27/2 28	3.41.00	07.02.2018 to 06.02.2023	
2.	Thiru.R.K.Panneerselvam, S/o. R.P.Kaliappan, No.163, Rengapalayam, Punnamchathiram, Punnam, Aravakurichi Taluk, Karur District.	2/4B, 3/3(Part), 3/4	01.59.32	13.03.2020 to 12.03.2025	

ii) Details of Abandoned/Expired Quarries

S.No	Name of the Owner	S.F. No.	Extent in Ha	Lease Period	Remarks
1.	Thiru.K.Palanisamy, S/o. Sri.Krishnasamy Gounder, Uthukkaraiatti , Pagantham Village, Karur District.	2/3, 2/4A	1.15.0	09.08.2016 to 08.08.2021	

iii) Details of Proposed Quarries

S.No	Name of the Owner	S.F. No.	Extent in Ha	Lease Period	Remarks
1.	Thiru.R.K.Panneerselvam, S/o. R.P.Kaliappan , No.163, Rengapalayam, Punnamchathiram , Pugalur Taluk,Karur District.	3/2	0.88.0		Proposed Area

iv) Details of Proposed Quarry in Neighbour District which is located within 500m radius of R.K.Panneerselvam lease boundary

S.No.	Name of the Owner	S.F. No.	Extent in Ha	Lease Period	Remarks
1.	Thiru.M.K.Kungumaraj, S/o.Thiru Kumaresan Thirukooranam Village, Gujiliamparai Taluk, Dindigul.	182/2(P)	3.00.0		Proposed Area

Cell: 99944 45789

K. KANMANI, B.A.B.L.,
Advocate & Notary Public
Govt.of India-Regd No:6877/08
Pudur, Andan Kovil Post,
KARUR - 639 008. T.N

4. There will not be any hindrance or disturbance to the people living on enroute / nearby my quarry site while transporting the mined out materials and due to quarrying activities.
5. There are no habitations/villages located within 300 meters radius from the periphery of my quarry.
6. I swear that afforestation will be carried out during the course of quarrying operation and maintained.
7. The required insurance will be taken in the name of the labourers working in my proposed quarry.
8. The existing road from the main road to the quarry is in good condition and same will be maintained and utilized for transportation of Ordinary Stone & Gravel.
9. I will not engage any child labour in my mines and I am aware that engaging child labour is punishable under the Law.
10. All types of safety/protective equipments will be provided to all the laborers working in my quarry.
11. No permanent structures, temples etc are located within 300m from the periphery of my quarry.
12. The quarrying activity has not yet commenced and it will be carried out only after obtaining environmental clearance.

Deponent



Thiru.R.K.Panneerselvam
(Project proponent)


Solemnly and sincerely affirmed and
Signed before the Notary Public on
the day of 21/11/22

21/11/22

Cell: 99944 45789
K. KANMANI, B.A.B.L.,
Advocate & Notary Public
Govt. of India-Regd No: 6877/08
Pudur, Andan Kovil Post,
KARUR - 639 008, T.N.



கீழ்க் கட்டிடம் அரவக்குறிச்சி வட்டம்
 அஞ்சாக்கவுண்டரியில் கீழ்க்கண்ட புல எண் 3/2
 ஜெக் 0.88.0 ஓர்ஸ் இடத்தில் அளவில்
 300 சீ தொலைவில் குடியிருப்பவர்கள் (நடுத்தர)
 பிளாபல்களோ, பள்ளிக்கூடங்களோ,
 உயர் மீன் அடித்து மீன் காய்க்கள எதுவும்
 கிண்டல என் சான்றுகூடுதல்.


 கிராம நிர்வாக அலுவலர்
 எருமாபட்டி கிராமம்
 அஞ்சாக்கவுண்டரியில் கிராமம்
 அரவக்குறிச்சி வட்டம்
 கரு மாவட்டம்

Thiru. R.K.Panneer Selvam, S/o. Thiru.R.P.Kaliappan, Ordinary stone & Gravel Quarry, in S.F.No. 3/2 over an extent of 0.88 Ha located in Anjagoundenpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.



General view of the Lease area - Ordinary stone & Gravel Quarry

Thiru. R.K.Panneer Selvam
கிராம நிர்வாக அலுவலர்
எருமாபட்டி கிராமம்
அஞ்சாக்கவுண்டனபட்டி கிராமம்
அரவக்குறிச்சி வட்டம்
கரூர் மாவட்டம்

Annexure-IX

From
Dr.P.Jayapal, M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Karur.

To
Thiru.R.K.Panneerselvam,
S/o.Thiru.R.P.Kaliappan,
No.163, Rengapalayam,
Punnamchathiram,
Pugalur Taluk,
Karur District.

