

DRAFT EIA/EMP REPORT

FOR

ROUGHSTONE AND GRAVEL QUARRY

Extent – 1.62.0 ha

FIRST FIVE YEAR PRODUCTION CAPACITY OF
98276m³ OF ROUGHSTONE AND 27084m³ OF
GRAVEL

DEPTH – 20m BGL (3m Gravel+17m Rough stone) for
the First 5 years

SURVEY Nos. 319/1, 319/2, 319/3, 319/4,
VILLAGE - SIRUTHAMUR, TALUK -UTHIRAMERUR,
DISTRICT – KANCHEEPURAM,
STATE - TAMILNADU.
CATEGORY – B1

Thiru.N. Kanniyappan

S/o. Narayanapillai

No,55, Mariyamman Koil Street,
Neerkundram Village, Aanampakkam Post,
Uthiramerur Taluk,
Kancheepuram District.

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS



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NABET ACC. NO: NABET/EIA/2023/IA0067

Valid till : 29th Dec.2023



ENVIRONMENTAL LAB

ACCURACY ANALABS

(NABL Accreditation Laboratory)

(ISO 9001: 2015 Certified Laboratory)

No.7A, 17Sri Sakthi Vinayagar Complex,

Ramalakshmi Nagar Extn,

Dindigul-624 004.



BASELINE MONITORING PERIOD : MARCH – MAY 2022

List of Quarries within the radius of 500 m

Proposed Quarries					
ID	Name of the Owner	Name of the Village, and Taluk, & S.F. Nos.	Extent in (ha)	Status	Remarks
P1.	N. Kanniyappan, S/o. Narayanapillai, No.55, Mariyamman Koil Street, Neerkundram Village, Aamambakkam Post, Salavakkam Via, Uthiramerur Taluk, Kancheepuram.	Sirudhamur Village, Uthiramerur Taluk 319/1,319/2,319/3, 319/4	1.62.00	-	Applied Area
P2.	K. Prabakaran, S/o. N. Kanniyappan, No.43, Old State Bank Colony Road, West Tambaram, Chennai - 45.	Sirudhamur Village, Uthiramerur Taluk 320/5 Govt.Land	2.15.30	-	Under Processing
P3.	D. Arunkumar, No.30/31, Thirumalai Nagar, Hasthinapuram, Kancheepuram District	Sirudhamur Village, Uthiramerur Taluk 338/1 (Part-1)	4.95.00	-	Under Processing
P4.	K. Subramaniam, S/o. Karuppannan, No.40, Kamarajar Street, Tambaram west Chennai - 45.	Sirudhamur Village, Uthiramerur Taluk. 337/2,3,336/3	3.26.50	-	Under Processing
		Total	11.98.80		
Existing Quarries					
SL.No.	Name of the Owner	Name of the Village, and Taluk, & S.F. Nos.	Extent (ha)	Lease Period	
E1.	D. Uma Sankar S/o. Devaraj No.1, Thiru.Vi.Ka. Salai, Thiruvalluvar Nagar, Salavanpettai, Vellore.	Sirudhamur Village, Uthiramerur Taluk 334/1B	2.72.00	31.01.2017 To 30.01.2022	Operation
E2	S. Vaithialingam 5/o. Sivaganapathy subramaniam, No.13, First street, Swamy Nagar Extn -1, Ullagaram,	Sirudhamur Village, Uthiramerur Taluk 314/6B,314/7A,314/7B ,314/8,314/10	1.08.00	22.02.2018 To 21.02.2023	Operation

E3	N. Kanniyappan , S/o. Narayanapillai, No.55, Mariyamman Koil Street, Neerkundram Village, Aamambakkam Post, Salavakkam Via, Uthiramerur Taluk, Kancheepuram.	Sirudhamur Village, Uthiramerur Taluk 320/3A, 3B, 4, 332/1A, 1B, 2	2.41.00	15.06.2018 To 14.06.2023	Operation
		Total	6.21.00		
Abandoned Quarries					
Sl.No	Name of the Owner	Name of the Village, and Taluk, & S.F. Nos.	Extent (ha)	Lease Period	
EX1.	S. Kothandaraman, Kancheepuram.	Sirudhamur Village, Uthiramerur Taluk 338(P) Q.No.1 (Govt. Land)	5.00.0	09.08.2005 To 08.08.2010	Lease Expired
EX2.	C. Ranganathan No.12, Thiruvalluvar Road, Unamancherry, Chennai - 48.	Sirudhamur Village, Uthiramerur Taluk338(P) Q.No.2 (Govt. Land)	5.00.0	04.10.2005 To 03.10.2010	Lease Expired
EX3.	K. Subramaniam, 5/o. Karuppannan, No.40, Kamarajar Street, Tambaram west, Chennai - 45.	Sirudhamur Village, Uthiramerur Taluk 337/2	1.93.00	22.09.2007 To 21.09.2012	Lease Expired
EX4.	PJR Sathishkumar PJR Bluemetals chennai pvt Ltd No.8, PJR Square, Sivashanmugam Salai, Tambaram, Chennai - 45	Sirudhamur Village, Uthiramerur Taluk 334/1	1.80.00	20.05.2010 To 19.05.2015	Lease Expired
EX5.	K.Subramaniam, Old No.198, New No.40, Kamarajar Street, West Tambaram, Chennai-45	Sirudhamur Village, Uthiramerur Taluk 336/3, 337/2,3, 5,6	3.26.50	12.09.2013 To 11.09.2018	Earlier leased out to 336/3 (1.93.00) K.Subramania m Applicant has applied including the same area & Other fields
		Total	15.06.50		

Source: i). AD Letter – Rc.No.740/Q3/2018 dated 11.12.2020

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

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru.N.Kanniyappan

“ToR issued vide Letter No. SEIAA-TN/F.No. 8997/SEAC/ToR-1256/2022,

Dated:20.09.2022

SPECIFIC CONDITIONS		
1.	The proponent shall obtain NBWL Clearance as the Karikili Birds Sanctuary is located within 10 km from the proposed mining area while submitting EIA study), along with minutes public hearing.	DFO letter and NBWL Clearance details will be submitted along with the final EIA report.
2.	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 after it is approved by the concerned Asst. Director of Geology) and Mining during the time of appraisal for obtaining the EC.	Cumulative impact study results related to air pollution, water pollution, & health impacts have been given in section 7.4, pp. 150 -158 under chapter VII. Based on the results, environmental management plan has been prepared and added in pp. 163-179 under chapter X.
3.	The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, indicating the haul road with keeping the benches intact.	Not Applicable. This project proposal comes under fresh lease category for quarrying of Rough Stone & Gravel.
4	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 affidavit and other evidences will be submitted along with the final EIA report.

	the MMR 1961 such as blaster. mining mate, mine foreman, III Class mines manager appointed by the proponent.	
5	The PP shall present 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 20 m from the blast site.	This quarry operation using NONEL blasting techniques and strictly follow guidelines of Deputy General of Mines Safety. This method will involve closed spaced perimeter holes to reduce the overbreak/backbreak on a blast. The objective of the blasting design is to prevent fly rocks from damaging the nearby structures.
6	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.	The video/photographic evidences will be submitted along with the final EIA report.
7	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?	Not Applicable. This project proposal comes under fresh lease category for quarrying of Rough Stone & Gravel.
b)	Quantity of minerals mined out.	The question is not applicable for this project and this project comes under fresh lease quarry.
c)	Highest production achieved in any one year	This project comes under fresh lease quarry.

d)	Detail of approved depth of mining.	The question is not applicable for this project and this project comes under fresh lease quarry
e)	Actual depth of the mining achieved earlier.	The question is not applicable for this project and this project comes under fresh lease quarry
f)	Name of the person already mined in that leases area.	The question is not applicable for this project and this project comes under fresh lease quarry
g)	If EC and CTO already obtained, the copy of the same shall be submitted.	The question is not applicable for this project and this project comes under fresh lease quarry
h)	Whether the mining was carried out as per the approved mine plan (or EC if issued with stipulated benches.	The question is not applicable for this project and this project comes under fresh lease quarry
8.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project area lease boundary coordinates details are given in Chapter II and Figure No. 2.3. Refer: p.no.12. Geology map of the project area covering 10km radius map has been included in Chapter II and Figure No. 2.4. Refer: p. no. 13 Geomorphology Map of the Study Area covering 10 km radius map has been included in Chapter II and Figure No. 2.5. Refer: p.no. 14.
9	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The drone survey will be conducted and the report will be submitted along with the final EIA report.
10	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.	The green belt development proposal has been discussed in the Chapter IV and section 4.6.2.2. Refer: pp.128-135. The photographs of Wire fencing will be submitted along with final EIA report.

11	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.	The details of mineral reserves have been provided in pp.15 under chapter II and section 2.5.
12	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.	Standard operating procedures as per DGMS for safety and health aspects of the workers and for surrounding habitants during mining operations should be followed. The safety and the health aspects of workers have been discussed in section 4.4.2, under chapter IV, pp.122-123.
13	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	Detailed hydrogeological studies were conducted for the period of 3 months (March-May,2022). Results have been discussed in section 3.2.5 pp.39-48 under chapter III.

	working will intersect groundwater. Necessary data and documentation in this regard may be provided.	
14	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 details have been provided in sections 3.1-3.5.8, pp.26-92 under chapter III. Traffic details have been given in section 3.7, pp.107-110 under chapter III.
15	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.	Cumulative impact study results related to air pollution, water pollution, & health impacts have been given in section 7.4, pp. 150 -158 under chapter VII. Based on the results, environmental management plan has been prepared and added in pp. 163-179 under chapter X.
16	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	This project involved exploration of rough stone. Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression.
17	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	Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8, p.20 under chapter II. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife

	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.	sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Figure 3.1, p.29 under chapter III.
18	Details of the land for storage of Overburden/waste Dumps (or) Rejects outside the mine lease. such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not Applicable. There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the needy customers. Hence, no dumps are proposed outside the lease area.
19	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
20	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.	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.

21	Impact on local transport infrastructure due to the Project should be indicated.	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in section 3.7-3.8 in pp.107-109 under chapter III.
22	A tree survey study shall be carried out (nos. name of the species, age, diameter etc.,) both within the mining leases applied area & 300m buffer zone and its management during mining activity.	The details have been provided in sections 3.5.6.1-3.5.7, pp.67-86 under chapter III. The details of green belt development proposal have been included in Chapter IV and section 4.6.2.1 Refer: pp.128-135.
23	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Mine closure details have been provided in section 2.6.3-2.6.4 in pp.19-20 and mine closure plan plates have been given in Figures 2.8 p.21 under chapter II.
24	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 SETAA/SEAC with regard to the Office Memorandum of MoEF & CC accordingly.	Public Hearing points raised and commitments of the Project Proponent on the same will be updated in the Final EIA report.
25	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	The public hearing advertisement information will be provided in the final EIA report.

26	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.	A draft EIA report, executive summary in English and Tamil have been prepared for submission to TNPCB for conducting public hearing.
27	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.	The EIA coordinator visited the project site, met the local people and student, and educated the importance of protecting the environment.
28	The purpose of green belt around the project is to capture the fugitive emissions and to attenuate the noise generated, in addition to the improvement in the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix in consultation with the DFO, State Agriculture University and local school/ college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in the mixed manner.	The detailed greenbelt development plan has been provided in sections 4.6.2.1-4.6.6, pp.128-135 under chapter IV.
29	Taller/one year old Saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted in proper escapement as per the	The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the eco-friendly bags should be purchased and planted with 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.	spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.
30	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.	Details regarding disaster management plan have been provided in Section 7.3, pp.145-158 under chapter VII.
31	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.	The details have been provided in section 7.3, pp.145 -158 under chapter VII.
32	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.	Occupational health impacts of the project and preventive measures have been explained in detail in sections 10.9-10.9.4 in pp.169-173 under chapter X.
33	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the	No public health implications are anticipated due to this project. Details of CER and CSR have been given in sections 8.6 and 8.7 in pp.160-161 under the chapter VIII.

	proposed remedial measures should be detailed along with budgetary allocations.	
34	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 socio – economic studies were carried out and the result have been discussed in section 3.6, pp.92-107 under chapter III
35	Details of litigation Pending against the project, if any' with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
36	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.	Project Cost is Rs.60,96,000 /- CER Cost is Rs. 1,21,920/- In order to implement the environmental protection measures, an amount of Rs. 18,02,000/-lakhs as capital cost and recurring cost as Rs. 11,21,480/-lakhs as recurring cost is proposed considering present market price considering present market scenario for the proposed project.
37	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	It is not applicable because the proposed project is a new one.

	certified by MoEF & CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	
38	The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating he would abide the EMP for the entire life of mine.	The EMP has been prepared and given in Table 10.9 under Chapter X, pp.174-178.
39	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Reference besides attracting penal provisions in the Environment (Protection) Act, 1986.	The EIA report has been prepared keeping in mind the fact that concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986.
<p>Discussion by SEIAA and the Remarks:</p> <p>The proposal was placed in the 552nd Authority meeting held on 20.09.2022. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management plan subject to the conditions as recommended by SEAC & normal condition in addition of the following conditions:</p>		
1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Cluster Management Committee will be constituted in the near future.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc..	The information will be shared to the cluster management committee.

3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	All the information has been discussed in Section 2.6 under Chapter II, pp.18-24.
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.	It will be informed to the committee.
6	The Cluster Management Committee shall form Environmental policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.
7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	A proper action plan regarding the restoration will be followed by the committee.

8	The committee shall furnish the Emergency Management plan within the cluster.	The committee will submit the emergency management plan to the respective authority in the stipulated time period.
9	The committee shall deliberate on the health of the worker staff involved in the mining as well as the health of the public.	The information on the health of the workers and the local people will be updated periodically.
10	<p>Detailed study shall be carried out in the 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</p> <ul style="list-style-type: none"> a) Soil health & bio-diversity. 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. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams. 	The study is in process. The results will be updated in the final EIA report.

11	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.
12	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	The fire safety and evacuation plan will be submitted by the committed to the corresponding authority.
13	The measures taken to control Noise, Air, Water, Dust and steps adopted to efficiently utilise the Energy shall be furnished.	The measures to control air, noise, and water pollution due to dust have been provided in Sections 4.3, 4.4, and 4.5 under Chapter IV, pp.111-128.
14	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.	The vegetation details have been provided in section 3.5.6 -3.5.7, pp.67-86 under chapter III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
15	Impact on surrounding agricultural fields around the proposed mining Area.	As the proposed lease area is dominantly surrounded by mining land, barren land, and fallow land, the impact on the surrounding agricultural fields if present will be low. With proper mitigation measures, the project will be carried out to reduce the impact further to the level of negligence.
16	Erosion Control measures.	Garland drainage structures will be constructed around the lease area to control the erosion, as discussed in Section 4.3 under Chapter IV, pp.111 and 112.
17	Impact on soil flora & vegetation around the project site	The vegetation details have been provided in section 3.5.6 -3.5.7, pp.67-86 under chapter

		III. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
18	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 matter has been discussed under Chapter IV, pp.110-135.
19	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines. roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The VAO certificate of 300 m radius have been given in the annexure part, p.331.
20	As per the MoEF & CC office Memorandum F.No. 22-65/2017-IA.III dated: 30.09.2020, and 20/10/2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the environment Management Plan.	The concerns raised during the public consultation and all the activities proposed will be updated in the final EIA report.
21	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	Greenbelt development plan as discussed in section 4.6.2 -4.6.6, pp.128-135 under chapter IV has been designed to reduce the impact of carbon emission on the environment.

	including control of other emission and climate mitigation activities.	
22	The environmental impact assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed bank and suggest measures to maintain natural ecosystem.	The matter including the results of the soil's micro flora, fauna and soil seed banks and the suitable remedial measures will be included in the final EIA report.
23	Action should specifically suggested for sustainable management of the area and restoration of ecosystem for flow of goods and services.	The FAE of ecology and biodiversity has advised the project proponent that replantation work, particularly for the project area where plants of 4 years old exist should be carried out in the vacant areas available.
24	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and reservoir.	An analysis for food chain in aquatic ecosystem is under process and report will be added to the final EIA report.
25	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact of mining on soil environment has been discussed in section 4.2, under chapter IV, p.111.
26	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	This report has included studies of ecology and biodiversity covering vegetation, endemic, vulnerable and endangered indigenous flora and fauna in section 3.5.6-3.5.8 pp. 67-92. According to the ecological report, there is no endemic, vulnerable and endangered indigenous flora and fauna.
27	The Environmental Impact Assessment should study impact on standing trees and the existing trees	The ecological details have been provided in section 3.5.6.1, pp.67 under chapter III.

	should be numbered and action suggested for protection.	
28	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	All the studies including wetlands, water bodies, river streams, lakes and farmer sites have been included in Table 3.43 in chapter III, p.109.
29	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	The details have been given in section 10.9.4 Table 10.9 and pp.174-179 under chapter X.
30	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The information will be included in the final EIA report.
31	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 near project site. The list of reserve forests within 10 km radius has been provided in section 3.5.6.4 p.83-84 and Table 3.43 under chapter III, p.109.
32	The Project proponent shall study and furnish the impact of project on plantations in adjoining Patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in section 4.1 under chapter IV, p.110.
33	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	The impacts of the proposed project have been discussed in chapter IV, pp.110-135.

34	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damage to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in sections 4.6.5-4.6.6 under chapter IV, pp.133-135.
35	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 & microplastic on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The matter on plastic waste management has been given in section 7.5 under chapter VII, p.156.
36	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	The project proponent shall do barbed wire fencing work and develop a green belt around the lease area to prevent wildlife from entering the site among other environmental protection measures.
37	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals. ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data. it may clearly be shown whether working will intersect groundwater.	Details on the nearest surface water bodies such as rivers, tanks, canals, ponds etc. have been given in Tables 3.9 & 3.10a pp.39-41. and Figure 3.5-3.8 in pp.42-45. Detailed hydrogeological studies were conducted for the period of 3 months (March-May 2022) and the results have been discussed in sections 3.2.5.5, pp.57-48 under chapter III.

	Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	
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.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII, pp.145-150.
39	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII, pp.142-145.
40	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Detailed mine closure plan has been attached with the approved mining plan report in Annexure III.
41	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management plan has been given in Table 10.9 under Chapter X, pp.174-178.
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	Not applicable. This is not a violation category project. This proposal falls under B1 category.

	1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	
2	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a patta land. Document is enclosed along with the approved mining plan in Annexure III.
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.	All the documents related to mining plan, EIA and public hearing are compatible to each other and have been provided in the annexure part.
4.	All corner coordinates of the mine lease area, superimposed on a high-resolution imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Project area lease boundary coordinates details are given in Chapter II and Figure No. 2.3. Refer: p.no.12. Geology map of the project area covering 10km radius map has been included in Chapter II and Figure No. 2.4. Refer: p. no.13 Geomorphology Map of the Study Area covering 10 km radius map has been included in Chapter II and Figure No. 2.5. Refer: p.14.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geology map of the area, geomorphology of land forms of the area, existing	Soil, water, air and noise sampling locations have been provided in toposheets of survey of India in pp.33,37,55,62 under chapter-III.

	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.	The applied area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement /deviation/violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the 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	The proponent has framed Environmental Policy and the same has been discussed in section 10.1, p.163 under chapter X.

	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.	It is an opencast quarrying operation involving semi mechanized method. As the rock is a hard, compact and homogeneous body, the height 5m and width of the bench 5m will be maintained as with 90 ⁰ bench angles. Quarrying activities will be carried out under the supervision of competent persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining environmental clearance.
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 considered for this study is of 10 km radius and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8, p.20 under chapter II. 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 has been discussed in Figure 3.1, p.29 under chapter III.

11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not Applicable. There is no waste anticipated during this quarry operation. The entire quarried out rough stone will be transported to the needy customers. Hence, no dumps are proposed outside the lease area.
12.	Certificate from the competent authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not Applicable. There is no forest land involved within the proposed project area. Moreover, a certificate from DFO will be obtained and attached with the final EIA report.
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 proposed project area does not involve any forest land.

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. There are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project, p.91 under chapter III.
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within 1 km radius. And details of vegetation found in the forests occurring beyond the 1 km radius have been given in chapter III, p.91.
16	A study shall be got done to ascertain the impact of the mining project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Not Applicable. There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in p.91 under chapter III.
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	Not Applicable. There are no National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/ Elephant Reserves within 10 km radius from the periphery of the project area, p.91 under chapter III.

	ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	<p>A detailed biological study was carried out in both core and buffer zones and the results have been discussed in section 3.5.6-3.5.8, pp.67-92 under chapter III.</p> <p>There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.</p>
19	Proximity to areas declared as 'Critically Polluted' or the project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications	<p>Not Applicable.</p> <p>Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.</p>

	<p>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.</p>	
20	<p>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).</p>	<p>Not Applicable. The project doesn't attract the C.R.Z. Notification, 2018.</p>
21	<p>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 programs prepared and submitted accordingly, integrating the sectoral</p>	<p>Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R plan / compensation details for the Project Affected People (PAP) is not anticipated.</p>

	<p>programs 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.</p>	
22	<p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December – February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction. The mineralogical composition of</p>	<p>Baseline data were collected for the period of March-May 2022 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in sections 3.0-3.7, pp.26-107 under chapter III.</p>

	PM10, particularly for free silica, should be given.	
23	Air quality modelling 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 modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing predominant wind direction may also be indicated on the map.	Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 9.6.1. The model results have been given in section 4.4-4.4.2, pp.113-123 under the chapter IV.
24	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in Table 2.11, p.24 under chapter II.
25	Necessary clearance from the competent authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable. Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.

26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27	Impact of the project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in section 4.3, pp. 111-113 under the chapter IV.
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 hydrogeological 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 should be furnished.	The ground water table is found at the depth of 50 m below ground level. The depth of quarry is 20m BGL Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in pp.40-45 under the chapter III.

29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.
30	Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The Highest elevation of the project area is 53m AMSL. Ultimate depth of the mine is 20 m below ground level (BGL). Depth to the water level in the area is 50 m BGL.
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed prior to commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Greenbelt development plan has been given in section 4.6.2.2-4.6.6, pp.129 -135 under chapter IV.

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>Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in section 37, pp.107-109 under chapter III.</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>Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in section 2.6.7, p.23 under chapter II</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>Mine closure plan is a part of approved mining plan enclosed in Annexure III.</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 examination schedules should be incorporated in</p>	<p>Occupational health impacts of the project and preventive measures have been explained in detail in section 4.4.2 pp.122-123 under chapter IV.</p>

	the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36	Public health implications of the project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in sections 8.6 and 8.7 in pp.160-161 under chapter VIII.
37	Measures of socio-economic significance and influence to the local community proposed to be provided by the project proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 26 people directly as discussed in section 8.1, p.159 under chapter VIII.
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed environment management plan for the project to mitigate the anticipated impacts has been included in pp.163-179 under chapter X.
39	Public hearing points raised and commitment of the project proponent on the same along with time bound Action Plan with	The outcome of public hearing will be updated in the final EIA/EMP report.