Rc.No.60/Mines/2021, Dated:31.10.2022

Sir,

Sub: Mines and Minerals – Minor Mineral – Karur District – Aravakurichi Taluk – Anjagoundanpatti Village – S.F.No.3/2 Over an extant 0.88.0 hectares - Quarry lease application for Rough Stone and Gravel – Preferred by Thiru.R.K.Panneerselvam – Mining Plan approved – requested for the details of Existing/ proposed/ abandoned quarries situated within 500 mts radial distance - furnished – Regarding.

- Ref: 1. Quarry lease application for Rough stone and Gravel preferred by Thiru.R.K.Panneerselvam, S/o.Thiru.R.P.Kaliappan, No.163, Rengapalayam, Punnamchathiram, Pugalur Taluk, Karur District - dated: 11.02.2022
2. Precise Area Communication Notice Rc.No.60/Mines/2021, Dated: 26.08.2022
3. Mining Plan submitted by Thiru.R.K.Panneerselvam Letter dated: 19.09.2022.
4. The Deputy Director, Geology and Mining, Karur Mining Plan approved letter Rc.No. 60/Mines/2021, Dated: .10.2022
5. Thiru.R.K.Panneerselvam letter dated: .10.2022

In the reference 1st cited, Thiru.R.K.Panneerselvam have applied quarry lease for quarrying Rough stone and Gravel in S.F.No.3/2 Over an extant 0.88.0 hectares of patta lands in Anjagoundanpatti Village, Aravakurichi Taluk, Karur District. The Deputy Director of Geology and

Mining, Karur have issued precise area letter to the proposed lease area vide reference 2nd cited.

Accordingly, the applicant has submitted the 3 copies of draft Mining Plan and the same was approved by the Deputy Director, Geology and Mining, Karur vide reference 4th cited.

In the reference 5th cited, the applicant has requested the Deputy Director of Geology and Mining, Karur for the Details of Existing, Proposed and abandoned quarries situated within 500 meter radial distance from subject area and same has been furnished as follows:-

I. Existing Other Quarries: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks.
1	Thiru.D.Sivajeeganesan, S/o.Duraisamy, No.53 F, Periyakadai Street, Aravakurich Taluk, Karur District.	27/2 28	3.41.00	07.2.2018 to 06.2.2023	
2	Thiru.R.K.Panneerselvam, S/o.R.P.Kaliappan, 163, Rengapalayam, Punnamchathiram, Punnam, Aravakurichi T.k, Karur D.t.,	2/4B, 3/3(Part) 3/4	01.59.32	13.03.2020 to 12.03.2025	

II. Proposed Area: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks
1	Thiru.R.K.Panneerselvam, S/o.Thiru.R.P.Kaliappan, No.163, Rengapalayam, Punnamchathiram, Pugalur Taluk, Karur District	3/2	0.88.0		Proposed Area

III. Lease Expired and abandoned Area: -

Sl No.	Name of the Owner	S.F.No.	Extent (hect)	Lease Period	Remarks
1	Thiru .K.Palanisamy S/o Sri .Krishnasamy Gounder Uthukkaraiatti Pagantham Village	2/3 2/4A	1.15.0	09.08.2016 to 08.08.2021	---

[Handwritten Signature]
31/10/22

Deputy Director,
Geology and Mining,
Karur.

[Handwritten Signature]
31/10/22

From
Dr.P.Jayapal M.Sc., Ph.D.,
Deputy Director,
Geology and Mining,
Karur.

To
Thiru.R.K.Panneerselvam,
S/o.Thiru.R.P.Kaliappan,
No.163, Rengapalayam,
Punnamchathiram,
Pugalur Taluk,
Karur District.

Rc.No.60/Mines/2021, Dated:10.10.2022

Sir,

Sub: Mines and Minerals – Minor Mineral – Karur District – Aravakurichi Taluk – Anjagoundanpatti Village – S.F.No.3/2 Over an extant 0.88.0 hectares - Quarry lease application for Rough Stone and Gravel – Preferred by Thiru.R.K.Panneerselvam - Precise area communicated - mining plan submitted for approval – Approved – Regarding.