	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.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The environmental implementation and protection measure can be achieved as per the EMP committee an amount of Rs. 29,23,480 /- as capital cost and recurring cost as Rs. 11,77,554 /- as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs. 79,98,885/-. The Budgetary Provision for Environmental Management given in section 10.9.4 and Table 10.10.p.45 under chapter-X.
42	A Disaster management plan shall be prepared and included in the EIA/EMP report.	Details regarding disaster management plan have been provided in section 7.3, pp.145-158 under chapter VII.
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.	Benefits of the project details have been given in p.159 – 161 under chapter VIII.
44	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive summary of the EIA/EMP report	Enclosed as a separate booklet.

b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the report, especially in tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project	Baseline monitoring reports are enclosed with this report in section 3.1-3.6.6, pp.26-107 under chapter III. Original Baseline monitoring reports will be submitted in the final EIA report during appraisal.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	Not applicable
f)	The questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The questionnaire will be enclosed along with final EIA/EMP report.
g)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 th August, 2009 have been followed while preparing the 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 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.	Not applicable.
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.	Not applicable because it is a fresh lease.
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,	Surface & geological plans have been included in Annexures III. Progressive closure plan and sections has been included in Annexures III.

	clearly showing the land features of the adjoining area.	
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CHAPTER I

INTRODUCTION

1.0 PREAMBLE

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

In compliance with ToR obtained vide letter No. SEIAA-TN/F.No.8997/ToR-1256/2022 dated 20.09.2022, this EIA report has been prepared for the project proponent, Mr.N. Kanniyappan applied for rough stone and gravel quarry lease in the patta land falling in S. F. Nos. 319/1, 319/2, 319/3, 319/4, over an extent of 1.62.00 ha in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu. This EIA report takes into account the rough stone quarries within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contain four proposed projects, known as P1, P2, P3 and P4 three existing projects, known as E1, E2, E3. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016. The total extent of all the quarries is 18.19.80 ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

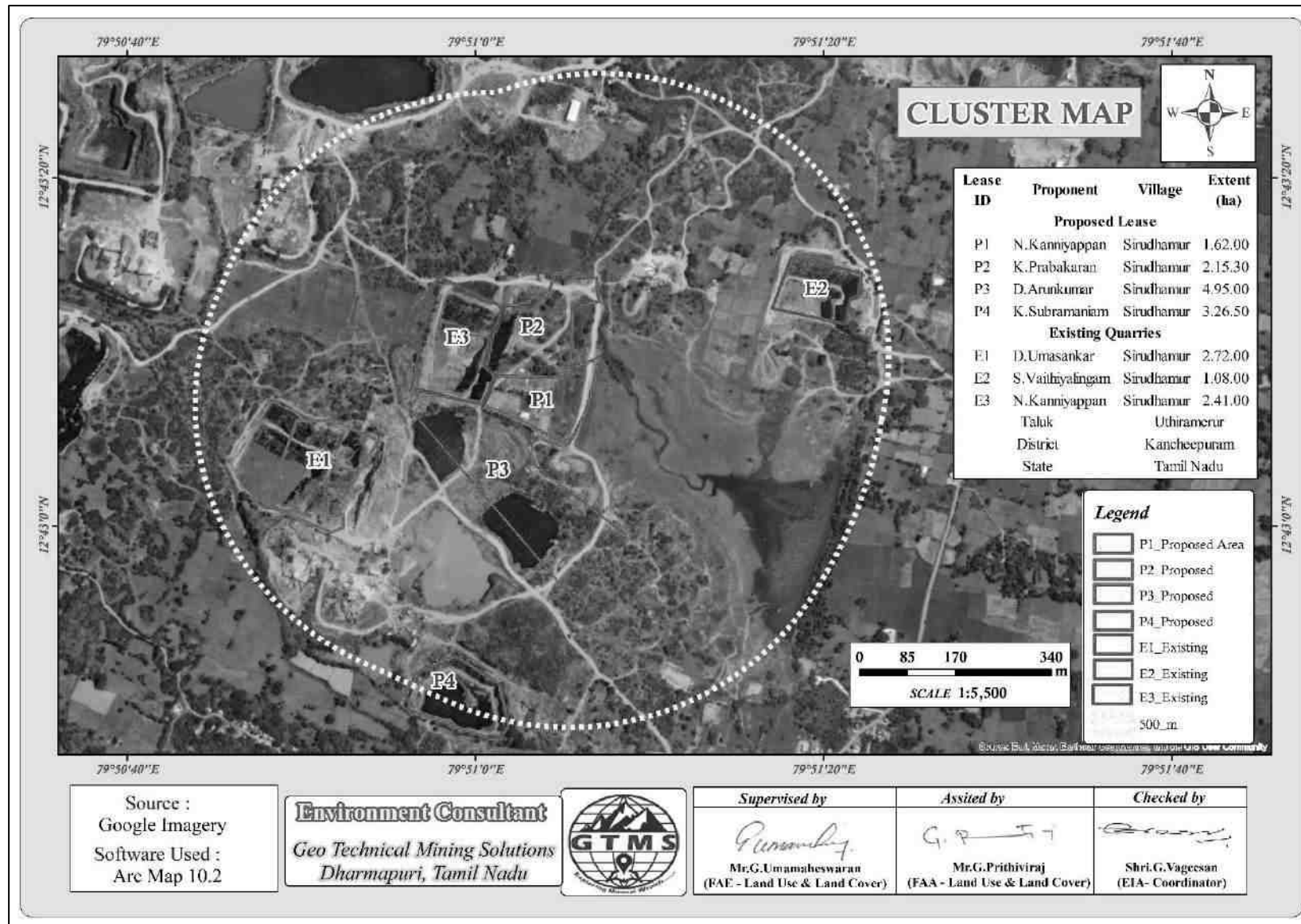


Figure 1.1 Location of the proposed and existing rough stone and gravel quarries in the cluster of 500 m radius

1.1 PURPOSE OF THE REPORT

The purpose of the report is to study baseline environmental conditions in and around the proposed project area for the period of **March to May 2022** according to the provisions of MoEF & CC office memorandum dated 29.08.2017 and MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015, to analyse impacts and provide mitigation measures.

1.2 ENVIRONMENTAL CLEARANCE

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

- ❖ Screening
- ❖ Scoping
- ❖ Public consultation &
- ❖ Appraisal

1.2.1 Screening

Screening is the first stage of the EIA process. In this stage, the State level Expert Appraisal Committee (SEAC) examined the application of EC made by the proponent in Form 1 through online (proposal No. SIA/TN/ MIN/ 72047/2022, dated 07.02.2022) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on 15.02.2022.

1.2.2 Scoping

During scoping, the SEAC framed a comprehensive Terms of Reference (ToR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued ToR to the proponent vide letter No. SEIAA-TN/F.No.8997/SEAC/ToR-1256/2022 Dated 20.09.2022 for the preparation of an EIA report.

1.2.3 Public Consultation

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

1.2.4 Appraisal

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

1.3 TERMS OF REFERENCE (ToR)

- ❖ Compliance to ToR issued vide ToR letter No. SEIAA-TN/F.No.8997/SEAC/ToR-1256/2022 dated 20.09.2022.

1.4 POST ENVIRONMENT CLEARANCE MONITORING

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

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

1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written “no objection” by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period (EIA Guidance Manual for Mining of Minerals, 2010).

1.6 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC. The generic structure of the EIA document should be as under:

- ❖ Introduction
- ❖ Project description
- ❖ Description of the environment
- ❖ Anticipated environmental impact & mitigation measures
- ❖ Analysis of alternatives (technology & site)
- ❖ Environmental monitoring program
- ❖ Additional studies
- ❖ Project benefits
- ❖ Environmental cost benefit analysis
- ❖ Environmental management plan (EMP)
- ❖ Summary & conclusion
- ❖ Disclosure of consultants engaged.

1.7 IDENTIFICATION OF THE PROJECT PROPONENT

The profile of the project proponent who has involved in this quarrying project has been given in Table 1.1.

1.1 Details of Project Proponent

Name of the Project Proponent	Thiru.N. Kanniyappan
Address	S/o. Narayanapillai No,55, Mariyamman Koil Street, Neerkundram Village, Aanampakkam Post, Uthiramerur Taluk, Kancheepuram District.
Status	Proprietor

1.8 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The method adopted for rough stone and gravel excavation is open cast mining method-involving formation of benches with 5 m height and 5m width. The proposed project site is located in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, and Tamilnadu State. Some of the important features of the proposed project have been provided in Table 1.2.

1.2 Brief Description of The Project

Name of the quarry	Thiru. N. Kanniyappan roughstone & gravel quarry	
Toposheet No	57- P/14	
Latitude	12°43'04.71"N to 12°43'09.69"N	
Longitude	79°51'00.49"E to 79°51'07.15"E	
Highest elevation	53 m AMSL	
Proposed depth of mining five years period	20 m BGL (3 m Gravel +17 m roughstone)	
Geological resources	Rough stone in m³	Gravel m³
	517376	48504
Minable reserves	141596	27084
Five-year production	98276	27084
Existing pit dimension	-	
Ultimate pit dimension	122 m (L) x 74 m (W) x 20 m (D)	
Water level in the surrounding area	40-45 m BGL	

Method of mining	Opencast semi mechanized mining involving drilling and blasting	
Topography	The applied lease area is exhibits plain with altitude of 53m maximum and minimum of 52m from the MSL. The area is sloping towards Southwestern side covered clayey soil with rough stone which does not sustain any type of vegetation.	
Machinery proposed	Jack hammer	2
	Compressor	1
	Excavator	1
	Tippers	4
Blasting method	Controlled blasting method by shot hole drilling and small dia. of 25 mm slurry explosives are proposed to be used for shattering and heaping effect for removal and winning of rough stone. No deep hole drilling is proposed.	
Project cost	Rs. 60,96,000/-	
CER cost @ 2% of project cost	Rs. 1,21,920/-	
Proposed water requirement	3.8 KLD	
Nearest habitation	0.720 km South	

Source: Approved mining plan

1.9 SCOPE OF THE STUDY

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

1.10 REFERENCES

The report has been prepared using the following references:

- ❖ Guidance manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, February, 2010
- ❖ EIA Notification, 14th September, 2006
- ❖ Terms of Reference (ToR) issued by SEIAA.
- ❖ Approved mining plan of this project.
- ❖ The Water (Prevention and Control of Pollution) Act, 1974
- ❖ The Air (Prevention and Control of Pollution) Act, 1981
- ❖ The Environment (Protection) Act, 1986
- ❖ The Forest (Conservation) Act, 1988
- ❖ The Wildlife (Protection) Act, 1972

CHAPTER II

PROJECT DESCRIPTION

2.0 GENERAL INTRODUCTION

The open cast mining method, also known as open-pit mining has been proposed to extract the mineral deposit. It is the most commonly used surface mining method all over the world and is generally suitable for mining low-grade mineral deposits that are found close to the surface of the earth and distributed uniformly over a large area. Open pits are also termed quarries when the pits are used for the extraction of building materials and dimension stones.

Opencast mining starts with the development of benches, the widths of which will be determined in such a way to accommodate the use of heavy machinery. The walls of open pits will be dug at an angle that will be decided based on well-established industry standards to provide safety. In some cases where the walls are composed of weak material such as soil and highly weathered rocks, dewatering holes will be drilled horizontally to relieve the water pressure to avoid wall collapse inside the mine site.

The required mine-related infrastructures will be established close to the open pit. The mining infrastructures may include an administration building, a maintenance garage, and a warehouse. The materials mined from open pits will be brought to the surface using trucks. The waste rocks will be piled up in a suitable location, usually close to the open pit. The structure produced by the waste rock pile is known as a waste dump. The dimension of the waste dump will be determined based on industrial safety standards to prevent the rocks from falling into the surrounding area.

2.1 DESCRIPTION OF THE PROJECT

The proponent, **Mr.N. Kanniyappan** is involved in the undertaking of establishment, construction, development, and closure of open cast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone and gravel. Therefore, the proponent had applied for quarry lease on 14.12.2018 to extract rough stone and gravel. The precise area communication letter was issued by Department of Geology and Mining, Kancheepuram vide Rc.No. 740/Q3/2018 (Mines), Dated 19.10.2020. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Assistant Director of Geology and Mining, Kancheepuram (Rc.No.740/Q3/2018 (Mines), Dated 10.12.2020.). The overall view of the project site is shown in Figure 2.1.



Figure 2.1 Overall view of proposed project site

2.2 LOCATION AND ACCESSIBILITY

The proposed quarry project is located in Siruthamur Village, Uthiramerur Taluk and Kancheepuram District, as shown in Figure 2.2. The project area is located about 20 km Southwest of Kancheepuram, 15 km Southwest of Uthiramerur and 1 km Southeast of Siruthamur Village. The area lies between Latitudes from 12°43'04.71"N to 12°43'09.69"N and Longitudes from 79°51'00.49"E to 79°51'07.15"E. The maximum altitude of the project area is 57 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	Melavalampattam-Nelvoy road (MDR-789)	1.2 km West
	Salavakkam -Tirumukkudal Village road	2.14 km NE
	Chengalpattu -kancheepuram Road (SH 132B)	6.6 km North
Nearest Town	Chengalpattu	13 km NE
Nearest Railway Station	Palur	7.9 km NE
Nearest Airport	Chennai	45 km NE
Nearest Seaport	Chennai	62 km NE

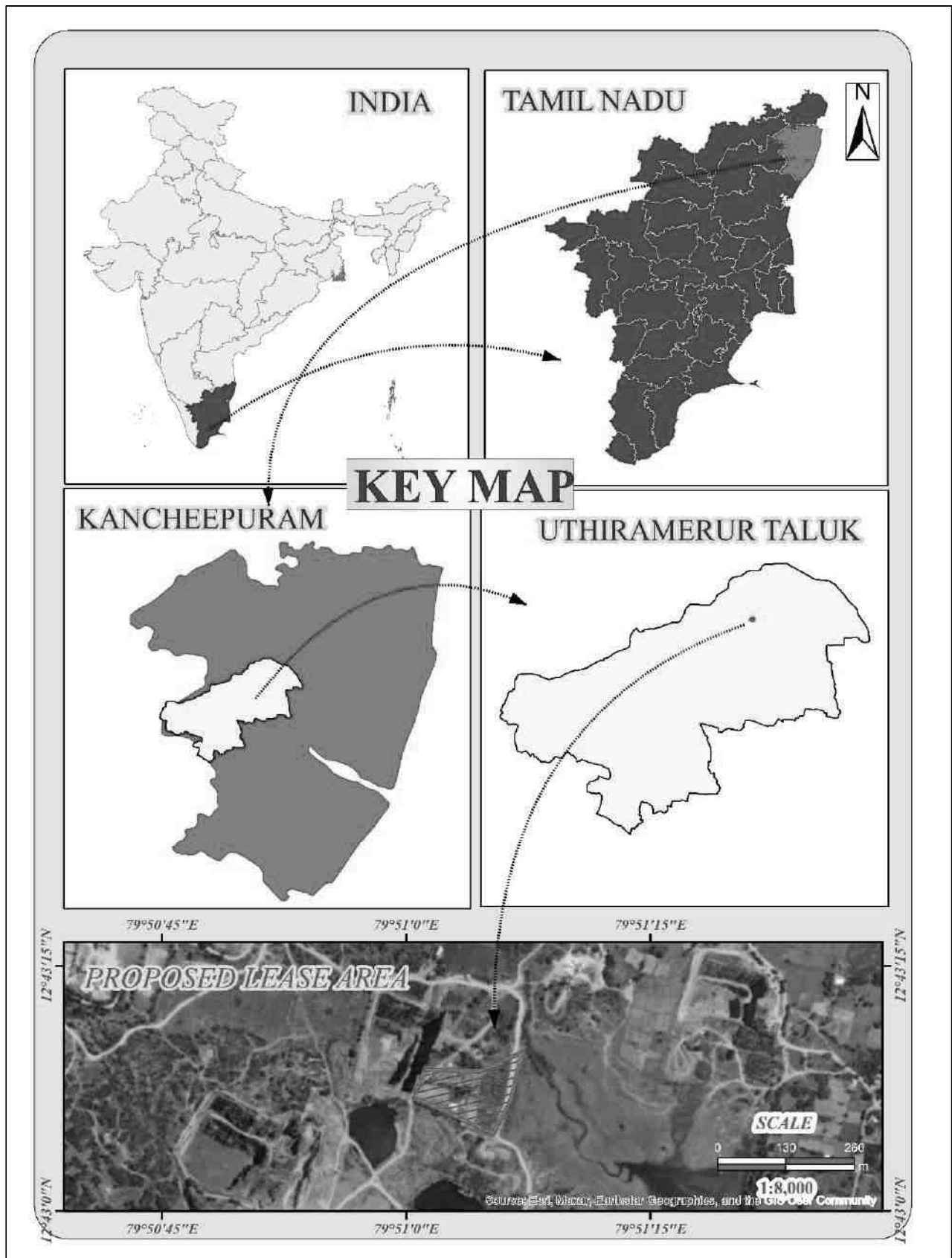


Figure 2.2 Key map showing location of the project site

2.3 LEASEHOLD AREA

- ❖ The extent of the proposed project site is 1.62.0 ha.
- ❖ The proposed project is site specific.
- ❖ There is no mineral beneficiation or processing proposed inside the project area.
- ❖ There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

2.3.1 Corner Coordinates

The boundary corner geographic coordinates are given in Table 2.2 and the proposed project site with boundary coordinates has been shown in Figure 2.3.

Table 2.2 Corner Geographic Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	12°43'9.69"N	79°51'7.15"E
2	12°43'6.62"N	79°51'6.38"E
3	12°43'4.71"N	79°51'5.37"E
4	12°43'6.95"N	79°51'0.49"E
5	12°43'8.61"N	79°51'1.16"E
6	12°43'8.53"N	79°51'4.52"E

2.4 GEOLOGY AND GEOMORPHOLOGY

This section discusses about the geology and geomorphology of the study area of 10 km radius, as given below.

2.4.1 Geology

The study area of 10 km radius mainly consists of granite, granitoid gneiss, sandstone, sand and silt, and ultramafic rocks, The massive formation of charnockite lies in the peninsular gneissic complex the general trend of the gneissic rock NE -SE direction and the regional trend observed is NNE-SSW to NW-SE direction. Spatial distribution of rocks has been shown in Figure 2.4.

2.4.2 Geomorphology

Geomorphologically, the study area is made up of shallow flood plain, and alluvial plain, moderately weathered/ buried pediplain, Shallow weathered/ buried pediplain, pediment/valley floor, channel bar, linear ridge/dyke, as shown in Figure 2.5.



Figure 2.3 Google earth image showing lease area with pillars

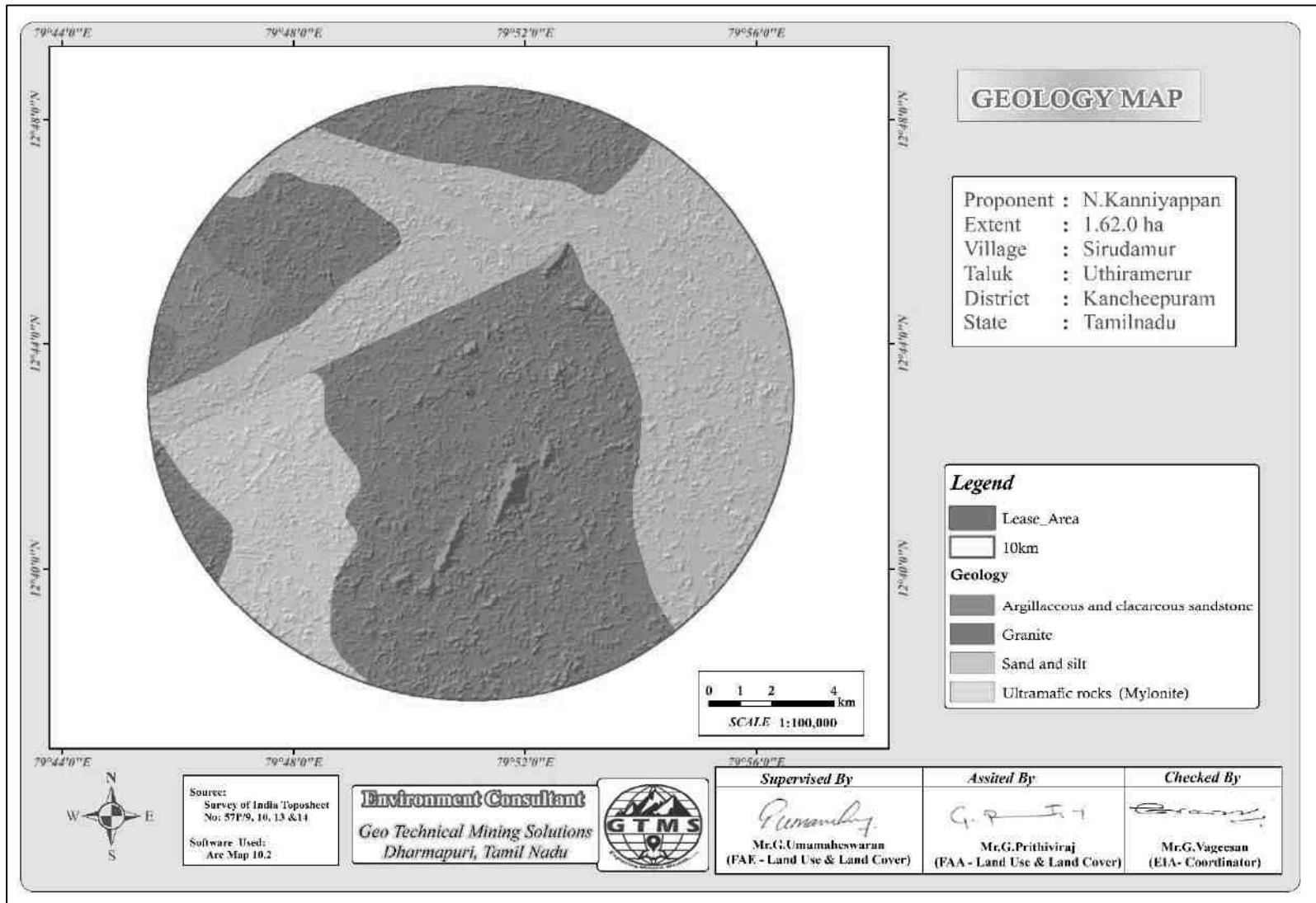


Figure 2.4 Geology map of 10 km radius from the proposed project site

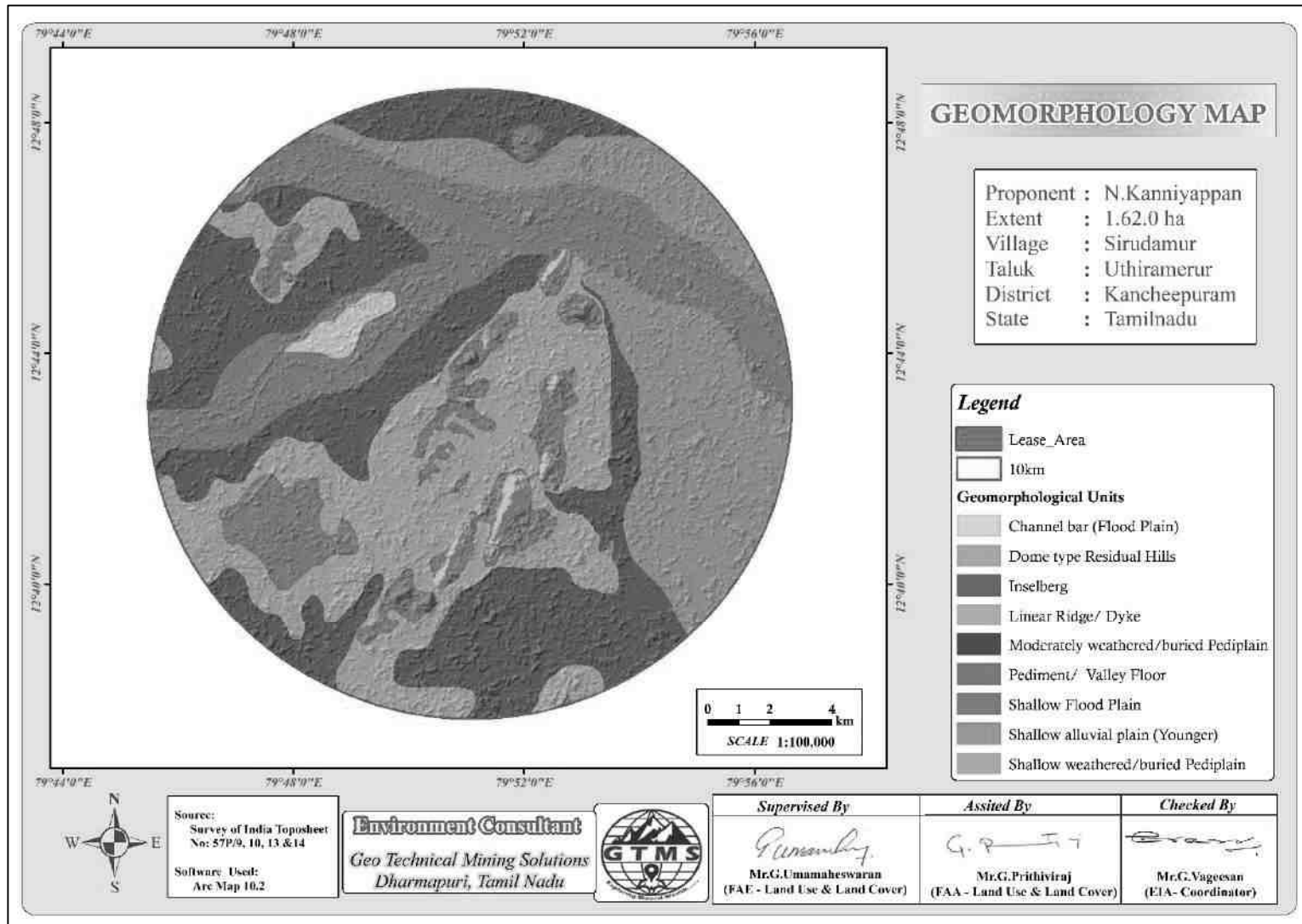


Figure 2.5 Geomorphology map of 10 km radius from the proposed project site

2.5 QUANTITY OF RESERVES

The resources and reserves of rough stone and gravel were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m and 10 m distance as per precise area communication letter and deducting the locked-up reserves during bench formation (also called as bench loss). The mineable reserves are calculated up to the depth of 25 m (first five years period) considering there is no waste / overburden / side burden (100% recovery anticipated) for the proposed project. The plate used for reserve estimation has been shown in Figure 2.6 and 2.7 results of geological resources and reserves have been shown in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Resource type	Rough stone in m ³	Gravel in m ³
Geological resource in m ³	517376	48504
Mineable reserves in m ³	141596	27084
Production for five-year plan period	98276	27084

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.4.

Table 2.4 Year-Wise Production Details

Year	Rough stone (m ³)	Gravel m ³
I	18056	27084
II	19200	-
III	18240	-
IV	21600	---
V	21180	---
Total	98276	27084

Source: Approved mining plan & ToR

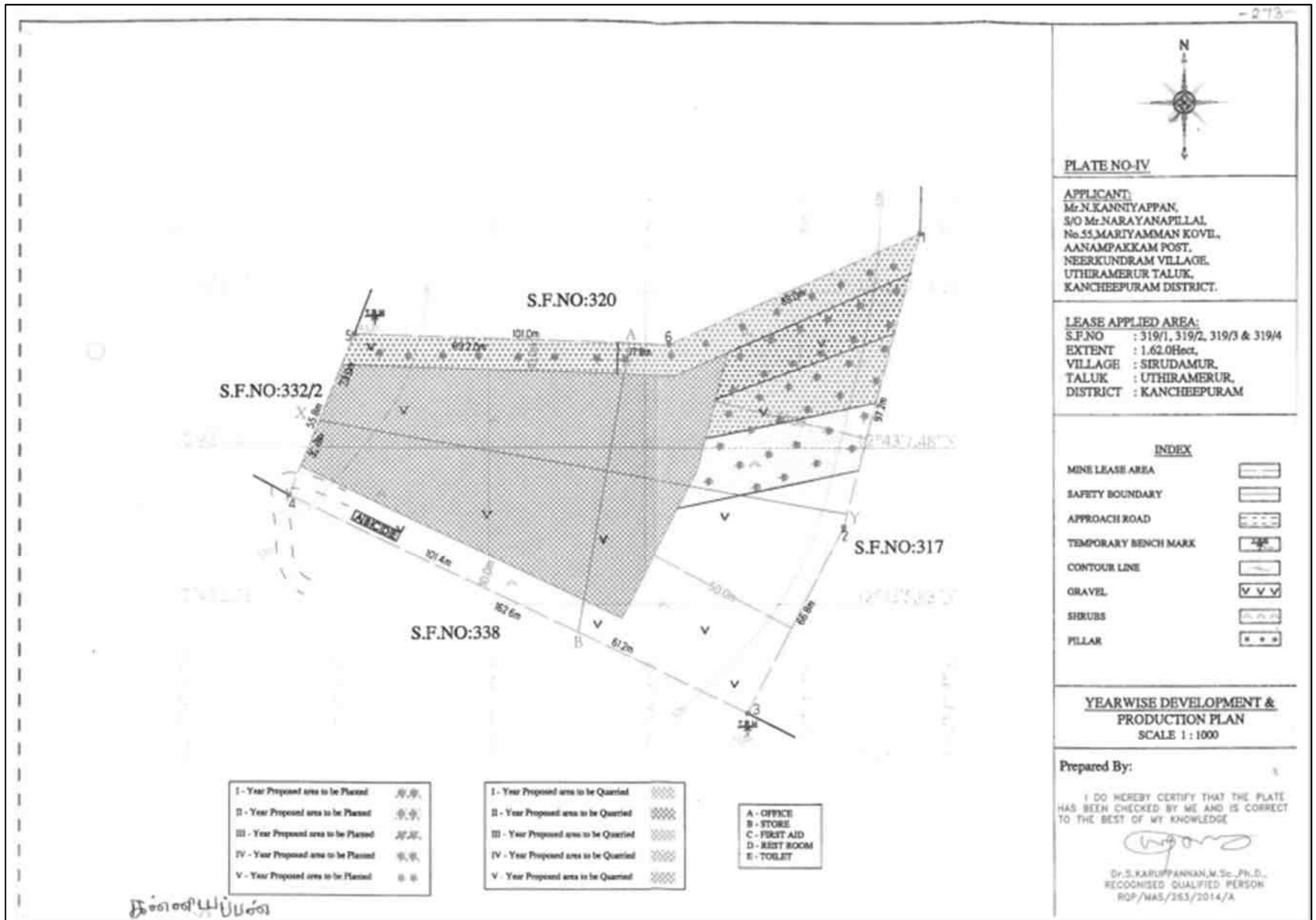


Figure 2.6 Yearwise development and production plan

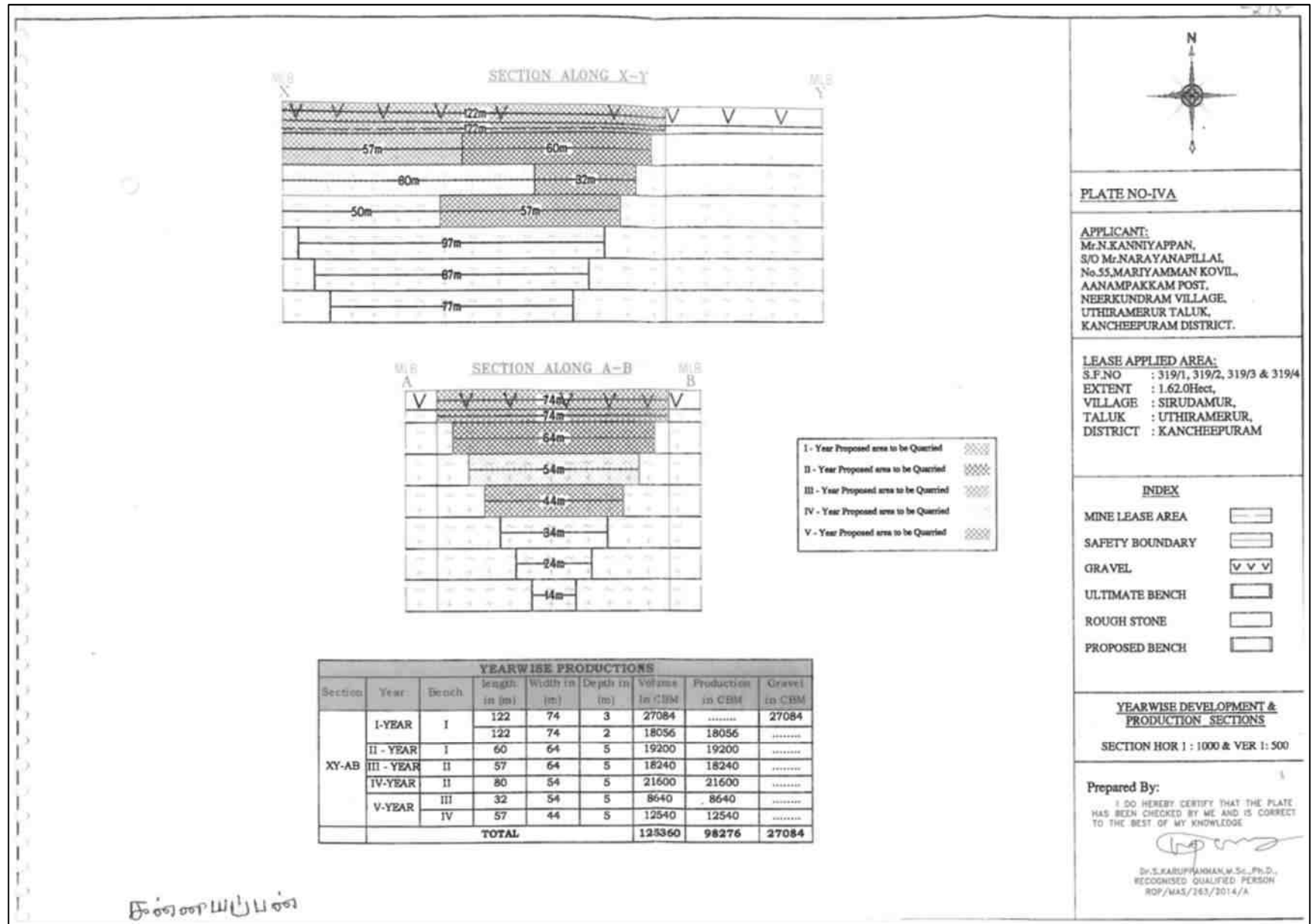


Figure 2.7 Yearwise development and production sections

2.6 MINING METHOD

The quarrying operation is proposed to be carried out by opencast semi mechanized mining method with the bench height and width of 5 m each. The open cast mining method offers several benefits to the proponent when compared to the more complex underground mining methods. The most important benefits include relatively smaller capital and operating costs, lesser safety hazards, ease of use for mass production, small closure costs, no restrictions on the use of heavy machinery if required, and easy drainage of subsurface water. Moreover, it provides a reasonable return on investments to the proponent and contributes to the growth of the local economy.

Excavators will be used in this method. In addition, drilling and blasting activities are inevitable in any quarry operations. In this project, shallow drilling with spacing of 1.2 m, burden of 1 m, and the depth of 1.5 m is proposed. After drilling, blasting operation will be carried out to remove overburden and weathered portions. This blasting is carried out for splitting the blocks from parent rock mass.

2.6.1 Magnitude of Operation

Based on the results of estimated production for the 5 years, details about the size of operation have been provided in Table 2.5.

Table 2.5 Operational Details for Proposed Project

	Rough stone	Gravel
First five-year production	98276	27084
Number of working Days /Annum	300	300
Production of /Day (m ³)	66	90
No. of Lorry loads	11	15

2.6.2 Extent of Mechanization

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

Table 2.6 Machinery Details

S. No.	Type	No of Unit	Capacity	Make	Motive power
1	Jack hammers	2	1.2 m to 2 m	Atlas Copco	Compressed air
2	Compressor	1	400 psi	Escorts formtrac	Diesel drive
3	Excavator with bucket / Rock breaker	1	300 HP	Tata Hitachi	Diesel drive
Haulage & Transport Equipment					
4	Tipper	4	15 tons	BMW	Diesel drive

2.6.3 Conceptual Blasting Design

In this project, NONEL blasting will be employed to win rough stone. This method will involve closed spaced perimeter holes to reduce the overbreak/backbreak on a blast. The objective of the blasting design is to prevent fly rocks from damaging the nearby structures. The conceptual blasting design has been given in Table...

Table 2. 7 Conceptual Blasting Design

Blasthole Diameter (D)	35 mm
Burden (B)	1137 mm
Spacing (S)	1307 mm
Subdrill	315 mm
Charge length (C)	700 mm
Stemming	1080 mm
Hole Length (L)	2095 mm
Bench Height (BH)	1780 mm
Mass of explosive/hole (@ Density of 1.15 g/cm ³)	825 g
Stemming material size	1.75-3.5 mm (angular material with minimum fines)
Burden stiffness ratio	1.58 (moderate fragmentation)
Blast volume/hole	2.6 m ³
Production of rough stone/day	66 m ³
Number of blastholes/day	25
Blasthole pattern	Staggered pattern
Mass of explosive /day	21 kg
Powder factor	0.32 kg/m ³
Loading density	0.83 kg/m
Type of explosives	Slurry
Diameter of packaging	26 mm
Initiation system	NONEL

Source: Explosives Engineers' Guide

2.6.4 Progressive Quarry Closure Plan

The progressive mine closure plan (Figure 2.8 & 2.9) of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8, about 1.62.0 ha of land is used for quarrying; whereas, at the end of the mine life, about 0.69.80 ha of land will have been quarried; about 0.48.23 ha of land will be used for green belt development; about 0.41.97 ha of land will be left unutilized; and the rest will be used for roads and infrastructures.

Table 2.8 Land Use Data at Present, During Scheme of Mining, and at the End of Mine Life

Description	Present area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	0.69.80
Infrastructure	Nil	0.01.00
Roads	Nil	0.01.00
Green Belt	Nil	0.48.23
Unutilized area	1.62.00	0.41.97
Total	1.62.00	1.62.00

2.6.5 Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, the mine closure cost is given in Table 2.9.

Table 2.9 Mine Closure Budget

Activity	Capital cost	Recurring Cost/Annum
324 plants inside the lease area	64800	9720
486 plants outside the lease area	145800	14580
Wire Fencing (1.62.0 ha)	324000	16200
Renovation of Garland Drain (1.62.0 ha)	16200	8100
Total	550800	48600

Source: Environment Management Plan

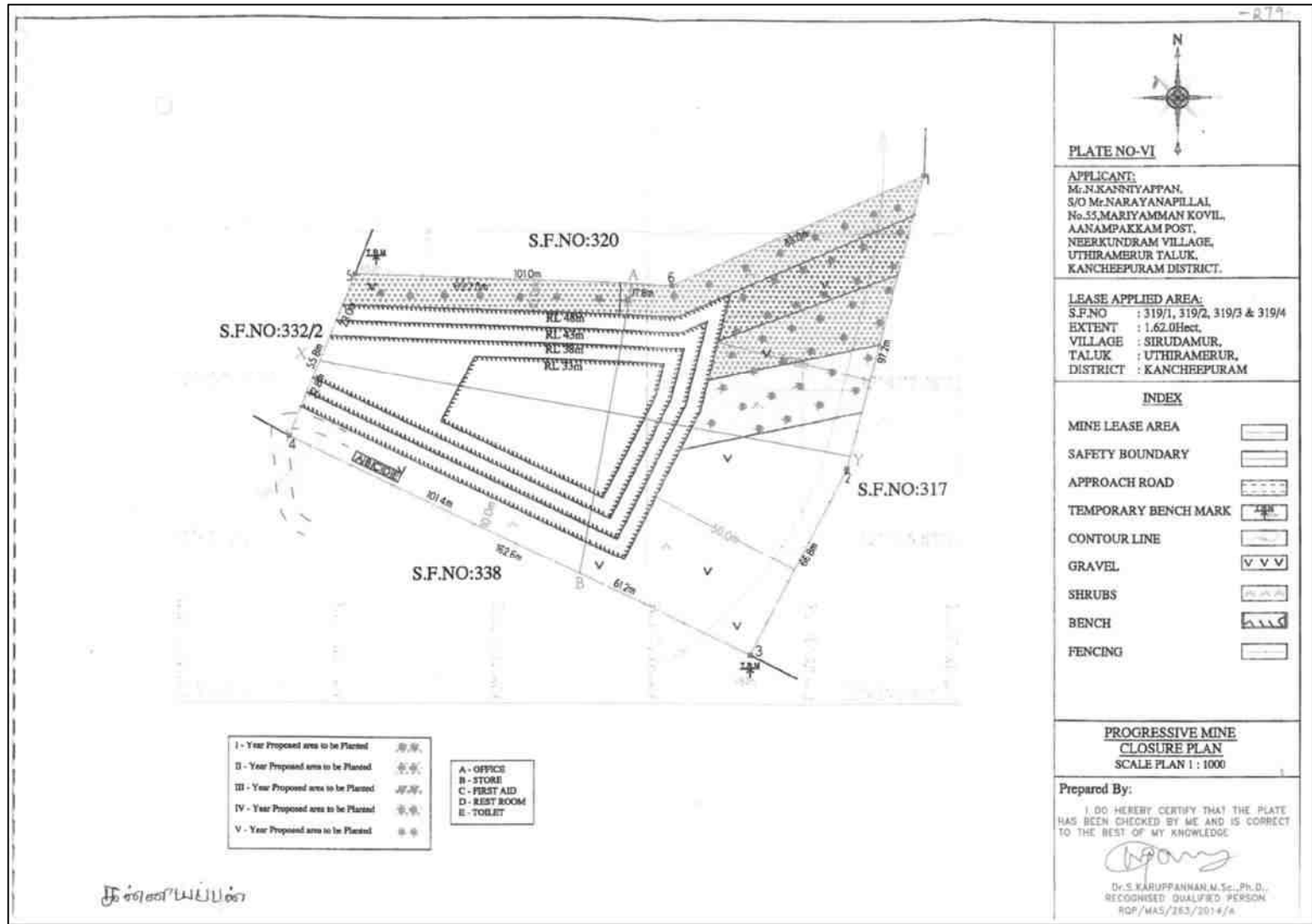


Figure 2.8 Progressive mine closure plan

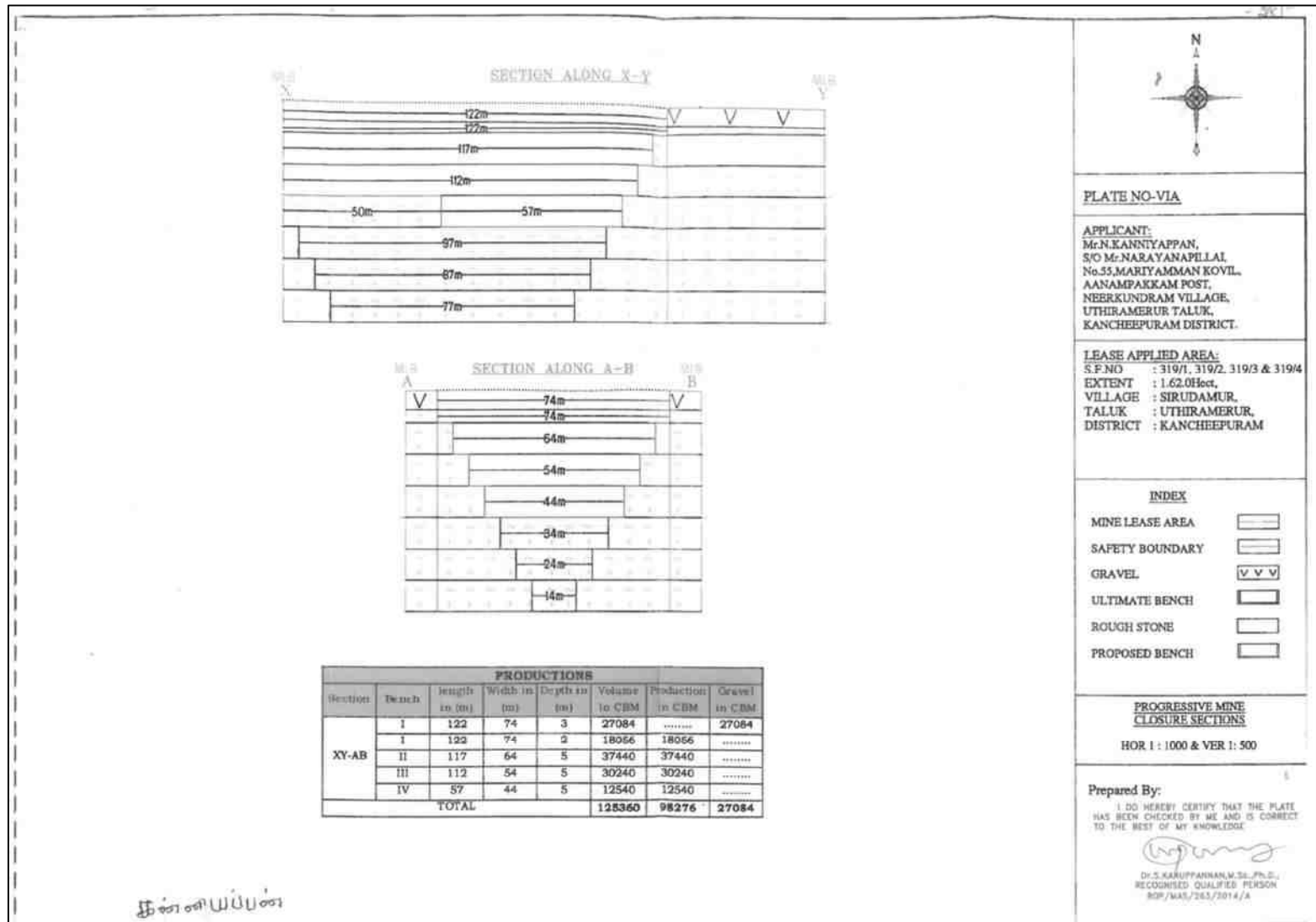


Figure 2.9 Progressive quarry closure sections

2.6.6 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. Details of ultimate pit dimensions have been derived from Figure 2.10 and given in Table 2.10.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth(m)
I	122	74	20

Source: Approved mining plan & ToR

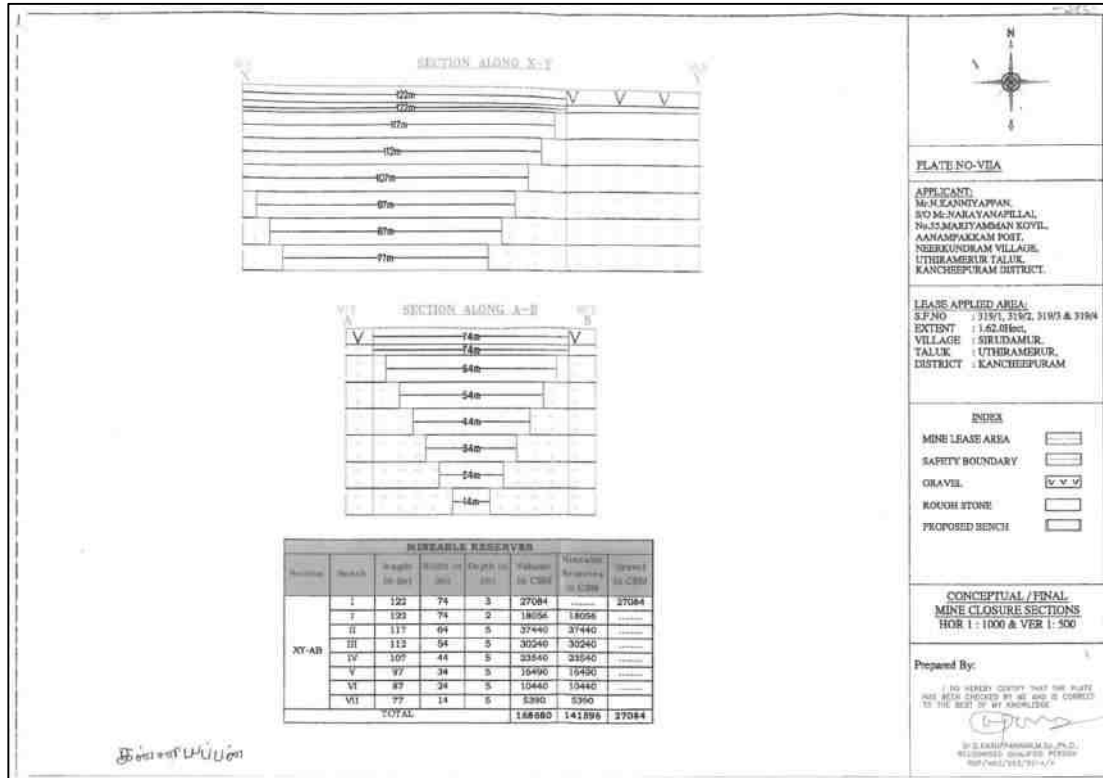


Figure 2.10 Conceptual final mine closure sections

2.6.7 Infrastructures

Infrastructures like mines office, temporary rest shelters for workers, latrine and urinal facilities have been proposed as per the mine rule and will be established after the grant of quarry lease. There is no proposal for the mineral processing or ore beneficiation plants in this project.