- Ref: 1. Quarry lease application for Rough stone and Gravel preferred by Thiru.R.K.Panneerselvam, S/o.Thiru.R.P.Kaliappan, No.163, Rengapalayam, Punnamchathiram, Pugalur Taluk, Karur District - dated: 11.02.2022.
2. Order of the Hon'ble Supreme Court of India in I.A.Nos.12-13/2011 in SLP (C) No.19628-19629/2009, dt: 27.02.2012.
3. Government of India, Ministry of Environment and Forest Office Memorandum, Dated:18.05.2012.
4. The Chairman, State Level Environment Impact Assessment Authority, Tamil Nadu D.O.Lr.No.SEIAA-TN/Minor Minerals/2012, Dated: 17.09.2012.
5. The Commissioner of Geology and Mining, Chennai letter Rc.No.3868/LC/2012, dt: 19.11.2012.
6. Deputy Director, Geology and Mining, Karur Notice Rc.No.60/Mines/2021, Dated: 26.08.2022.
7. Mining Plan submitted by Thiru.R.K.Panneerselvam letter Dated: 19.09.2022.

Thiru.R.K.Panneerselvam applied for quarry lease to quarry Rough Stone and Gravel vide in the reference 1st cited and Precise area

communicated to the applicant regarding to submit the mining plan for approval as per rule 41 and also submit the Environmental Clearance as per Rule 42 of Tamil Nadu Minor Mineral Concession Rules

Accordingly Thiru.R.K.Panneerselvam have submitted three copies of draft mining plan for approval in respect of Rough stone and Gravel quarry lease applied areas, over an extent of 0.88.0 hectares of patta land in S.F.No.3/2 of Anjagoundanpatti Village, Aravakurichi Taluk, Karur District in the reference 7th cited.

The above submitted mining plan for the grant of Rough stone and Gravel quarry lease in S.F.No.3/2 Over an extant 0.88.0 hectares of patta land in Anjagoundanpatti Village, Aravakurichi Taluk, Karur District has been examined in detail.

As per the guidelines/ instructions issued by the Commissioner of Geology and Mining, Chennai vide letter Rc.No.3868/LC/2012, date: 19.11.2012., the mining plan submitted by the applicant 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) Act, 1957, 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) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.


- (III) The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (IV) The approval is valid up to five years from the date of execution of lease deed and the applicant should submit scheme of mining / at lease 180 days before the expiry of the mining plan period.
- (V) As per the Deputy Director, Geology and Mining, Karur notice in Rc.No.60/Mines/2021, Dated:26.08.2022 the following conditions are incorporated in the Mining Plan plates.

1. விண்ணப்ப புலத்தின் கிழக்கில், தென்வடலாக செல்லும் வாரிக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு யாதொரு சேதமுமின்றி முறையாக குவாரி பணி செய்ய வேண்டும்.
2. விண்ணப்ப புலத்திற்கு அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் மற்றும் புறம்போக்கு நிலத்திற்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விட்டு யாதொரு சேதமுமின்றி முறையாக குவாரிப்பணி செய்ய வேண்டும்.
3. குத்தகைக்காலத்தில் கைத்துளைப்பான் கருவி கொண்டு பாறைகளை துளையிட்டும், மிதமான வெடிபொருள் பயன்படுத்தியும், பொதுமக்களுக்கோ, பொது சொத்துக்களுக்கோ யாதொரு சேதமுமின்றி விதிமுறைகளின்படி குவாரிப்பணி செய்ய வேண்டும்.
4. குவாரித் தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்ய Metalliferous Mines, விதிகளின்படி அகலமானதும், பாதுகாப்பானதுமான Benches அமைத்து பாதுகாப்பான முறையில் குவாரிக்குள் வாகனங்கள் சென்றுவரவும் மற்றும் குவாரி தொழிலாளர்களின் பாதுகாப்பினை உறுதி செய்தும் குவாரிப்பணி செய்ய வேண்டும்.
5. குவாரி குத்தகை வழங்க ஏதுவாக துணை இயக்குநர் (சுரங்கம்) அவர்களால் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினையும், மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (SEIAA) அனுமதி பெற்று மாவட்ட நிர்வாகத்திற்கு விண்ணப்பதாரரால் சமர்ப்பிக்கப்பட வேண்டும்.

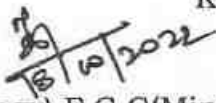
- (VI) Quarrying shall be done as per the approved Mining Plan and that the mining plan is approved without prejudice to any other law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.

(VII) If anything is found to be concealed as required by the Mines Act in the contents of the Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

Encl: Two copies of Approved Mining Plan.


18/10/22
Deputy Director,
Geology and Mining,
Karur.

Copy to:


18/10/2022
Thiru.S.Suriyakumar, M.Sc., M.Phil.(Geology) F.C.C(Mining), PGDBA,
PGDIPC,
Aadhi Boomi Mining and Enviro Tech (P) Ltd.,
3/216, K.S.V.Nagar, Narasothipatti, Salem 636 004.