2.6.7.1 Other Infrastructure Requirement

No workshops are proposed inside the project area. Hence, there will not be any process effluent generation from the proposed lease area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. As there is no toxic effluent expected to generate in the form of solid, liquid or gaseous form, there is no requirement of waste treatment plant.

2.6.8 Water Requirement

Detail of water requirement in KLD is given in Table 2.11.

Table 2.11 Water Requirement for the Project

Purpose	Quantity	Source
Dust suppression	1.0 KLD	Existing bore wells nearby the lease area
Green belt development	1.5 KLD	Existing bore wells nearby the lease area
Drinking & domestic	1.3 KLD	Existing bore wells and approved water vendors
Total	3.8 KLD	

Source: Prefeasibility report

2.6.9 Energy Requirement

As per the data shown in Table 2.12, High Speed Diesel (HSD) will be used for quarrying machineries. Around 78621 litres of HSD will be used for rough stone extraction and 4514 litres of HSD for removal of gravel during this 5 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.12 Fuel Requirement Details

	Rough Stone	Gravel
Quantity of material to be quarried out in five years in m ³	98276	27084
Average rate of fuel consumption for an excavator in litres/Hour	16	10
Capacity of the excavator in m ³ /Hour	20	60
Time required in hours	4914	451
Total diesel consumption in litres	78621	4514

2.6.10 Capital Requirement

The project proponent will invest Rs. 60,96,000 to the project. The breakup summary of the investment has been given in Table 2.13.

Table 2.13 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Operational cost	57,76,000
2	EMP cost	3,20,000
Total project cost		60,96,000

Source: Approved mining plan

2.7 MANPOWER REQUIREMENT

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.14.

Table 2.14 Employment Potential for the Proposed Project

S. No.	Category	Role	Nos.
1.	Skilled	Mines manager/mines foreman	1
		Accountant cum & admin	1
		Jack hammer operator	2
		Blaster/mate	1
		Tipper driver	4
		Mechanic	1
2.	Semi – skilled	Security	1
3.	Unskilled	Helper/greaser	3
		Musdoor/labours	10
		Co-operator and cleaner	2
Total			26

Source: Prefeasibility report

2.8 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the environmental clearance will be compiled before the start of mining operation. Expected time schedule for the quarrying operation is given Table 2.15.

Table 2.15 Expected Time Schedule

S. No.	Particulars	Time schedule (in Months)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental clearance						
2	Consent to establish						Project establishment Period
3	Consent to operate						Production starting period.
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

Source: Anticipated based on timelines framed in EIA notification & CPCB guidelines

CHAPTER III

DESCRIPTION OF THE ENVIRONMENT

3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering **March, April and May 2022** with CPCB guidelines. Environmental data have been collected with reference to cluster quarries by Accuracy Analabs NABL Accreditation, ISO 9001: 2015 certified Laboratory and MoEF notified laboratory for the below attributes:

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

Study Area

The study area has been divided into two zones: **core zone** and **buffer zone**. Core zone is considered as lease area and buffer zone as 10 km radius from the periphery of the cluster. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

3.1 LAND ENVIRONMENT

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

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 10 km radius of the study area	Once during the study period	Study Area	Satellite Imagery Primary Survey
*Soil	Physico- Chemical characteristics	Once during the study period	9 (1 core & 8 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	7 (3 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorolo gy	Wind speed Wind direction Temperature Cloud cover Dry bulb temperature Rainfall	1 hourly continuous mechanical/automatic weather station	1	Site specific primary data & secondary data from IMD Station
*Ambient AirQuality	PM ₁₀ PM _{2.5} SO ₂ NO _x Fugitive dust	24 hourly, twice a week	9 (1 core & 8 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	10 (1 core & 9 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

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

3.1.1 Land Use/ Land Cover

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

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (Hectare)	Area (%)
1	Barren Land	446	2
2	Crop Land	13858	47
3	Dense Forest	1482	5
4	Fallow Land	2919	10
5	Scrub Land	3293	11
6	Mining lands	167	1
7	Plantations	3712	12
8	Settlements	352	1
9	Water bodies	3521	12
Total Area		29751	100

Source: LISS III Satellite Imagery

The land use/land cover map (Fig.3.1) shows that majority of the land in the study area is cropland land covering 47% of the total land area, followed by plantations (12%), water bodies (12%), land with scrub (11%), fallow land (10%), dense forest (5%), mining area and settlement (1% each). The total mining area within the study area is 167 ha. The cluster area of 18.19.80 ha contributes about 0.06 % of the total land use land cover within the study area. This small percentage of mining activities shall not have any significant impact on the environment.

3.1.2 Topography

The applied lease area is plain terrain with altitude of 57 m maximum and minimum of 55m from the MSL.

3.1.3 Drainage Pattern of the Area

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. The drainage pattern of the proposed area is dendritic – sub dendritic indicating uniform lithology beneath the surface, as shown in Figure 3.2

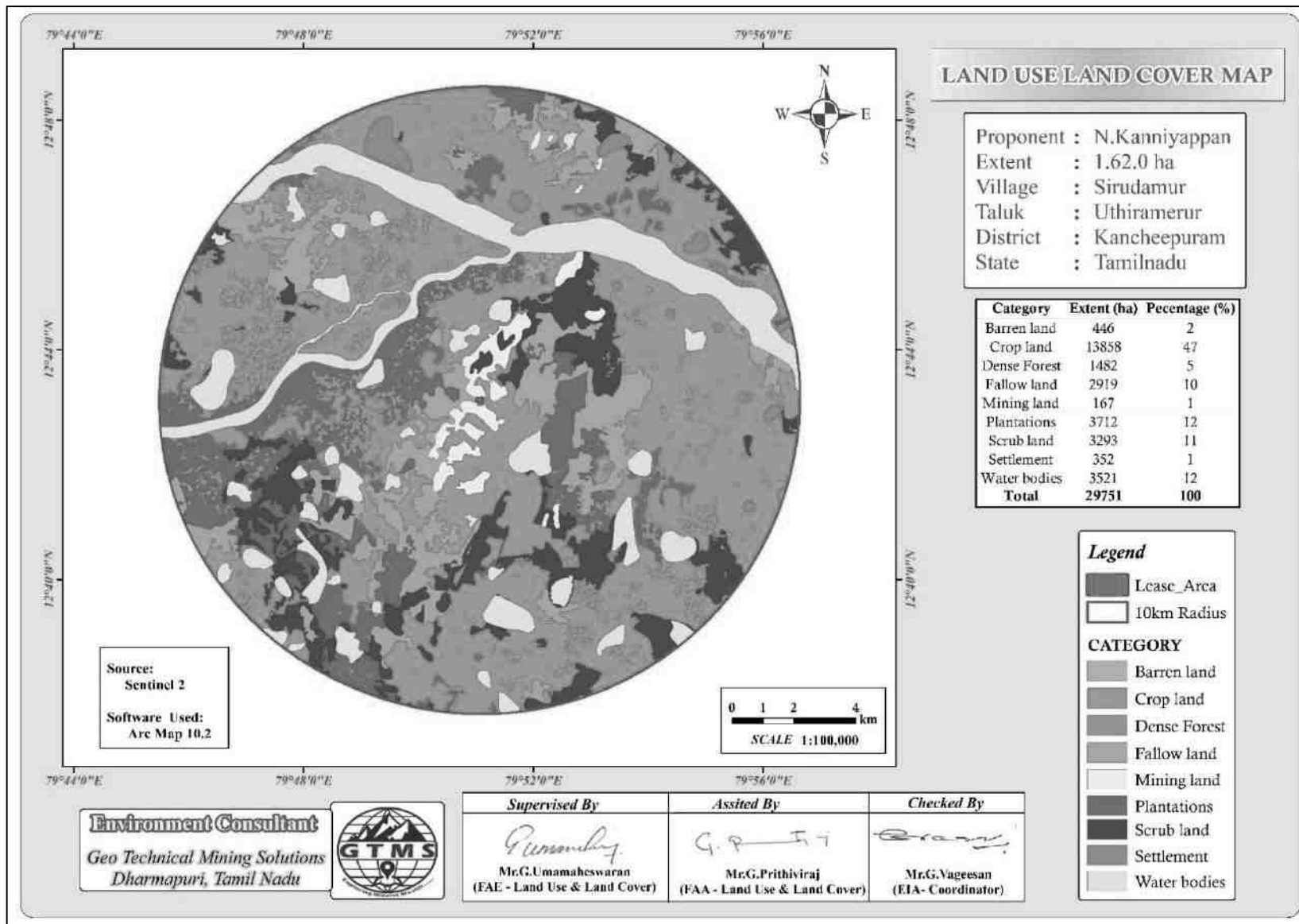


Figure 3.1 LULC map of 10 km radius from the proposed project site

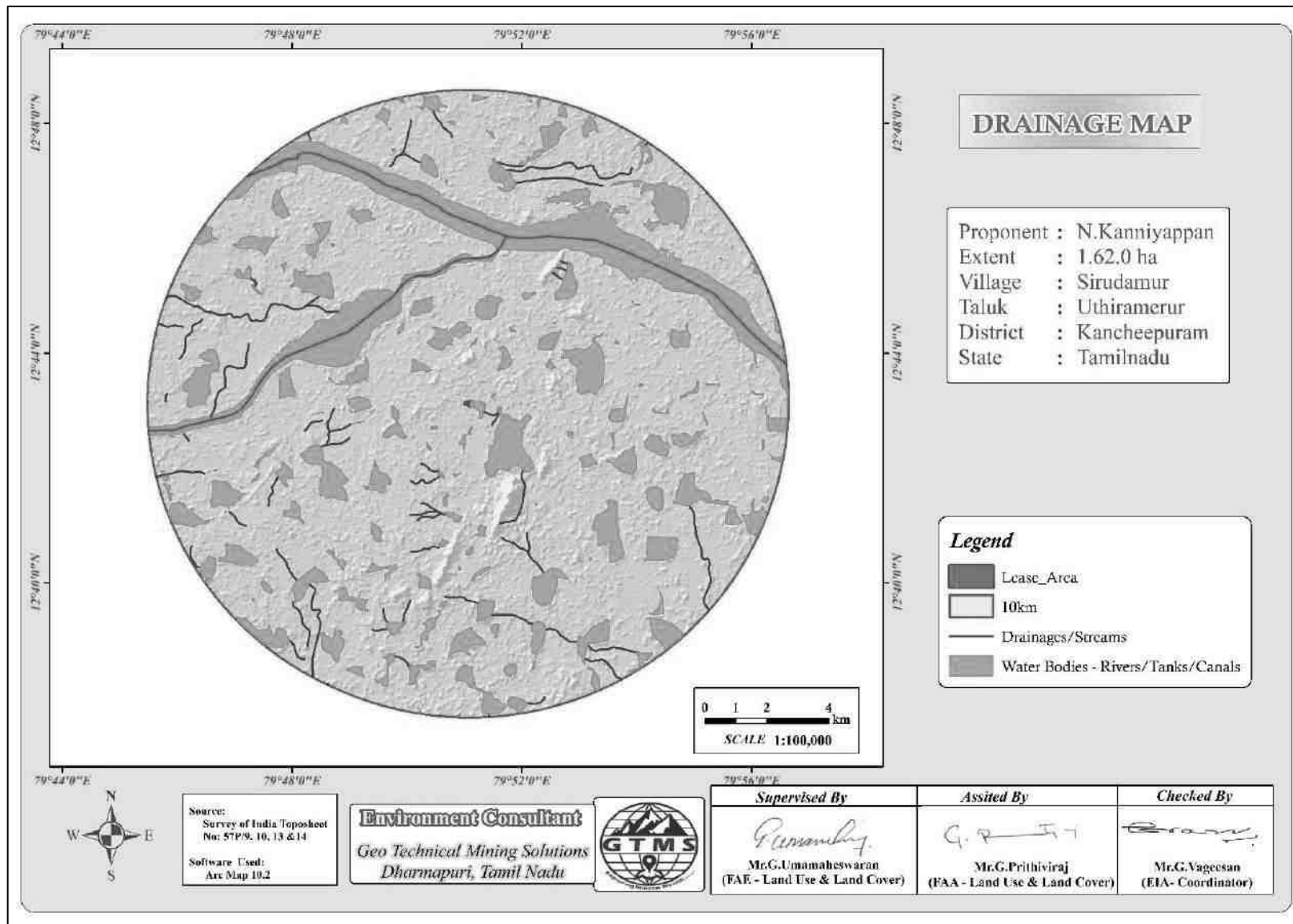


Figure 3.2 Drainage map of 10km radius from the proposed project site

3.1.4 Seismic Sensitivity

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

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

3.1.5 Soil Environment

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

- ❖ to determine the baseline soil characteristics of the study area
- ❖ to study the impact of proposed activity on soil characteristics and
- ❖ to study the impact on agriculture production

3.1.5.1 Methodology

- ❖ For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected up to 30-cm depth. Nine (9) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology are given in Table 3.3. The samples were sent to laboratory for analysis.
- ❖ The samples were analysed for physical and chemical characteristics as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil pH and organic matter, water content, nitrogen, phosphorous and potassium. The physico-chemical characteristics of the soil & test results in Table 3.5.

Table 3.3 Details of Soil Sampling Methodology

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

Table 3.4 Soil Sampling Locations

S. No.	Sampling ID	Location	Distance & Direction	Coordinates
1	S1	Sirudamur	0.86 km NE	12°43'18.18"N 79°51'34.27"E
2	S2	Padoor	3.0km SW	12°42'36.97"N 79°49'24.76"E
3	S3	Kattankulam	3km SSW	12°41'58.18"N 79°49'44.88"E
4	S4	Pazhaveri	2.7km NNE	12°44'19.25"N 79°52'05.50"E
5	S5	Sirudamur	2.7km NNW	12°44'35.28"N 79°50'54.56"E
6	S6	Vayalakkavoor	3.4km NWW	12°44'05.80"N 79°49'23.38"E
7	S7	Edamichi	3.9km SE	12°41'53.89"N 79°52'53.41"E
8	S8	Thirumukkudal	3.7km N	12°45'09.17"N 79°51'34.05"E
9	S9	Core zone	-	12°43'06.46"N 79°51'05.53"E

Source: On-site monitoring/sampling by **Accuracy Analabs Laboratory**, in association with GTMS

3.1.5.2 Results and Discussion

Physical Characteristics

- ❖ The soil texture found in the study area is sandy loam.
- ❖ PH of the soil varies from 6.09 to 7.26 indicating slightly alkaline nature.
- ❖ Electrical conductivity of the soil varies from 58.97 to 120.4 $\mu\text{s}/\text{cm}$ and
- ❖ The water content varies from 5.13 to 10.24 %.

Chemical Characteristics

- ❖ Nitrogen ranges between 75.1 and 150 mg/kg.
- ❖ Phosphorus ranges between 0.89 and 1.90 mg/kg.
- ❖ Potassium ranges between 308 and 910 mg/kg.
- ❖ Sodium ranges between 420 and 654 mg/kg.
- ❖ Dry matter content ranges between 89.76 and 94.71.

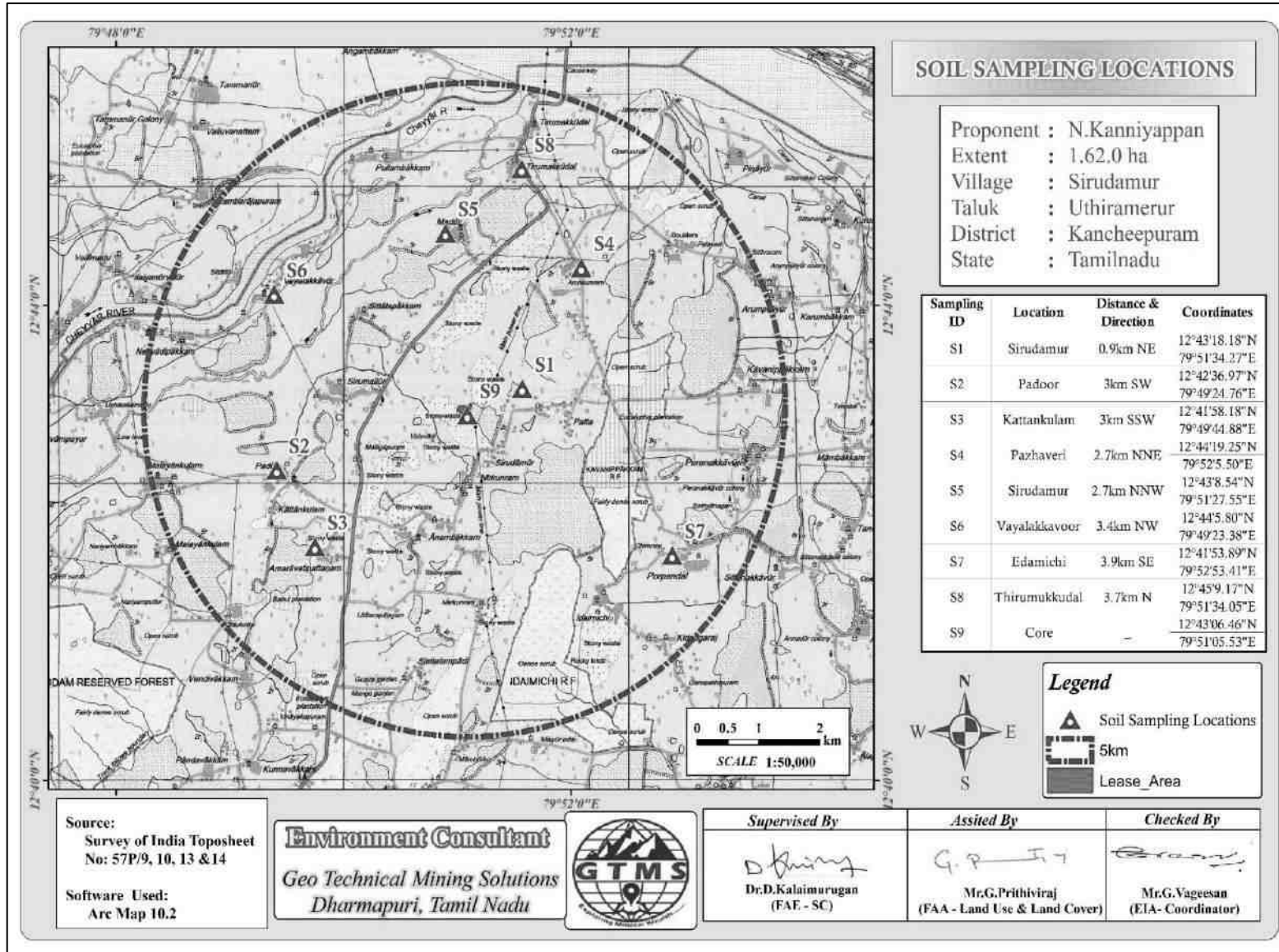


Figure 3.3 Toposheet showing soil sampling locations within 5 km radius around the proposed project site

Table 3.5 Soil Quality of the Study Area

S.No.	Parameters	Units	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9
1	pH @ 25°C	-	7.14	6.09	7.06	7.26	7.09	6.98	7.08	7.12	6.76
2	EC @ 25°C	µs/cm	58.97	92.45	62.76	120.4	68.87	65.98	86.85	95.43	109.30
3	Dry matter content	-	94.71	94.87	92.46	94.51	90.25	90.54	89.76	93.45	89.75
4	Water content	%	5.29	5.13	7.54	5.49	9.75	9.45	10.24	6.55	5.99
5	Organic Matter	%	1.52	0.48	0.94	0.72	1.06	1.24	0.94	1.42	0.84
6	Soil Texture	%	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
7	Sand	%	56.68	33.12	54.9	39.52	45.54	56.62	40.35	52.3	44.67
8	Silt	%	32.56	41.68	29.6	37.63	32.65	32.58	35.63	35.32	33.77
9	Clay	%	10.76	25.2	15.5	22.85	21.81	10.80	24.02	12.38	17.56
10	Phosphorus	mg/Kg	1.24	0.89	1.33	1.9	0.97	1.18	1.09	1.15	1.12
11	Sodium	mg/Kg	585	592	654	420	487	546	514	654	570
12	Potassium	mg/Kg	910	485	497	308	365	905	469	765	503
13	Nitrogen	mg/Kg	122	75.1	98.8	120	133	132	150	128	97.8
14	Sulphur	%	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)	BDL (D.L.0.02)

Source: Sampling Results by Accuracy Analabs Laboratory

3.2 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. The purpose of this study is to assess the critical water quality parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity.

3.2.1 Surface Water

There are numerous water bodies including Palar River and Cheyyar River around the lease area of 5 km radius. In this study, three surface water samples were collected and analysed for important water quality parameters.

3.2.2 Ground Water

The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc. Groundwater occurs in the crystalline rocks of Achaean age and Recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depths of dug wells range from 9 to 15 m below ground level. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigating one or two crops in the monsoon period.

3.2.3 Methodology

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

- ❖ Drainage pattern
- ❖ Location of residential areas /likely impact areas
- ❖ Likely areas which can represent baseline conditions

One surface water and three open well, and two bore well water samples were collected from the study area and were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The list of water sampling locations has been given in Table 3.6 and the spatial occurrence of water sampling locations in Figure 3.4.

Table 3.6 Water Sampling Locations

S. No.	Sampling ID	Location	Distance & Direction	Coordinates
1	SW1	Sirudamur	1.4 km NE	12°43'37.81"N,79°51'45.78"E
2	SW2	Kattankulam	3.0 km SW	12°41'59.49"N,79°49'44.52"E
3	SW3	Edamichi	2.2 km SE	12°41'59.18"N,79°51'45.35"E
4	GW1	Pazhaveri	2.7 km NE	12°44'19.15"N,79°52'40.02"E
5	GW2	Sirudamur	1.0 km E	12°43'07.05"N,79°51'41.90"E
6	GW3	Vayalakkavoor	3.5 km NW	12°44'50.30"N,79°49'19.78"E
7	GW4	Edamichi	4.0 km SE	12°41'52.24"N,79°53'00.28"E

Source: On-site monitoring/sampling by **Accuracy Analabs Laboratory**, in association with GTMS.

Table 3.7 Surface Water Quality Result

S. No.	Parameters	Unit	RESULT			CPCB Designated Best Use
			SW1	SW2	SW3	
1	Color	Hazen	6	5	5	300
2	Turbidity	NTU	5	5	5	Not specified
3	pH@ 25°C	-	7.1	6.9	7.0	6.5 – 8.5
4	Electrical Conductivity @ 25°C	µs/cm	495	344	322	Not specified
5	Total Dissolved Solids	mg /l	142	72	84	1500
6	Total Hardness	mg/l	48.34	41.74	46.23	600
7	Calcium as Ca	mg/l	54.7	21.6	33.5	200
8	Magnesium as Mg	mg/l	27	18	24	100
9	Sodium	mg/l	13	11	12	200
10	Potassium	mg/l	3	2	2	12
11	Chloride as Cl ⁻	mg/l	52	42	47	600
12	Sulphate as SO ₄ ⁻	mg/l	37	28	35	400
13	Iron as Fe	mg/l	BDL	BDL	BDL	Not specified

Source: Sampling Results by **Accuracy Analabs Laboratory**

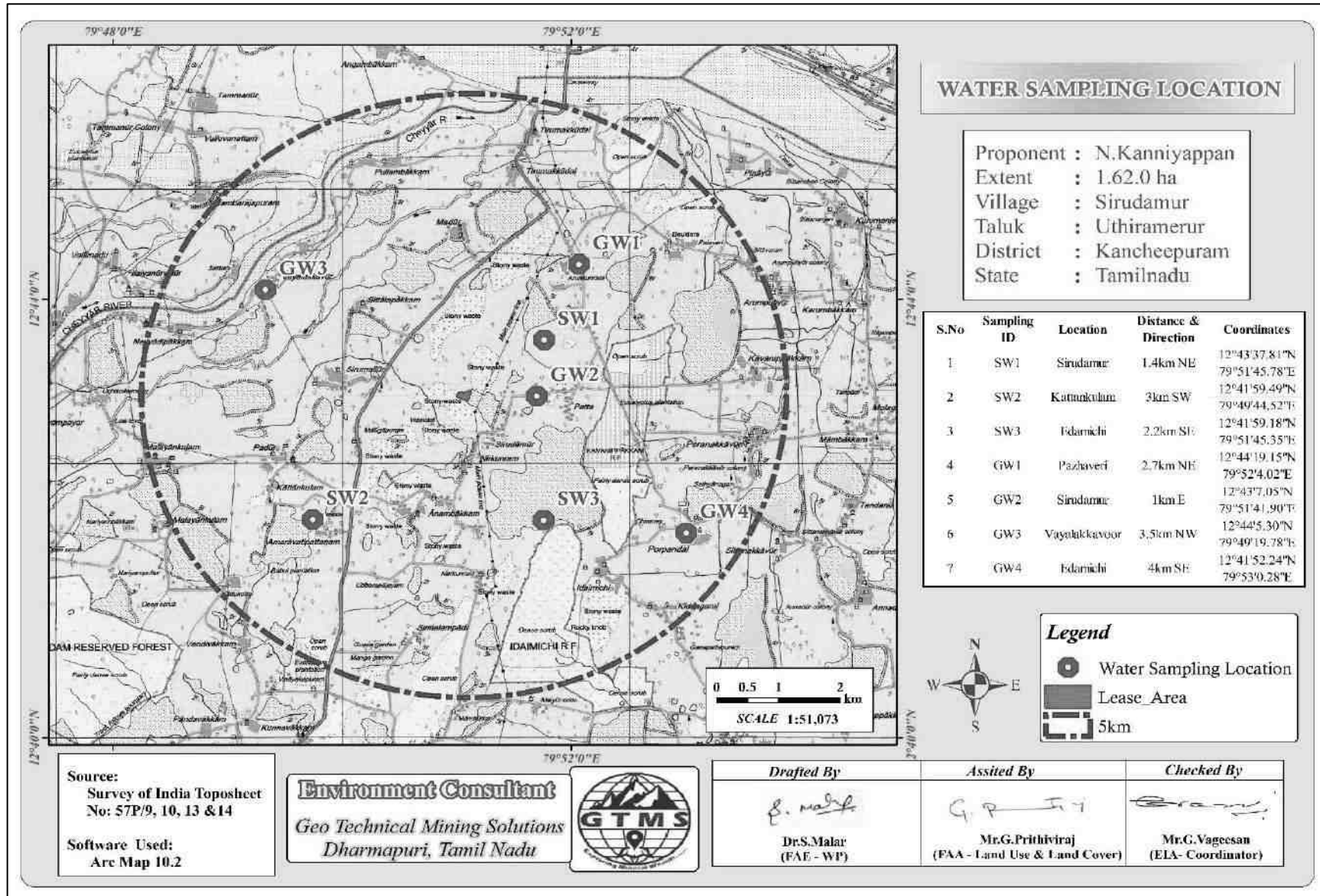


Figure 3.4 Toposheet showing water sampling locations within 5 km radius around the proposed project site

Table 3.8 Ground Water Quality Result

S. No	Parameters	Units	RESULTS				Standards as Per IS 10500: 2012	
			GW1	GW2	GW3	GW4	Acceptable Limit	Permissible Limit
1	Color	Hazen	Agreeable	Agreeable	Agreeable	Agreeable	5	15
2	Turbidity	NTU	< 1	< 1	< 1	< 1		
3	pH@ 25°C	-	7.59	7.73	7.63	7.35	6.5-8.5	No relaxation
4	Electrical Conductivity @ 25°C	µs/cm	632	474	961	698	Not specified	Not specified
5	TDS	mg /l	686	289	586	912	500	2000
6	Total Hardness	mg /l	302	290	296	561	200	600
7	Calcium as Ca	mg/l	91	32	85	92	75	200
8	Magnesium as Mg	mg/l	17	21	19	20	30	100
9	Sodium	mg/l	16	13	18	16	50	200
10	Potassium	mg/l	12	8	9	11.6	10	12
11	Total Alkalinity	mg/l	334	186	284	181	200	600
12	Chloride as Cl-	mg/l	145	148	138	275	500	1000
13	Sulphate as SO ₄ -	mg/l	61	32	72	84	200	400
14	Iron as Fe	mg/l	0.14	0.1	0.14	0.17	0.3	No relaxation
15	Fluoride as F	mg/l	0.52	0.41	0.58	0.72	1.0	1.5

Source: Sampling Results by **Accuracy Analabs Laboratory**

3.2.4 Results and Discussion

Results of important surface and ground water quality parameters have been shown in Tables 3.7 and 3.8 and have been discussed in the following sections.

Surface Water

- ❖ The pH of surface water sample is 6.9 and 7.1
- ❖ Turbidity is 5 NTU.
- ❖ TDS is 72-142 mg/l, whereas TH is 41-48 mg/l.
- ❖ Calcium is 21.6-54.72 mg/l and magnesium 18-27 mg/l.
- ❖ Chloride is 42-52 mg/l and sulphate 28-37 mg/l.

Ground Water

- ❖ The pH of the water samples ranges from 7.35 to 7.59.
- ❖ TDS are found in the range of 289 - 912 mg/l.
- ❖ The total hardness varies between 290 -561 mg/l.
- ❖ Calcium varies from 32 to 92mg/l and magnesium from 17 mg/l to 21.
- ❖ Chloride varies from 138 to 275 mg/l; sulphate from 32-84 mg/l; and fluoride from 0.41 to 0.72 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

3.2.5 Hydrogeological Studies

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

3.2.5.1 Groundwater Levels and Flow Direction

As the groundwater moves from the points of highest static groundwater elevation to the points of lowest static groundwater elevation under the influence of gravity, data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May, 2022 (Pre-Monsoon Season) and Oct-2021 through Dec-2021 (Post Monsoon Season) season. The dug well data thus collected onsite are provided in Tables 3.9 and 3.9a. According to the data, average depths to the static water table in open wells range from 14.4 to 17.2 m BGL in pre monsoon and from 8.3 to 11.1 m BGL in post monsoon.

The bore well data thus collected onsite are provided in Tables 3.10 and 3.10a. The average depths to static potentiometric surface in borewells for the period of March through May, 2022 (Pre-Monsoon Season) is 56.2 to 58.7 m and for the period of Oct-2021 through Dec-2021 (Post Monsoon Season) is 48.7 to 53.3 m. The depths to static water table and potentiometric surface data were used to calculate static groundwater table and potentiometric surface elevations for open wells and borewells, respectively to draw contour lines connecting

groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

The maps thus produced are shown in Figures 3.5 -3.8. From the maps of groundwater flow direction, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 6 located in ESE of the proposed project sites and that most of the borewell groundwater for the two monsoon seasons flows towards the bore well number 3 located in E of the proposed project sites. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	March-2022	April-2022	May- 2022	Average		
DW01	15.4	15.7	16.2	15.7	12°43'43.48"N	79°50'28.48"E
DW02	14.6	15.7	16.8	15.7	12°42'56.65"N	79°50'29.50"E
DW03	16.4	17.2	17.8	17.1	12°42'33.27"N	79°50'31.84"E
DW04	15.6	15.8	16.1	15.8	12°42'5.62"N	79°51'9.38"E
DW05	13.2	14.4	15.7	14.4	12°42'25.86"N	79°51'20.67"E
DW06	15.7	15.9	16.5	16	12°42'56.67"N	79°51'27.49"E
DW07	16.6	17.3	17.8	17.2	12°43'23.50"N	79°51'51.94"E
DW08	16.1	16.7	17.5	16.7	12°43'46.15"N	79°51'42.60"E
DW09	16.5	16.9	17.4	16.9	12°42'57.47"N	79°51'5.97"E

Source: Onsite monitoring data

Table 3.9a Post-Monsoon Water Level of Dug Wells within 2 km Radius

Station Code	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
DW01	8.4	8.7	9.2	8.7	12°43'28.40"N	79°52'6.84"E
DW02	9.5	9.7	10.0	9.7	12°44'1.75"N	79°52'20.99"E
DW03	8.7	8.9	9.5	9.0	12°43'46.25"N	79°52'4.20"E
DW04	9.6	9.8	10.1	9.8	12°44'8.27"N	79°51'58.66"E
DW05	10.2	11.4	11.9	11.1	12°42'25.86"N	79°51'20.67"E
DW06	9.7	10.2	10.8	10.2	12°42'56.67"N	79°51'27.49"E
DW07	7.6	8.5	8.9	8.3	12°43'23.50"N	79°51'51.94"E
DW08	8.2	8.7	9.1	8.6	12°43'46.15"N	79°51'42.60"E
DW09	8.5	8.9	9.4	8.9	12°42'57.47"N	79°51'5.97"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Pre-Monsoon Season					
	March-2022	April-2022	May- 2022	Average		
BW01	56.7	57.2	58.2	57.3	12°42'43.37"N	79°51'19.54"E
BW02	55.6	56.1	57.4	56.3	12°42'48.50"N	79°50'47.57"E
BW03	56.2	57.6	58.1	57.3	12°43'5.50"N	79°51'29.20"E
BW04	57.1	57.9	58.4	57.8	12°43'11.00"N	79°51'54.56"E
BW05	55.8	56.9	57.5	56.7	12°43'8.48"N	79°51'44.35"E
BW06	56.2	57.4	58	57.2	12°43'25.61"N	79°51'7.96"E
BW07	58.3	58.7	59.2	58.7	12°43'41.35"N	79°51'38.03"E
BW08	56.6	57.4	58.7	57.6	12°44'18.22"N	79°51'52.89"E
BW09	55.3	56.1	57.4	56.2	12°43'54.98"N	79°51'15.69"E

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2021	Nov-2021	Dec-2021	Average		
BW01	48.2	48.7	49.2	48.7	12°42'43.37"N	79°51'19.54"E
BW02	51.4	52.6	53.5	52.5	12°42'48.50"N	79°50'47.57"E
BW03	50.7	51.2	52.6	51.5	12°43'5.50"N	79°51'29.20"E
BW04	49.5	50.7	51.3	50.5	12°43'11.00"N	79°51'54.56"E
BW05	52.6	53.5	53.9	53.3	12°43'8.48"N	79°51'44.35"E
BW06	51.7	52.4	53.7	52.6	12°43'25.61"N	79°51'7.96"E
BW07	48.3	48.7	49.2	48.7	12°43'41.35"N	79°51'38.03"E
BW08	49.2	50.6	51.7	50.5	12°44'18.22"N	79°51'52.89"E
BW09	50.1	51.6	52.4	51.3	12°43'54.98"N	79°51'15.69"E

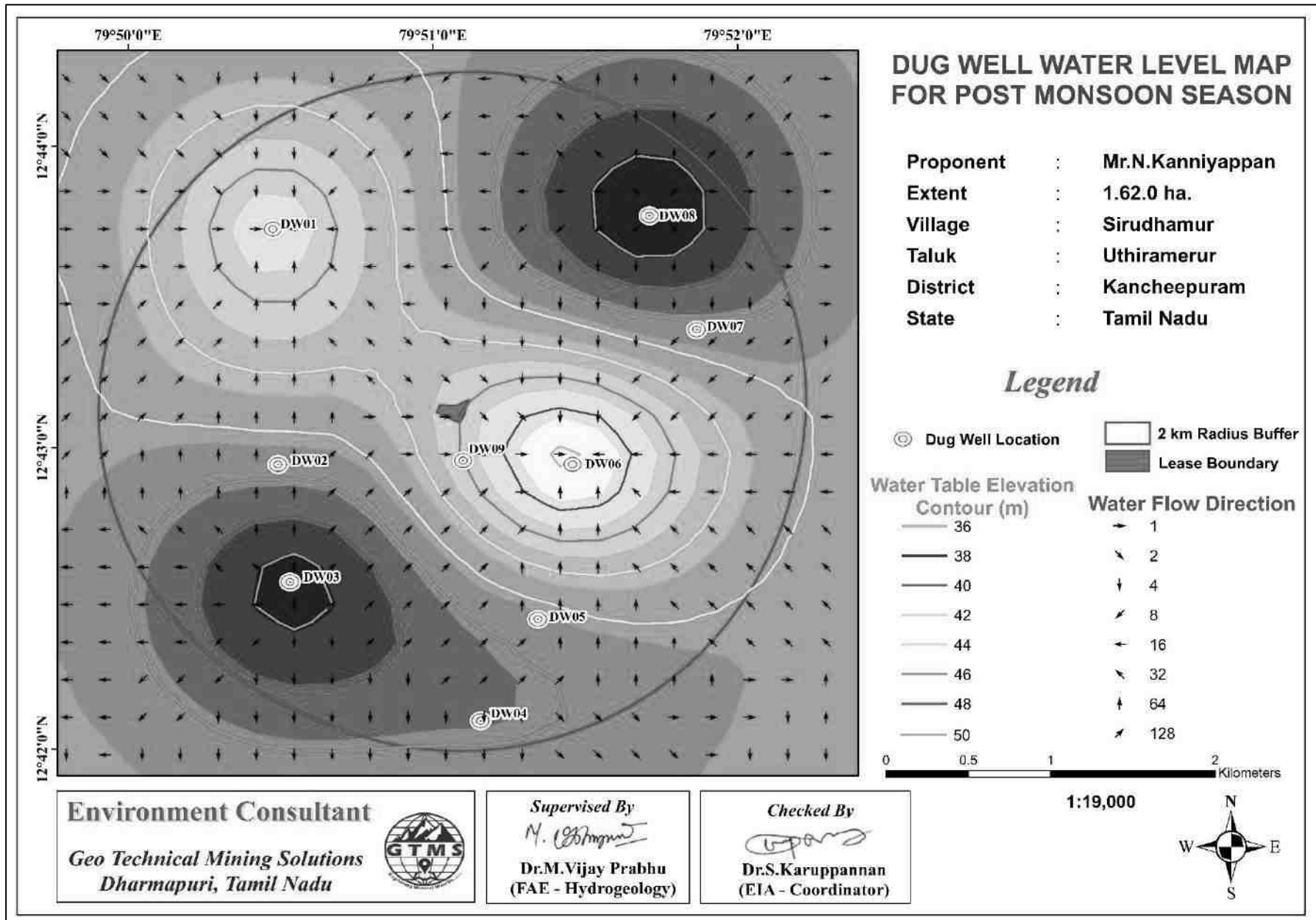


Figure 3.5 Open well static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

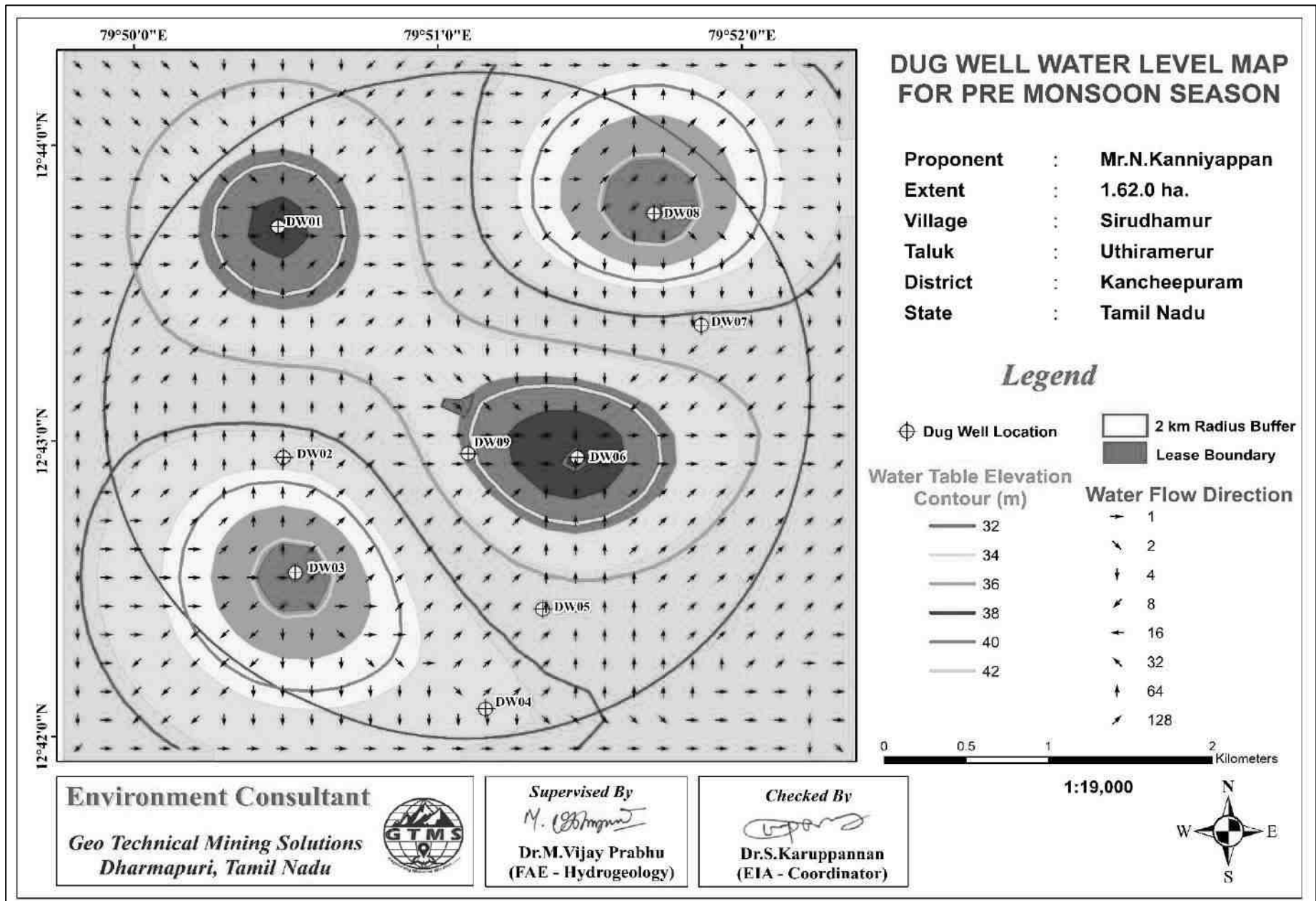


Figure 3.6 Open well static groundwater elevation map showing the direction of groundwater flow during Pre-monsoon season

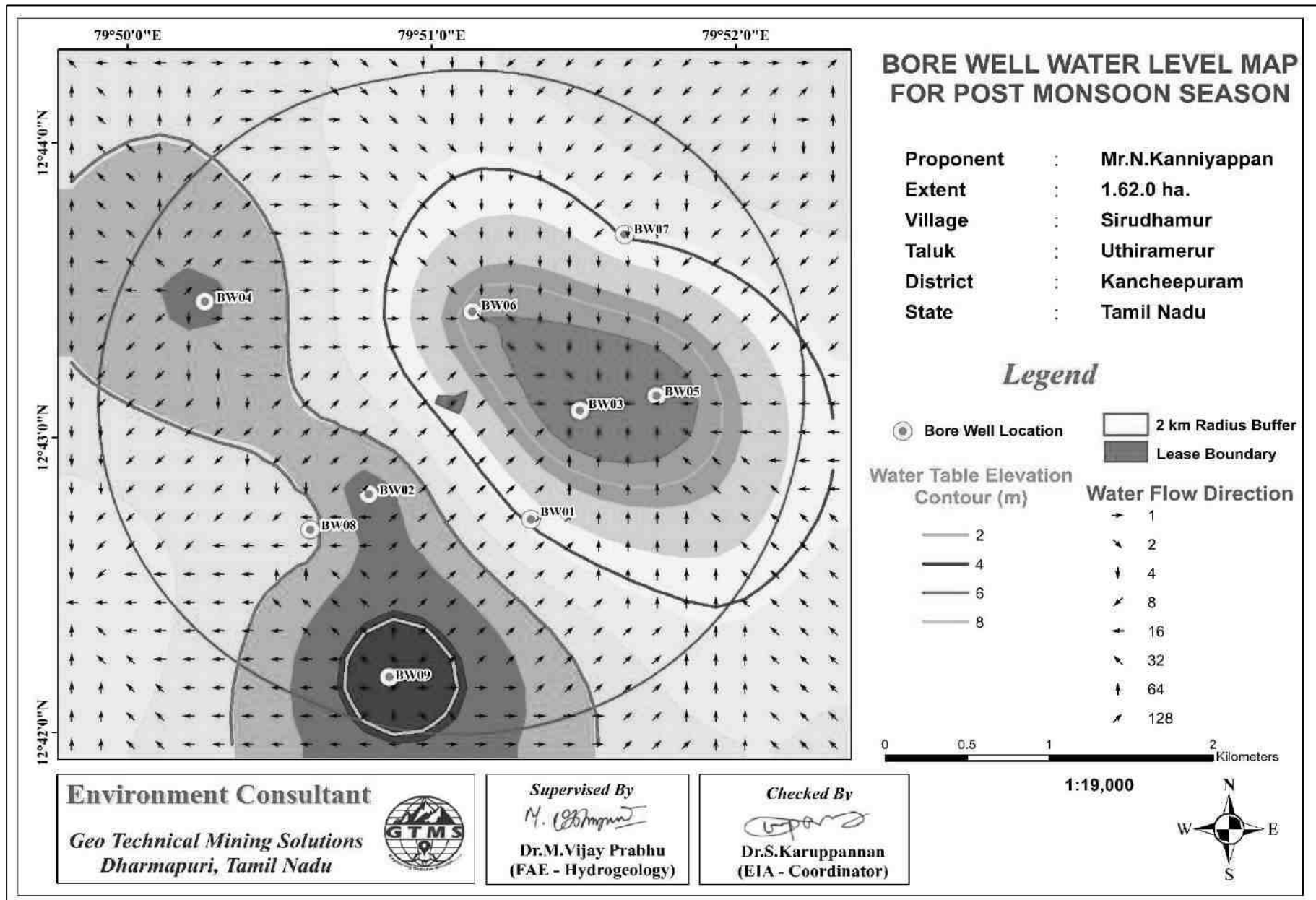


Figure 3.7 Borewell static groundwater elevation map showing the direction of groundwater flow during post-monsoon season

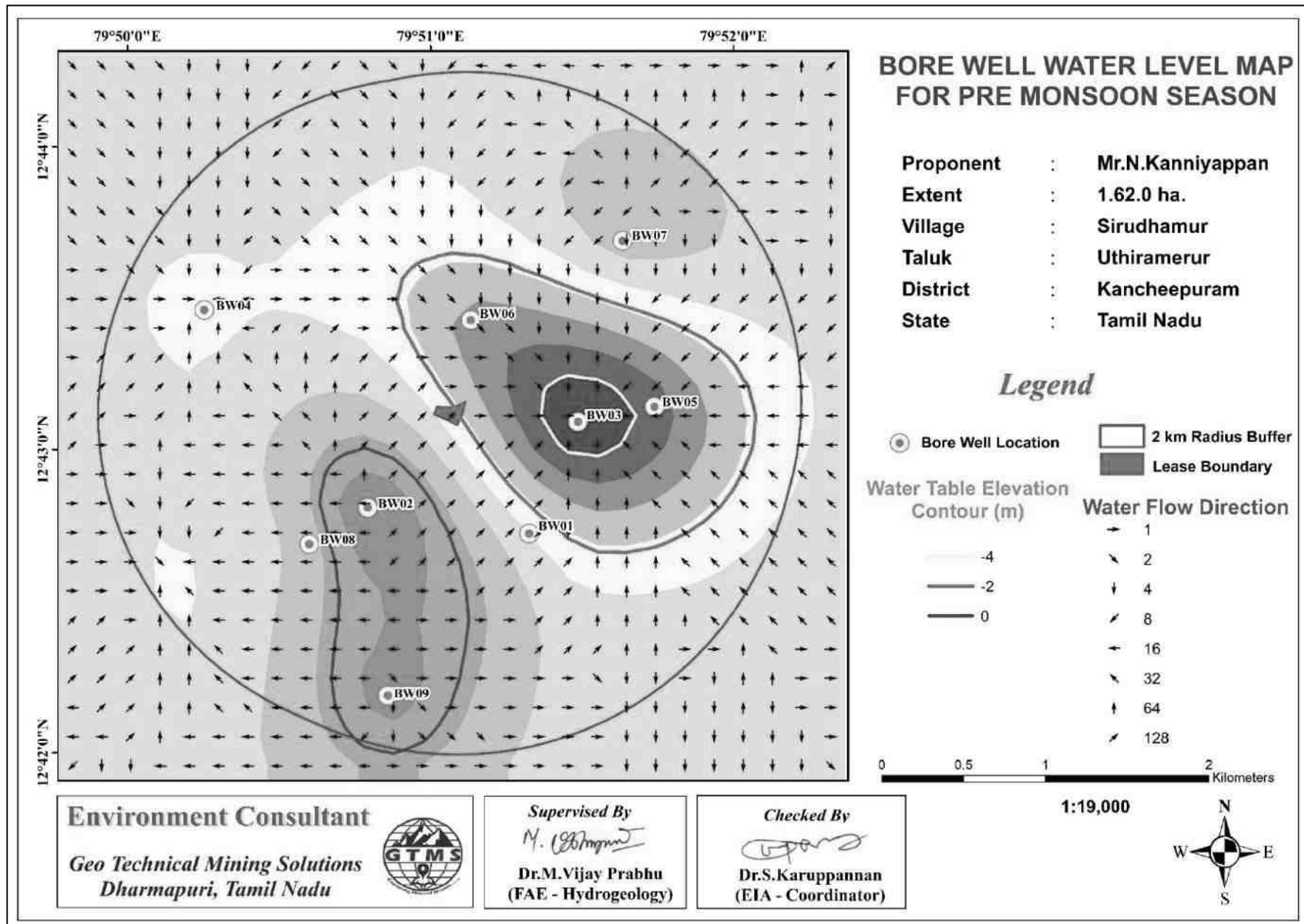


Figure 3.8 Borewell static groundwater elevation map showing the direction of groundwater flow during Pre-monsoon season

3.2.5.2 Electrical Resistivity Investigation

For understanding subsurface hydrogeological conditions geophysical investigation is carried out. The geophysical investigation is especially useful in the areas where there are no adequate exploratory well data about the aquifer conditions. Electric resistivity method is one of the well-known geophysical methods for delineating lateral as well vertical discontinuities in the resistivities of the earth's subsurface layers. It is mainly applied to locate aquifers in the field of hydrogeology. The present study makes use of vertical electric sounding (VES) to delineate earth's subsurface layers. The electrical resistivity investigation used four electrodes collinear set up where current is sent through outer electrodes into the ground and the inner electrodes measure the potential difference, as shown in Figures 3.9 and 3.10.

3.2.5.3 Methodology and Data Acquisition

The present study uses Schlumberger array for making vertical electrical sounding measurements since it is least influenced by lateral inhomogeneities and is capable of providing higher depth of investigation. The main goal of the present study is to search the vertical inhomogeneities that is consistent with the measured data.

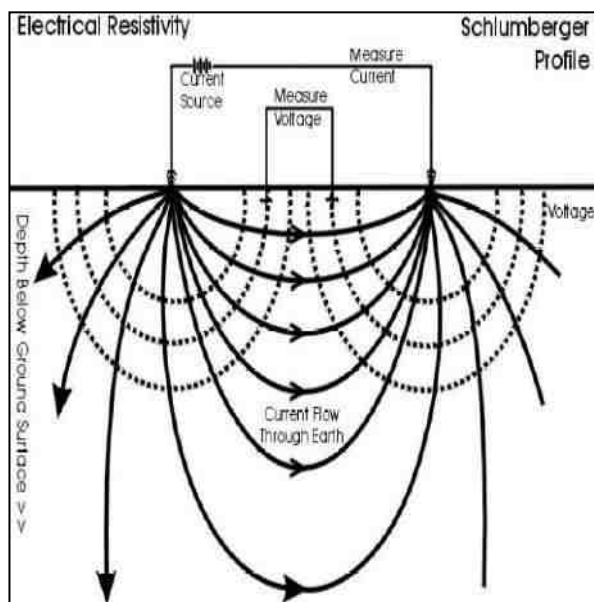


Figure 3.9 Principle of electrical resistivity investigation



Figure 3.9a Geophysical survey within the lease area

The field equipment deployed for the study is a deep resistivity meter with a model of SSR – MP – ATS. This Signal Stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for earth resistivity measurements. For more information about the instrument, refer to the manufacturer's manual.

3.2.5.4 Data Presentation

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

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 12°43'6.95"N 79°51'4.09"E					
S. No.	AB/2 (m)	MN/2 (m)	Geometrical Factor (G)	Resistance in Ω	Apparent Resistivity in Ωm
1	2	0.5	4.71	26.55	125.05
2	4	0.5	23.55	7.13	167.91
3	6	0.5	54.95	5.25	288.48
4	8	0.5	98.91	4.24	419.37
5	10	0.5	155.45	3.44	534.74
6	10	2	23.55	18.33	431.67
7	15	2	62.8	7.68	482.30
8	20	5	117.75	6.1	718.27
9	30	2	274.75	3.19	876.45
10	40	2	494.55	2.17	1073.17
11	50	5	777.15	0.92	714.97
12	60	5	1122.55	0.95	1066.42
13	70	5	1530.75	0.81	1239.90
14	80	10	2001.75	0.64	1281.12
15	90	10	2535.55	0.61	1546.686
16	100	10	3132.15	0.57	1785.326

3.2.5.5 Geophysical Data Interpretation

The rock formation of low resistivity values indicates occurrence of water at the depth of about 50 m below ground level. The maximum depth proposed for the proposed project is 25 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

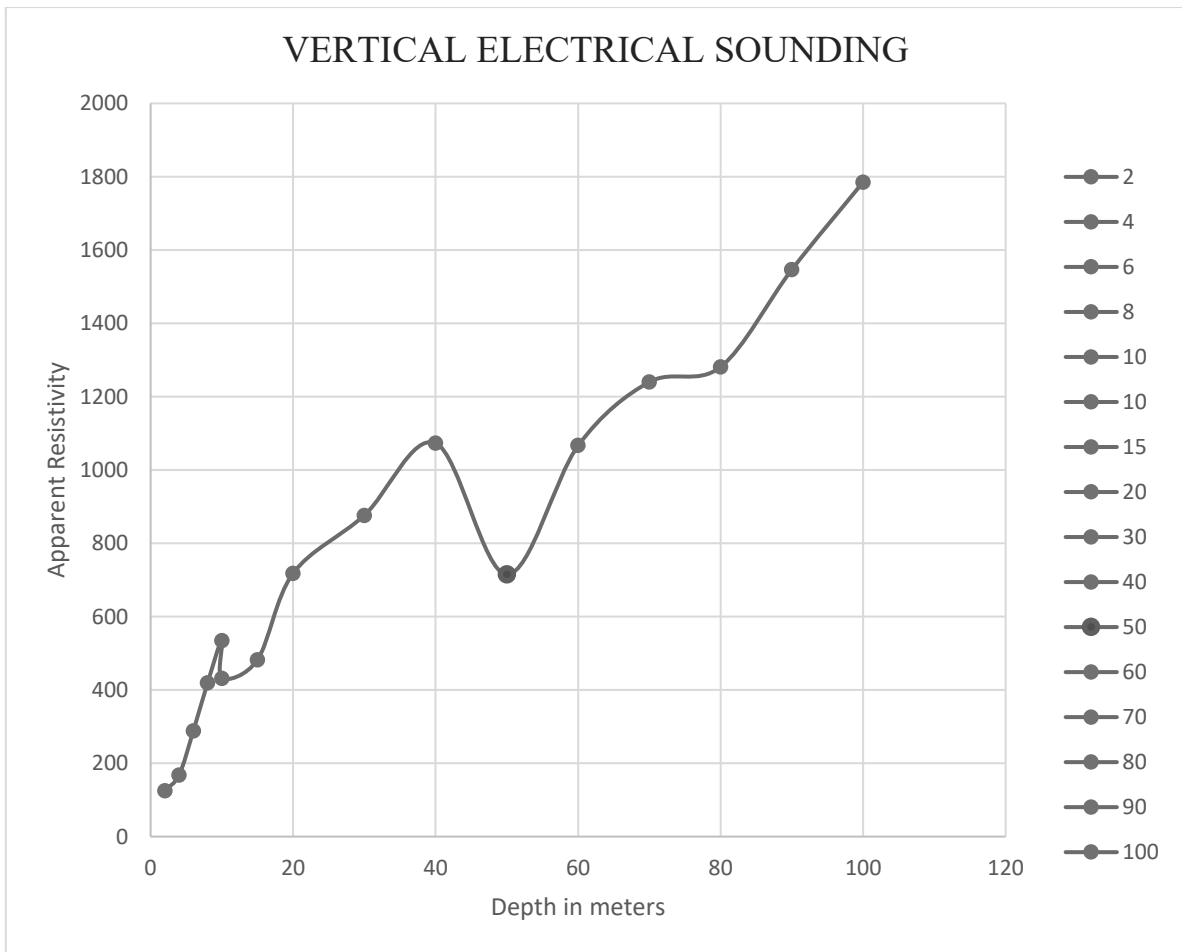


Figure 3.10 Graph showing occurrence of water bearing fracture zones at the depth range of 50 m below ground level in proposed project

3.3 AIR ENVIRONMENT

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

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 5 km radius around the cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime objective of the baseline air quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed project in cluster.

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

3.3.1 Meteorology

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time accomplish dispersion and strongly influence other processes associated with them. A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.12.

According to the onsite data, the temperature in March, 2022 varied from 25.5 to 36.9⁰C with the average of 29.72⁰C; in April, 2022 from 25.88 to 36.46⁰C with the average of 30.14⁰C; and in May, 2022 from 25.33 to 34.31⁰C with the average of 28.98.5⁰C. During the period of the three months, relative humidity ranged from 73.88 to 77.58 % in average. The highest average humidity was measured in May 2022, whereas the lowest in March 2022. When speaking about wind speed, the wind speed in March, 2022 varied from 0.08 to 6.08 m/s with the average of 3.43m/s; in April, 2022 from 0.03 to 8.10 m/s with the average of 4.01 m/s; and in May, 2022 from 0.06 to 6.29m/s with the average of 3.61 m/s.

Table 3.12 Onsite Meteorological Data

S. No.	Parameters		Mar-2022	Apr-2022	May-2022
1	Temperature (⁰ C)	Min	25.75	25.88	25.53
		Max	36.49	36.46	34.31
		Avg	29.72	30.14	28.98
2	Relative Humidity (%)	Min	41.50	42.69	50.31
		Max	94.88	97.25	94.81
		Avg	73.88	74.61	77.58
3	Wind Speed (m/s)	Min	0.08	0.03	0.06
		Max	6.08	8.10	6.29
		Avg	3.43	4.01	3.61
4	Wind Direction (degree)	Min	0.00	5.66	1.02
		Max	359.78	343.15	356.50
		Avg	150.21	207.16	222.97
5	Surface Pressure(kPa)	Min	99.83	99.40	99.73
		Max	101.05	100.62	100.51
		Avg	100.44	100.05	100.12

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

3.3.1.1 Climate

The Kancheepuram has a tropical climate. In winter, there is much less rainfall in summer in Kancheepuram. This climate is considered to be Aw according to the Köppen-Geiger climate classification. In Kancheepuram, the average annual temperature is 27.7 °C | 81.9 °F. The rainfall here is around 967 mm | 38.1 inch per year. The least amount of rainfall occurs in February. The Average in this month is 10 mm/0.4 inch. With average of 195mm/7.7 inch, the most precipitation falls in October. The warmest month of the year is May, with an average temperature of 31.8 °C | 89.3 °F. The lowest average temperatures in the year occur in January, when it is around 23.6 °C | 74.5 °F. The difference in precipitation between the driest month and the wettest month is 185 mm | 7 inches. The variation in temperatures throughout the year is 8.2 °C | 14.8 °F.

Source: <https://en.climate-data.org/asia/india/tamil-nadu/kancheepuram-26316//>

3.3.1.2 Rainfall

Table 3.13 Rainfall Data

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	
1191.7	833.0	1131.4	1258.4	1698.1	985

[Kanchipuram | TWAD \(tn.gov.in\)](#)

From the data for the period of 2017-21, the average annual rainfall has been calculated to be 1225.52. mm. Of the 5 years, the lowest rainfall (833 mm) occurred in the year 2018, while the highest rainfall (1698mm) in the year 2021.

3.3.1.3 Wind Pattern

Local wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction over a period of 3 months. The wind rose thus produced, as shown in Figure 3.12 reveals that:

- ❖ The measured average wind velocity during the study period is 3.69m/s.
- ❖ Predominant wind was dominant in the directions ranging from southwest to northeast.

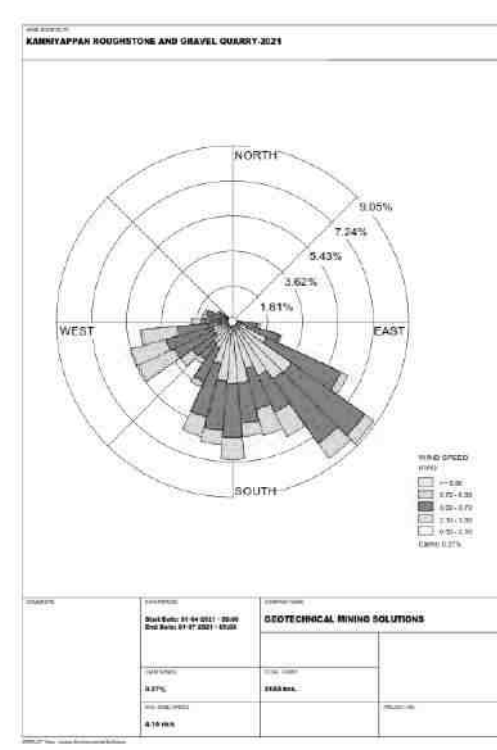
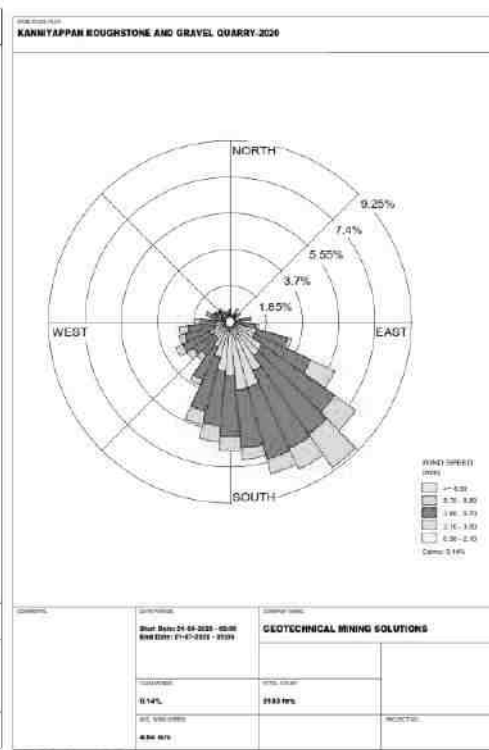
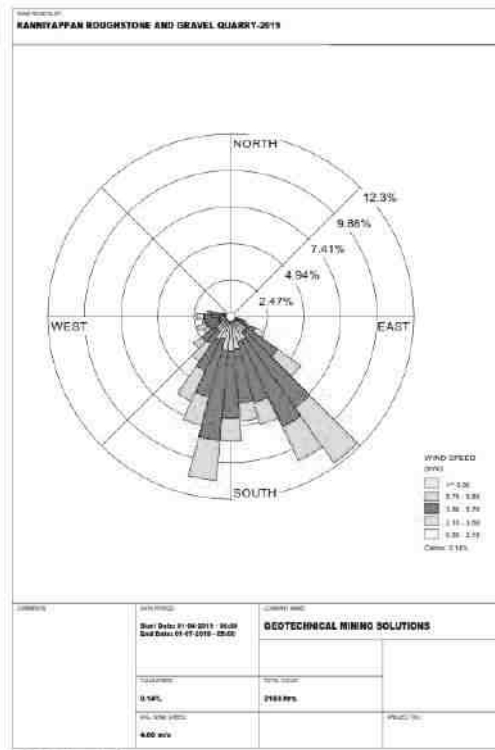
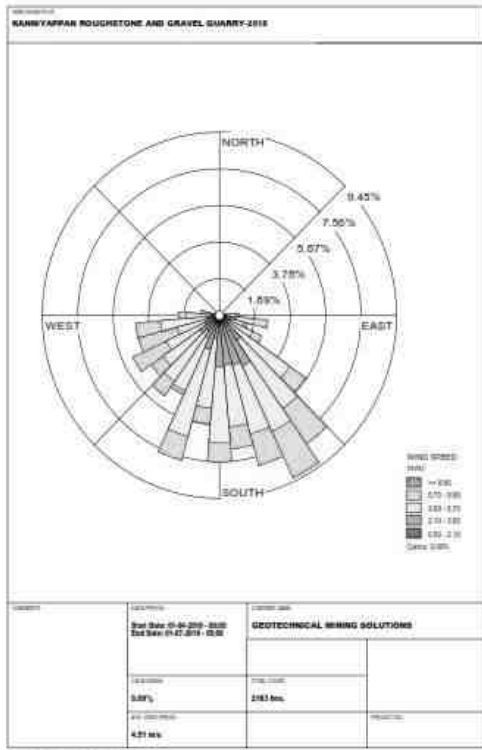


Figure 3.11 Windrose Diagram from 2018 to 2021 (March to May)

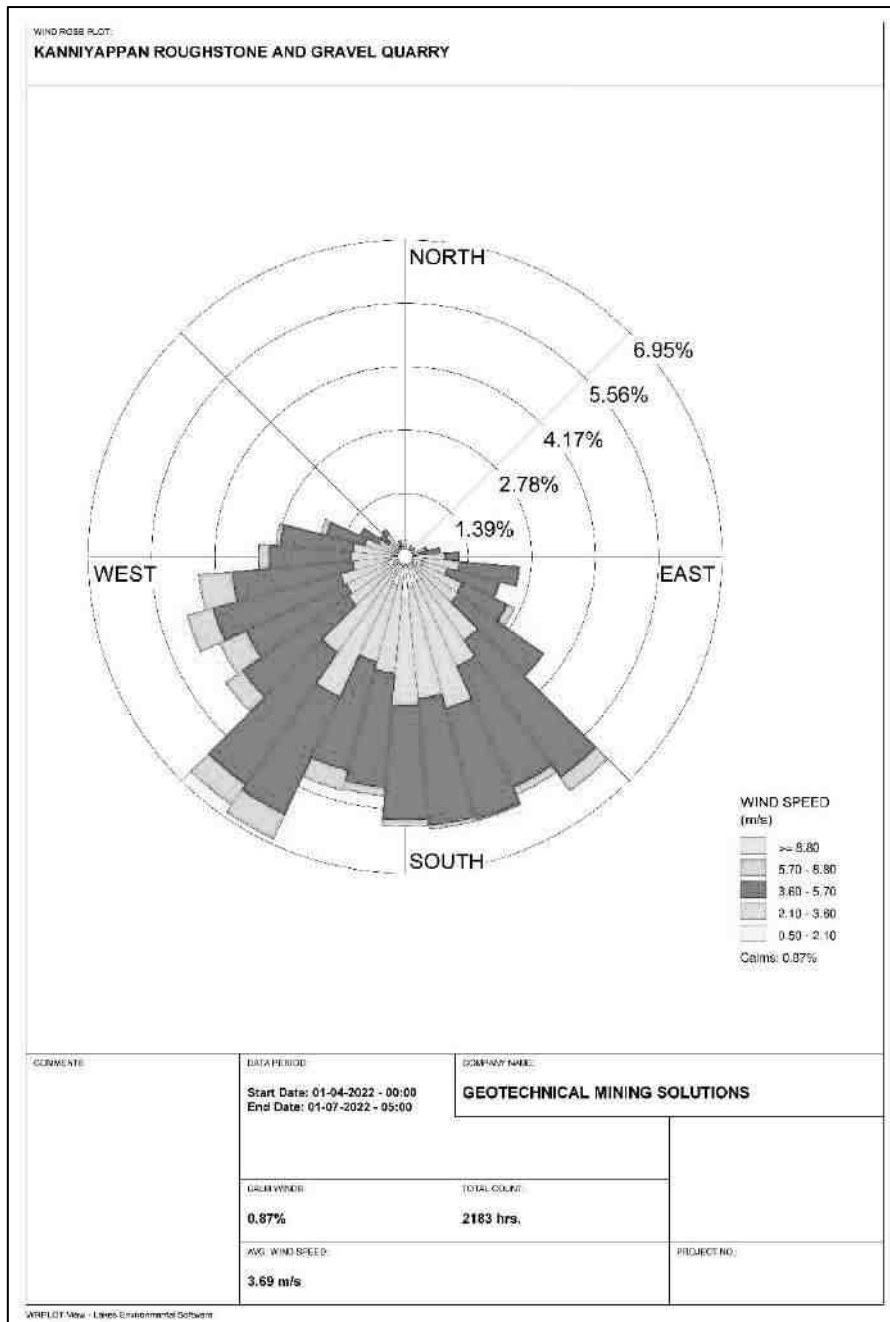


Figure 3.12 Onsite Wind Rose Diagram

3.3.2 Methodology and Objectives

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

- ❖ Meteorological condition on synoptic scale
- ❖ Topography of the study area

- ❖ Representatives of regional background air quality for obtaining baseline status
- ❖ Location of residential areas representing different activities
- ❖ Accessibility and power availability

3.3.3 Sampling and Analytical Techniques

Table 3.14 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
PM2.5	Gravimetric method Beta attenuation method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM10	Gravimetric method Beta attenuation method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NOx	IS-5182 Part II (Jacob & Hoch heiser modified method)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology based on Accuracy Analabs Laboratory & CPCB Notification

Table 3.15 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide ($\mu\text{g}/\text{m}^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than $10\mu\text{m}$) PM10 ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	60.0 $10^\circ.0$	60.0 $10^\circ.0$
4	Particulate matter (size less than $2.5\mu\text{m}$) PM2.5 ($\mu\text{g}/\text{m}^3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

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

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

3.3.4 Frequency and Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at Nine (9) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March-May 2022. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

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

3.3.5 Ambient Air Quality Monitoring Stations

Nine monitoring stations were set up in the study area as depicted in Figure 3.13 for the assessment of the existing ambient air quality. The sampling locations and concentrations of air pollutants measured from the proposed project site have been given in Tables 3.16.

Table 3.16 Ambient Air Quality (AAQ) Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Sirudamur	0.92km NE	12°43'19.87"N, 79°51'35.87"E
2	AAQ-2	Padoor	0.70km SW	12°42'48.39"N, 79°50'46.86"E
3	AAQ-3	Kattankulam	3.1 SW	12°41'53.58"N, 79°49'51.00"E
4	AAQ-4	Pazhaveri	4.1 NE	12°44'30.33"N, 79°52'56.85"E
5	AAQ-5	Madhur	2.15km NNE	12°44'19.05"N 79°51'12.97"E
6	AAQ-6	Vayalakkavoor	3.52km NW	12°44'10.33"N, 79°49'20.52"E
7	AAQ-7	Edamichi	4.1km SE	12°41'20.08"N, 79°52'28.96"E
8	AAQ-8	Thirumukkudal	4.42km NE	12°45'30.23"N, 79°51'37.33"E
9	AAQ-9	Core Zone	-	12°43'5.93"N, 79°51'03.91"E

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

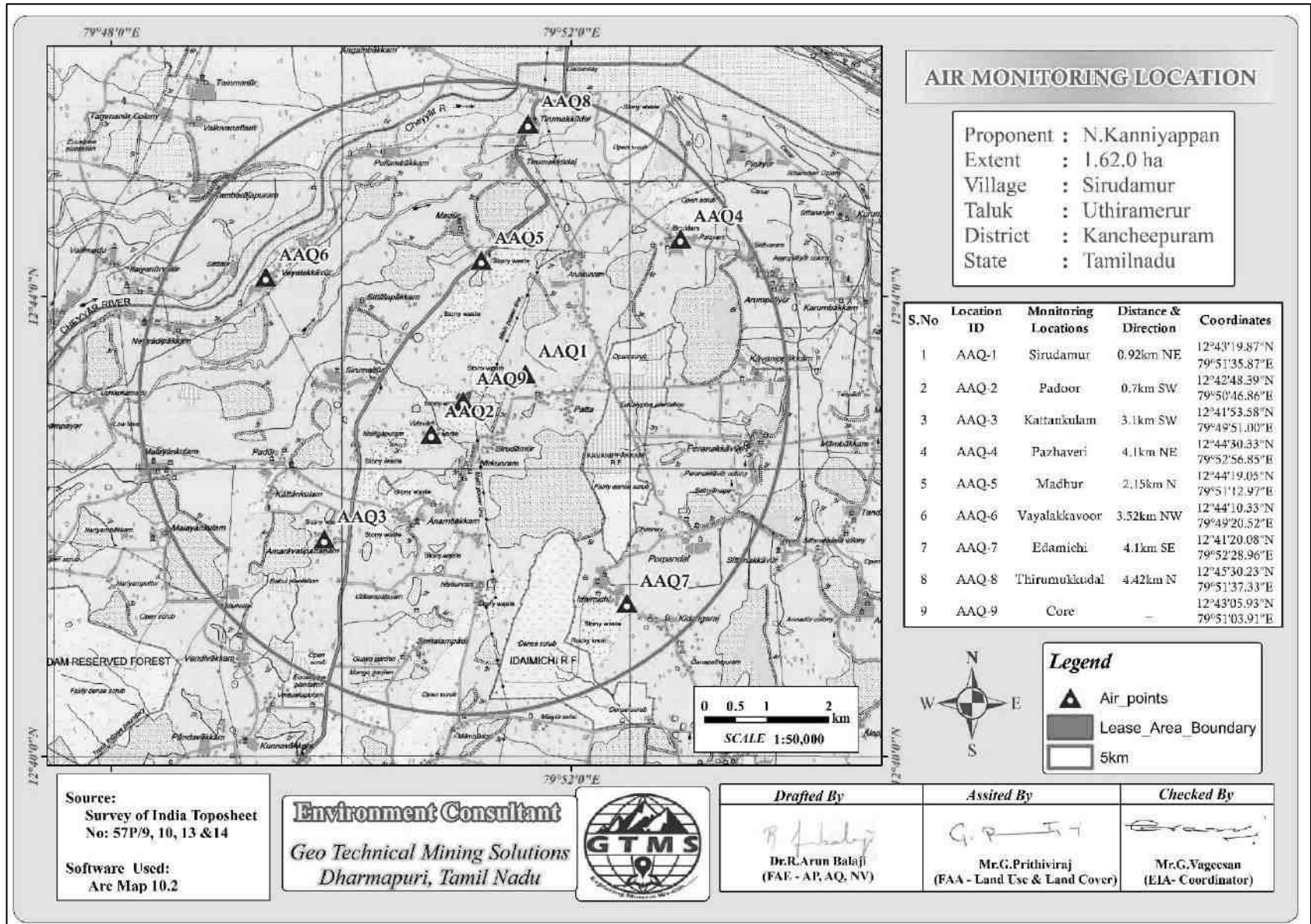


Figure 3.13 Toposheet showing ambient air quality monitoring station locations around 5 km radius from the proposed project site

Table 3.17 Summary of AAQ Result

PM_{2.5}					
Station ID	Max	Min	Mean	98th Percentile	STDEV
AAQ-1	35.4	25.9	32.40	35.26	2.22
AAQ-2	27.2	22.4	25.08	27.02	1.10
AAQ-3	21.7	17.5	20.27	21.70	1.24
AAQ-4	23.8	20.7	22.30	23.66	0.79
AAQ-5	26.8	17.8	24.39	26.80	2.48
AAQ-6	22.7	17.4	20.10	22.65	1.25
AAQ-7	25.9	18.9	23.30	25.72	1.97
AAQ-8	25.7	20.2	23.52	25.72	1.66
AAQ-9	36.1	26.5	33.05	36.01	2.24
PM₁₀					
Station ID	Max	Min	Mean	98th Percentile	STDEV
AAQ-1	55.5	47.5	52.23	55.45	2.02
AAQ-2	47.1	42.7	45.23	47.01	1.35
AAQ-3	41.9	37.2	39.58	41.76	1.32
AAQ-4	43.0	38.9	40.99	42.82	1.12
AAQ-5	45.9	39.8	43.43	45.53	1.40
AAQ-6	42.0	36.2	38.86	41.36	1.45
AAQ-7	46.6	42.5	44.68	46.55	1.20
AAQ-8	44.7	37.9	42.18	44.61	1.70
AAQ-9	56.3	48.4	53.02	56.25	2.01
SO₂					
Station ID	Max	Min	Mean	98th Percentile	STDEV
AAQ-1	14.4	8.6	11.53	14.03	1.39
AAQ-2	10.8	5.1	8.70	10.52	1.35
AAQ-3	7.8	4.7	5.89	7.70	0.90
AAQ-4	7.7	4.9	6.48	7.65	0.69
AAQ-5	8.9	6.1	7.23	8.76	0.82
AAQ-6	6.8	5.2	6.08	6.80	0.49
AAQ-7	10.0	7.2	8.66	9.95	0.77
AAQ-8	10.5	6.7	8.63	10.41	0.96
AAQ-9	14.9	9.3	12.13	14.49	1.38
NO₂					
Station ID	Max	Min	Mean	98th Percentile	STDEV
AAQ-1	28.1	19.2	23.85	27.87	2.49
AAQ-2	25.6	19.8	22.24	25.19	1.63
AAQ-3	19.4	6.9	16.78	19.31	2.41
AAQ-4	20.7	16.4	18.75	20.56	1.41
AAQ-5	22.8	18.7	20.85	22.57	1.07
AAQ-6	21.4	15.6	18.70	21.03	1.28
AAQ-7	24.6	19.5	22.40	24.24	1.34
AAQ-8	25.9	17.7	21.72	24.89	1.75
AAQ-9	29	19.9	24.64	28.82	2.51

**Table 3.18 Maximum, Minimum, Average and 98th Percentile of Average
Air Pollutant Concentrations over the Study Area**

S.No.	Parameter	Pollutant Concentration, $\mu\text{g}/\text{m}^3$			
		PM _{2.5}	PM ₁₀	SO ₂	NO ₂
1	Maximum	27.26	47.0	10.20	24.17
2	Minimum	20.81	41.23	6.42	17.08
3	Mean	24.93	44.47	8.37	21.10
4	98th percentile	27.17	46.82	10.03	23.83
5	NAAQ Norms	60	100	80	80

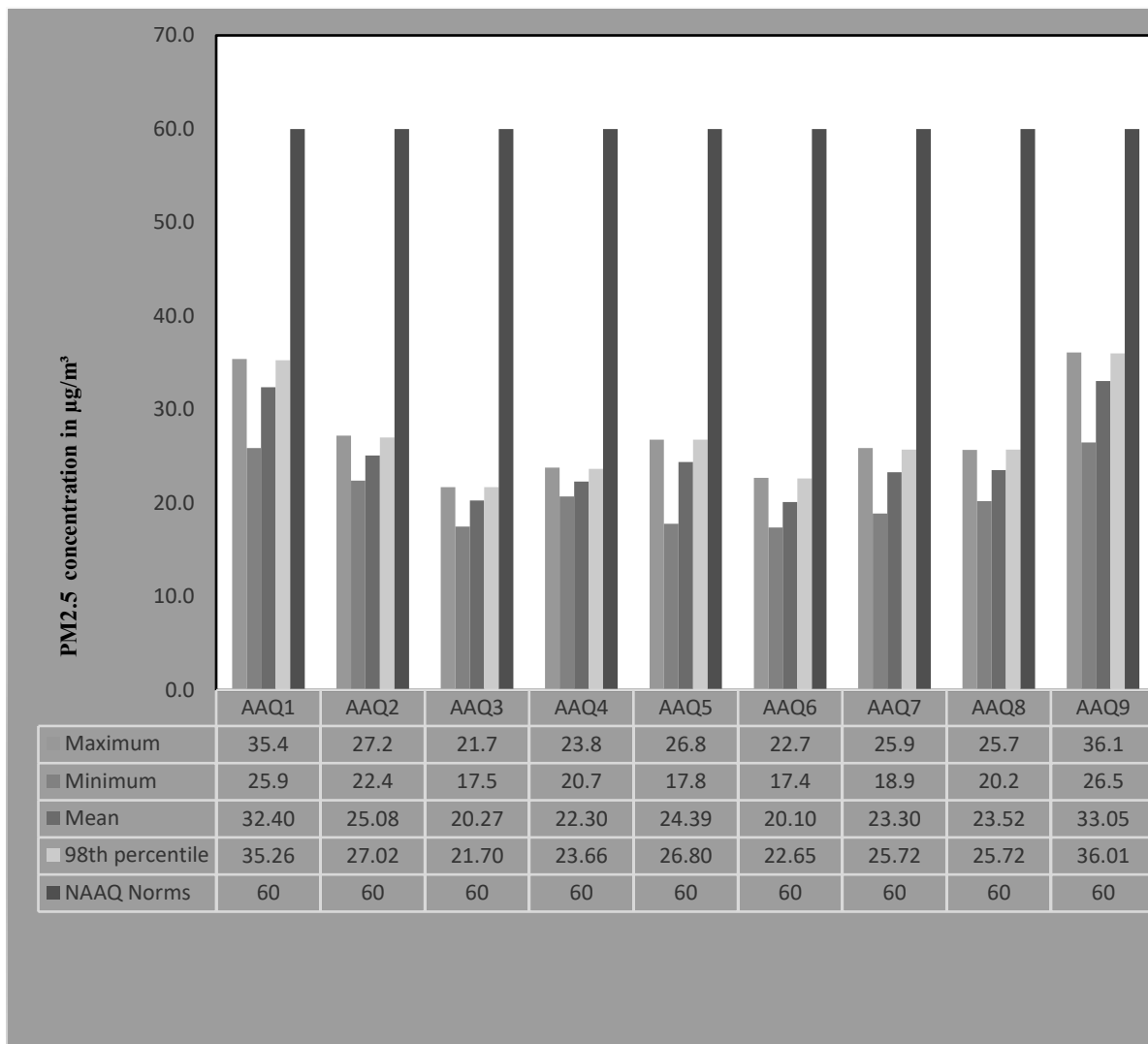


Figure 3.14 Bar chart showing maximum, minimum, and the average concentrations of PM_{2.5} measured from the nine air quality monitoring stations within 5 km radius

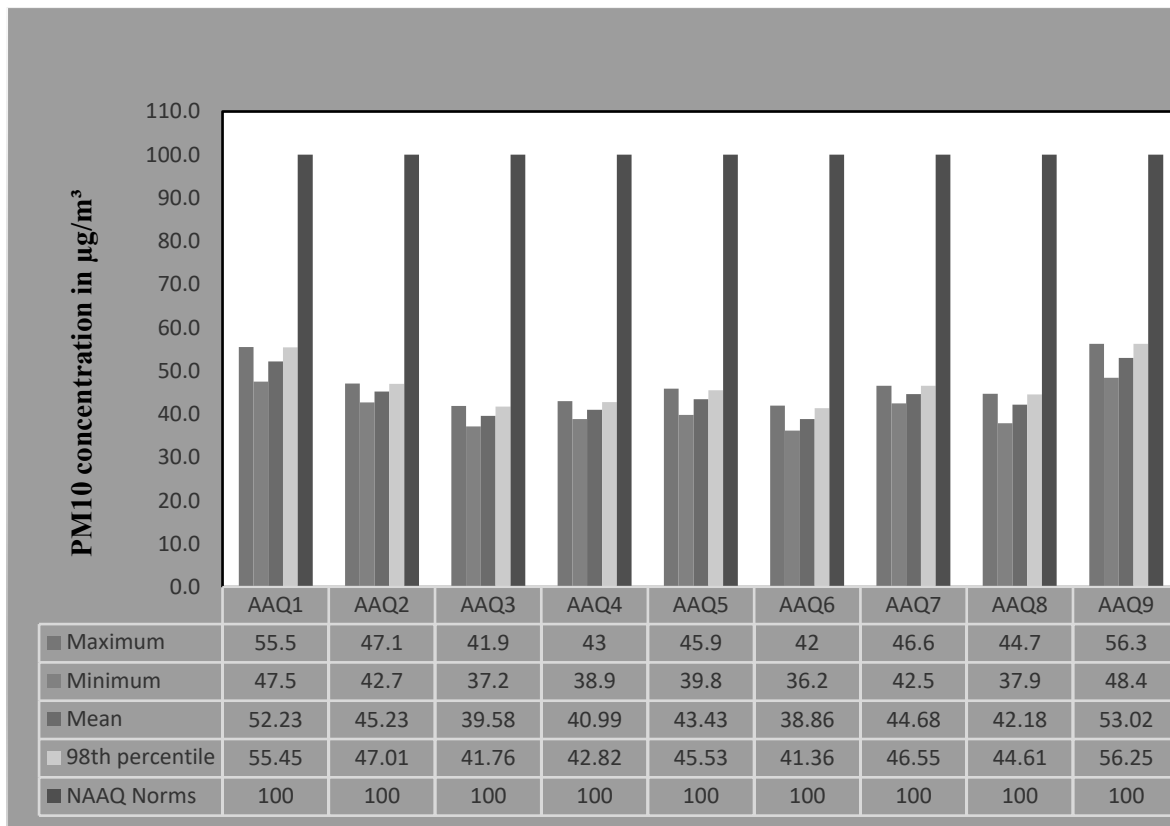


Figure 3.15 Bar chart showing maximum, minimum, and the average concentrations of PM10 measured from the nine air quality monitoring stations within 5km radius

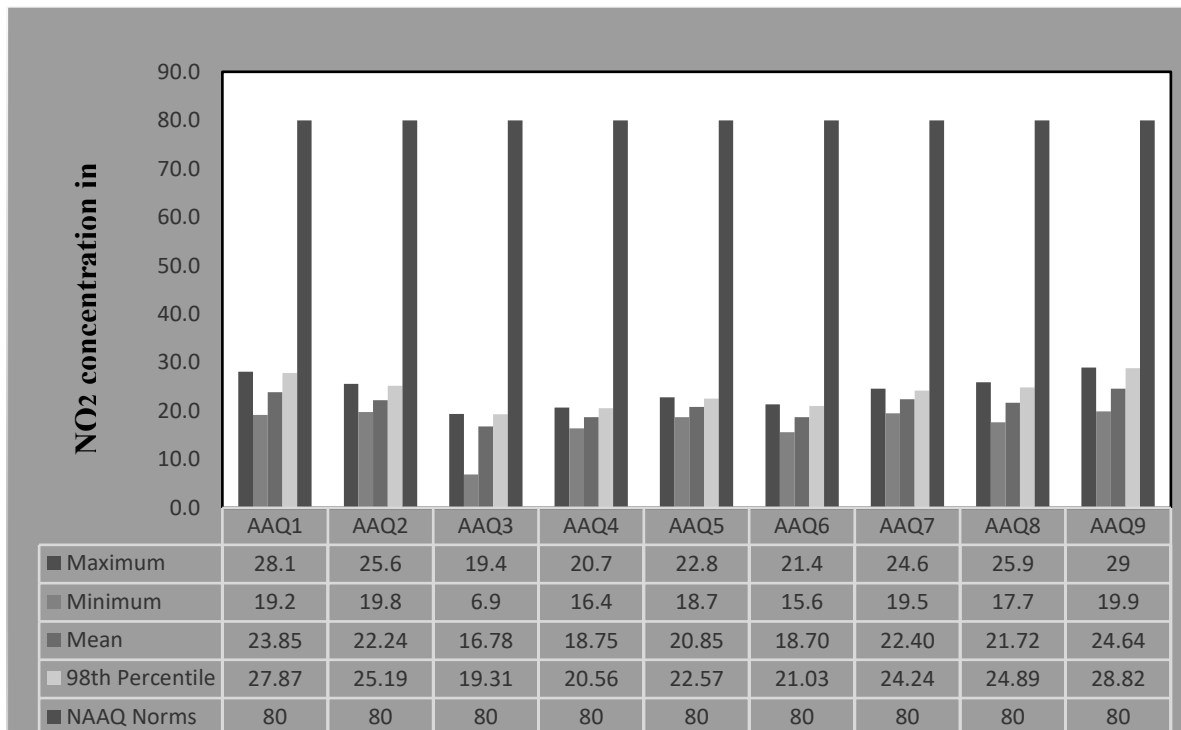


Figure 3.16 Bar chart showing maximum, minimum, and the average concentrations of NO₂ measured from the nine air quality monitoring stations within 5 km radius

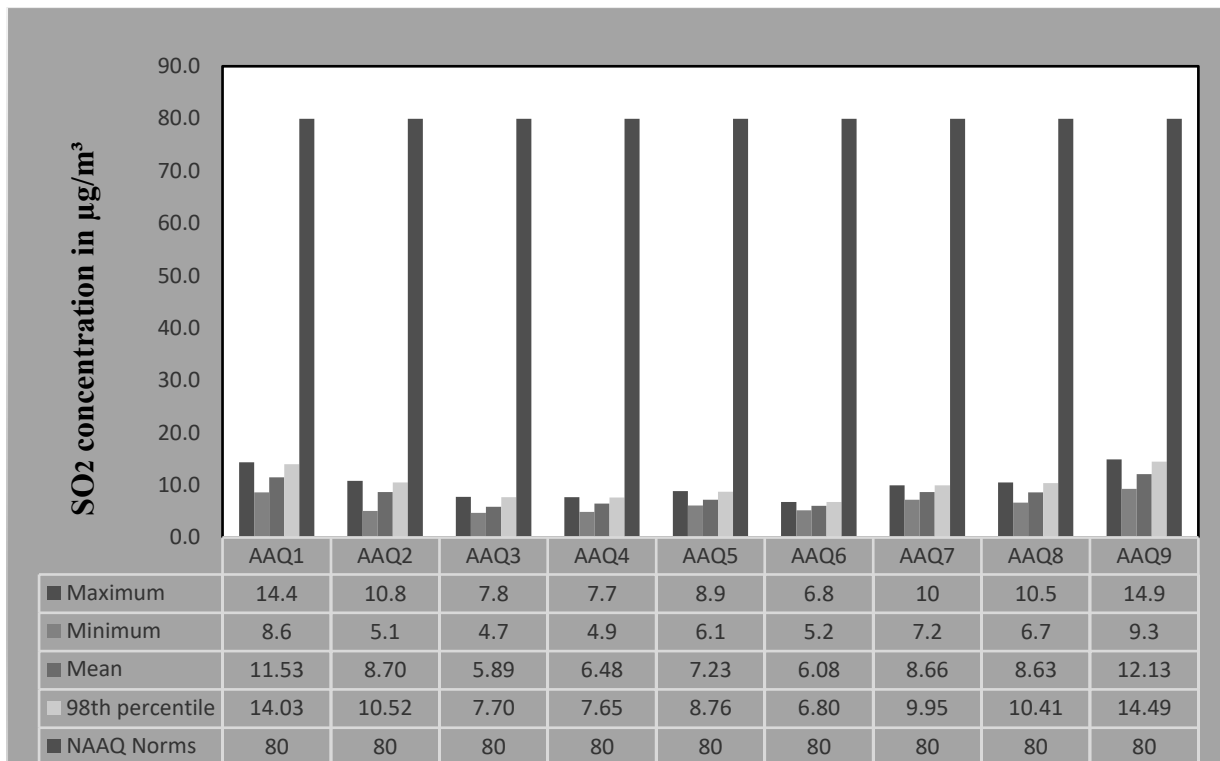


Figure 3.17 Bar chart showing maximum, minimum, and the average concentrations of SO₂ measured from the nine air quality monitoring stations within 5km radius

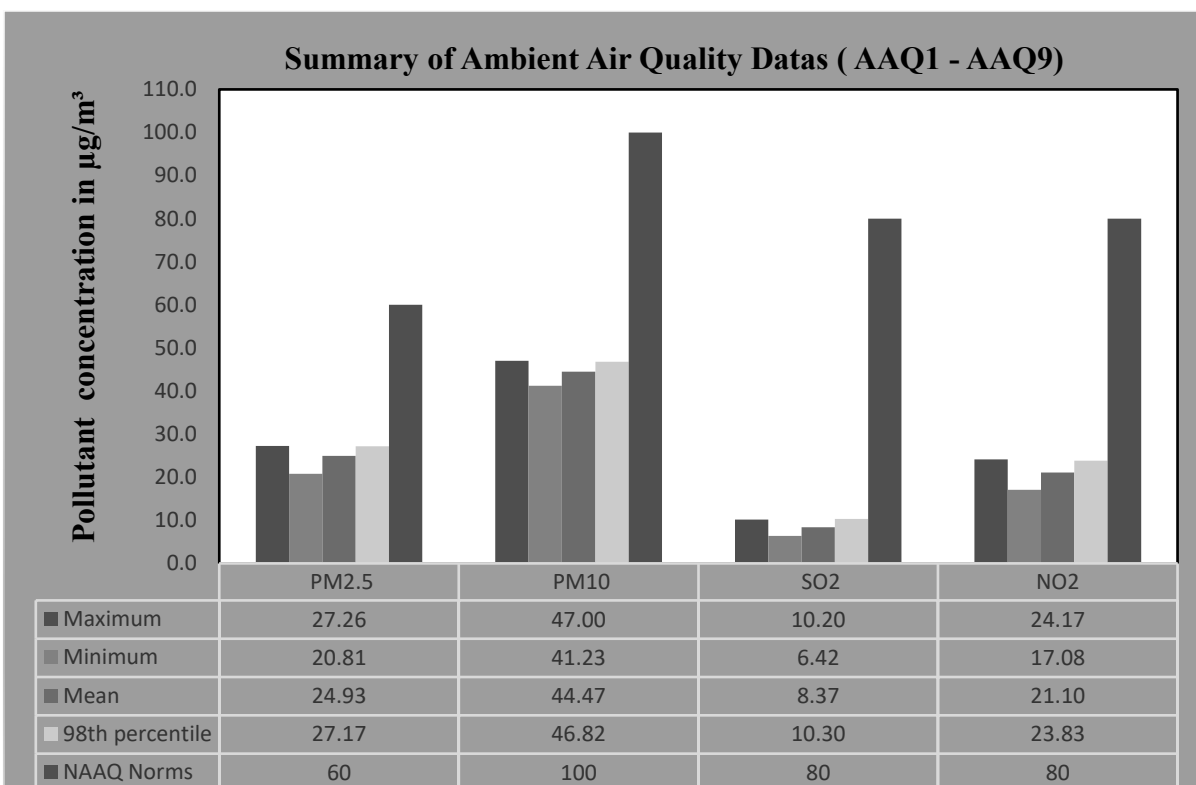


Figure 3.18 Bar chart showing maximum, minimum, and the average concentrations of pollutants in the atmosphere within 5km radius

3.3.6 Results & Discussion

As per the monitoring data, PM₁₀ ranges from 41.23 µg/m³ to 47.00µg/m³; PM_{2.5} from 20.81µg/m³ to 27.26 µg/m³; SO₂ from 6.42µg/m³ to 10.20 µg/m³; NO₂ from 17.08 µg/m³ to 24.17µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.4 NOISE ENVIRONMENT

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

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

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at ten (10) locations covering commercial, residential, rural areas within the radius of 5 km. A suitable noise monitoring methodology was chosen to meet the purpose and objectives of the study.

Table 3.19 Details of Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N1	Sirudamur	0.92km NE	12°43'18.42"N 79°51'35.82"E
2	N2	Sirudamur	1.0km SE	12°43'06.83"N 79°51'40.96" E
3	N3	Kattankulam	3.0km SW	12°41'53.33"N 79°49'53.30" E
4	N4	Pazhaveri	4.10km NE	12°44'28.97"N 79°52'56.40"E
5	N5	Madhur	2.2km NNE	12°44'19.05"N 79°51'12.97"E
6	N6	Vayalakkavoor	3.52km NW	12°44'11.80"N 79°49'23.81"E
7	N7	Edamichi	4.0km SE	12°41'20.08"N 79°52'26.90"E
8	N8	Thirumukkudal	4.4km NNE	12°45'29.69"N 79°51'37.19"E
9	N9	Core Zone	-	12°43'04.30"N 79°51'05.17"E
10	N10	Neerkundram	0.72km SE	12°42'46.31"N 79°51'20.48"E

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

3.4.2 Method of Monitoring

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

$$Leq = 10 \text{ Log } L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A), T = Time interval of observation

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

3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352). An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.20.

Table 3.20 Ambient Noise Quality Result

S. No.	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Project Area near	48.6	36.5	Residential Day Time– 55 dB (A) Night Time- 45 dB (A) Industrial Day Time- 75 dB (A) Night Time-70 dB (A)
2	Sirudamur	45.6	35.6	
3	Kattankulam	42.5	30.9	
4	Pazhaveri	42.9	31.5	
5	Sirudamur	40.2	29.8	
6	Vayalakkavoor	39.8	30.8	
7	Edamichi	38.0	27.6	
8	Thirumukkudal	44.9	33.0	
9	Core Zone	50.05	37.11	
10	Neerkundram	45.54	33.8	

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

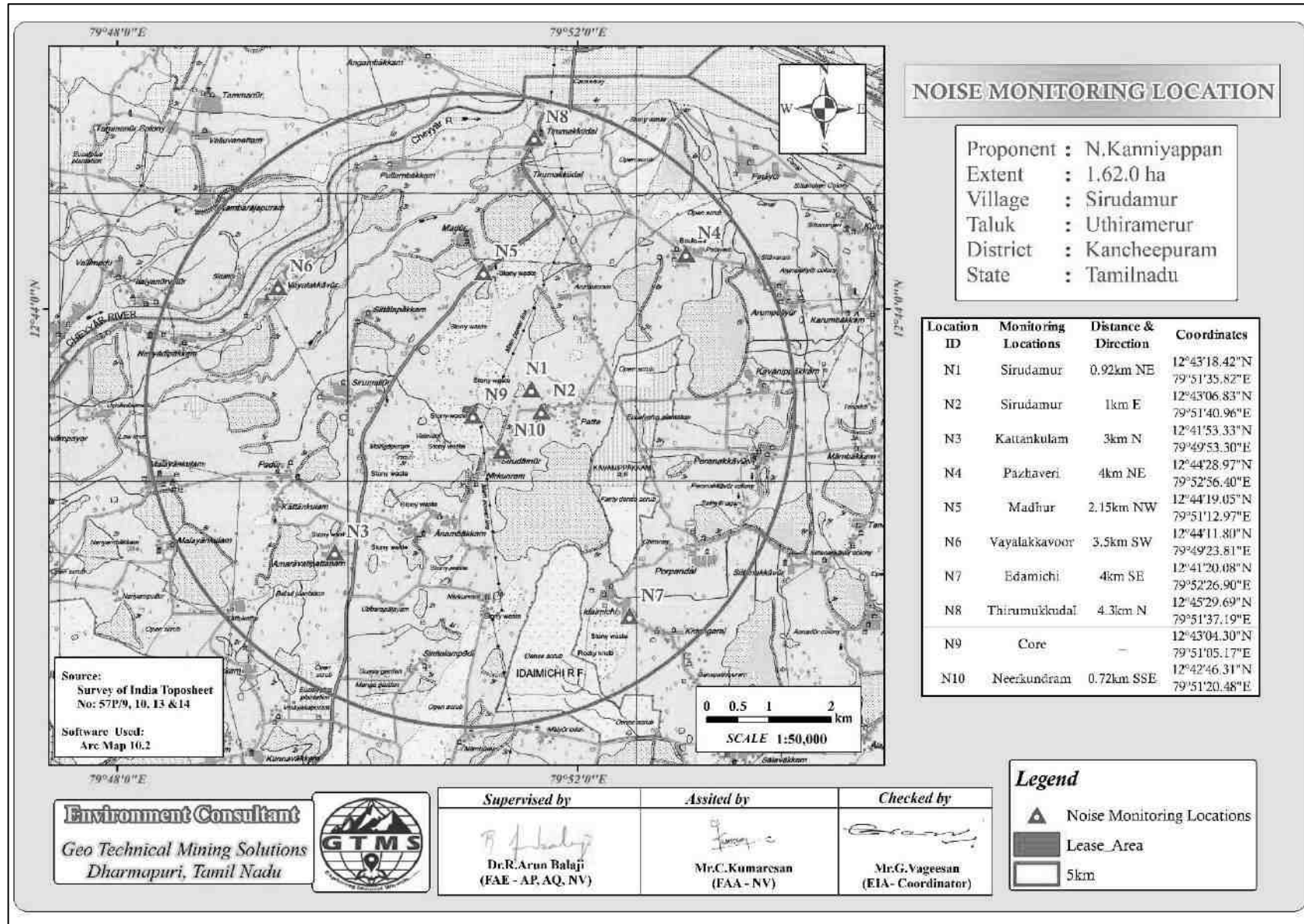


Figure 3.19 Toposheet showing noise level monitoring station locations around 5km radius from the proposed project site

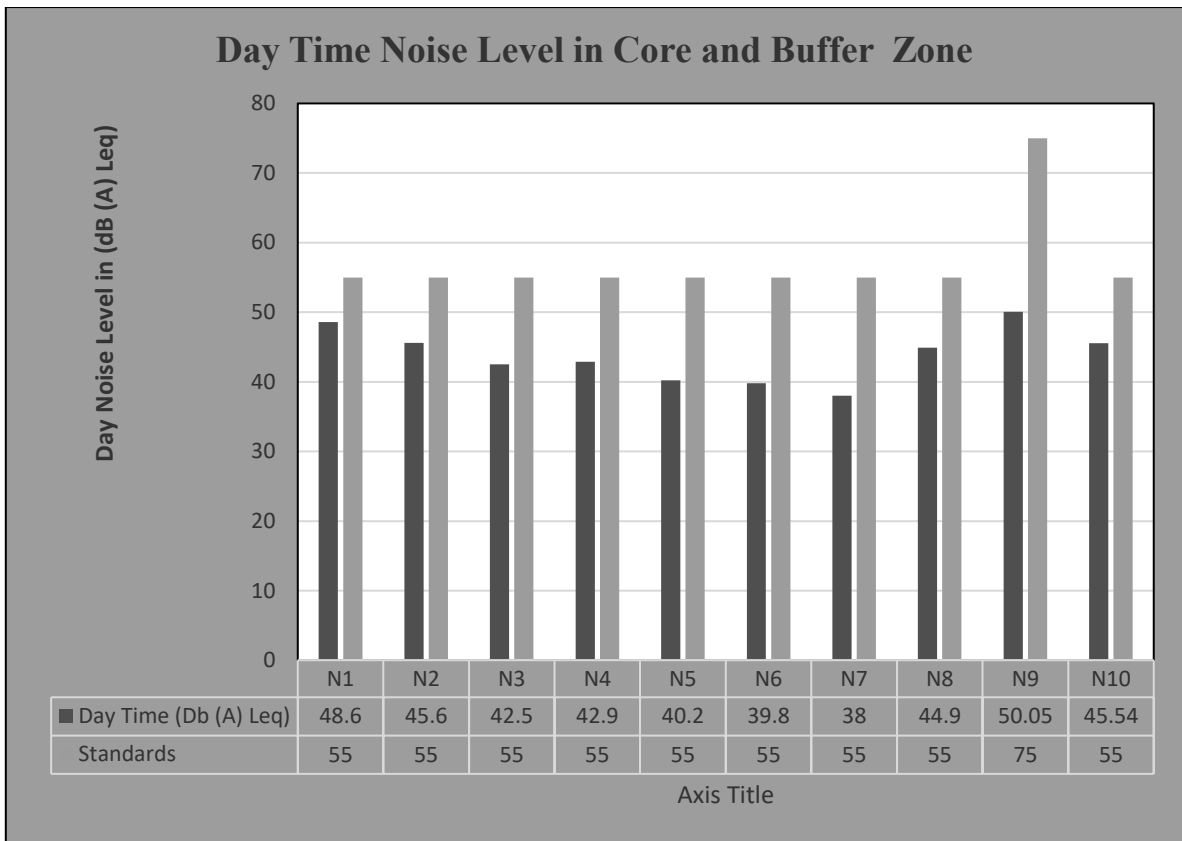


Figure 3.20 Bar chart showing day time noise levels measured in core and buffer zones

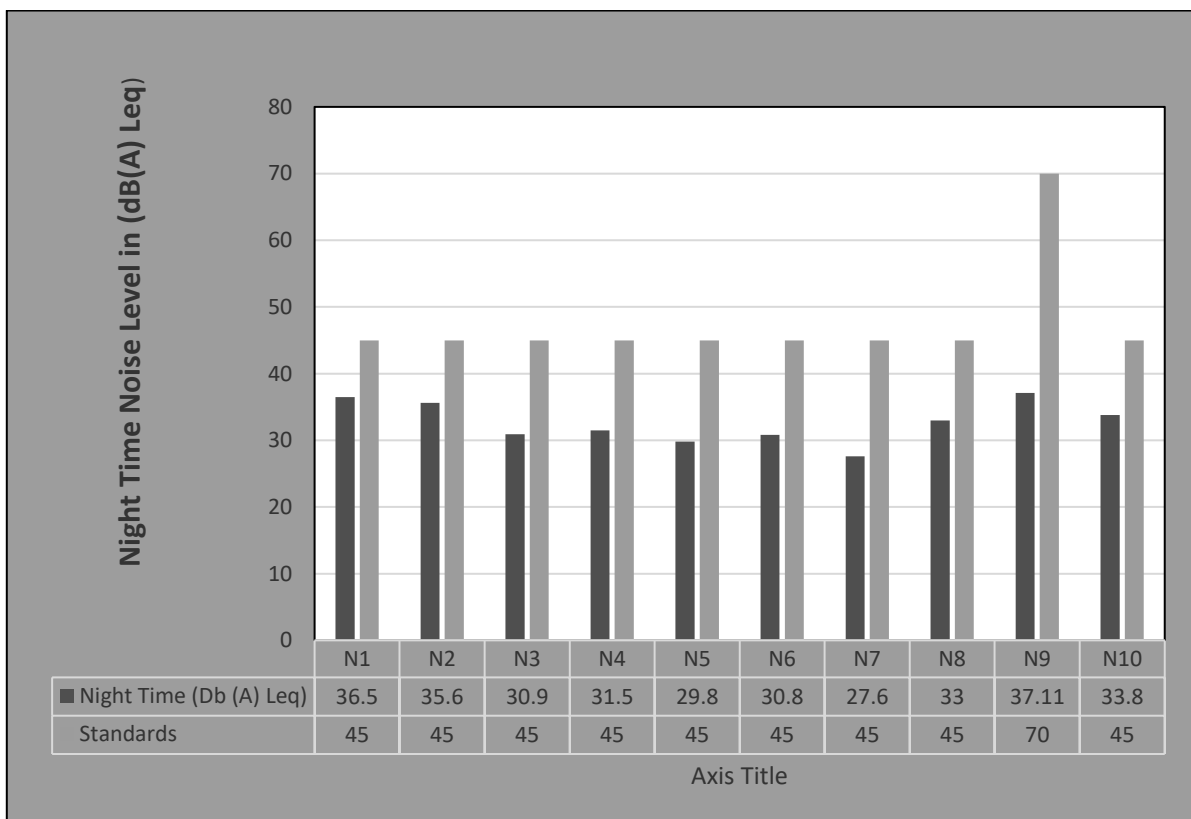


Figure 3.21 Bar chart showing night time noise levels measured in core and buffer zones

3.4.4 Results & Discussion

Ambient noise levels were measured at 10 locations around the proposed project area. Noise levels recorded in core zone during day time was 50.05.6 dB (A) Leq and during night time was 37.11 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 38 to 48.6dB (A) Leq and during night time from 27.6 to 36.5 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

3.5 BIOLOGICAL ENVIRONMENT

Ecology is a branch of science which dealing the relations and interactions between organisms and their environment. An ecological survey of the study area was conducted, particularly with reference to listing of species and assessment of the existing baseline ecological conditions in the study area. The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area. Data has been collected through extensive survey of the area with reference to flora and fauna. Information is also collected from different sources i.e., government departments such as District Forest Office, Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

3.5.1 Study area

As the proposed project with the extent of 1.62 ha has an impact on diversity of flora and fauna of the study area including core area and buffer area of 10 km radius from the periphery of the lease area, a detailed biological study was carried out over the study area. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

3.5.2 Objectives

The present study was undertaken with the following objectives:

- ❖ To study the likely impact of the proposed mining project on the local biodiversity and to suggest mitigation measures, if required, for vulnerable biota.
- ❖ To assess the nature and distribution of vegetation (Terrestrial and Aquatic) in and around the mining activity.
- ❖ To collect details of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately from the core and buffer area and to clearly indicate the schedule of fauna present.

- ❖ To prepare the necessary plan along with budgetary provisions for their conservation in consultation with State Forest and Wildlife Department and details furnished, in case of any schedule- I fauna found in the study area.
- ❖ To devise effective management & conservation measures for biodiversity.

3.5.3 Site selection

Selection of sampling locations was made with reference to topography, land use, vegetation pattern, etc. The observations were taken on natural vegetation, roadside plantation and non-forest area (agricultural field, in plain areas, Village wasteland, etc.) for quantitative representation of different species. A methodology of Sampling Flora and fauna studies were carried out during the Pre monsoon 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.

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

3.5.4 Quadrats Method

Quadrats of 25 × 25m were laid down randomly within core and 10km buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and one, 10 × 10m sub-quadrat nested within the quadrat for shrubs. The quadrats were laid randomly to cover the area to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, wildlife areas, natural forest area, avenue plantations, house backyards, etc. In each quadrat individuals belonging to tree (25 × 25m) and shrub (10 × 10m) were recorded separately and have been identified on the field.

3.5.5 Phyto-Sociological Survey

Phyto sociological parameters, such as *Density, Frequency, Abundance and Importance Value Index* of individual species (Trees) were determined in randomly placed quadrates of different sizes in the study area. Relative frequency, and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For shrubs, herbs and grasses, *Density, Frequency, Relative Density & Relative Frequency were found*. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the

study area of 10 km radius. Analysis of the vegetation will help in determining the relative importance of each species in the study area and to reveal if any economically valuable species is threatened in the process.

Table 3.21 Calculation of Density, Frequency (%), Dominance, Relative Density, Relative Frequency, Relative Dominance & Important Value Index

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

3.5.5.1 Shannon – Wiener Index, Evenness and Richness

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

Table 3.22 Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness

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

3.5.6 Flora

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

3.5.6.1 Flora in Core Zone

Taxonomically a total of 21 species belonging to 17 families have been recorded from the core mining lease area. The lease applied area is flat terrain. Based on habitat classification of the enumerated plants the majority of species were Climbers, Grass, Herbs, (12) followed by trees (05) Shrub (04) and the result of core zone of flora studies shows that Fabaceae and Lamiaceae are the main dominating species and Species Richness (margalef Index) in the study area it mentioned in Table 3.23-3.25. Moreover, no species are found as threatened category. The proposed lease area following plant types such as *Prosopis juliflora*, *Holoptelea integrifolia*, *Borassus flabellifer*, *Azadirachta indica*, *Phoenix Reclinata* is abundant in meagre amount. The project proponent plan to removing all the trees and regeneration in the adjacent safety area. The regenerated trees are possible to growing only for forty percentage, hence we recommend to project proponent 1:10 ratio of new seedling planning to established within the safety barriers, nearest forests land, road side and government Porampoke lands

3.5.6.2 Flora in Buffer Zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area because nearby agriculture land but presently there are no cultivation. It contains a total of 91 species belonging to 41 families have been recorded from the buffer zone. The floral (81) varieties among them Trees (31), shrubs (18) and herbs (20) and Climbers (12) Creepers (5), Grasses (4) Cactus (1) were identified. The result of buffer zone of flora studies shows that Fabaceae and Poaceae, are the main dominating species and Species Richness (margalef Index) in the study area it mentioned in Table 3.26-3.28. There is no Rare, Endangered and Threatened Flora species in mining area and their surrounding area. Details of flora with the scientific name were mentioned in Table 3.26.

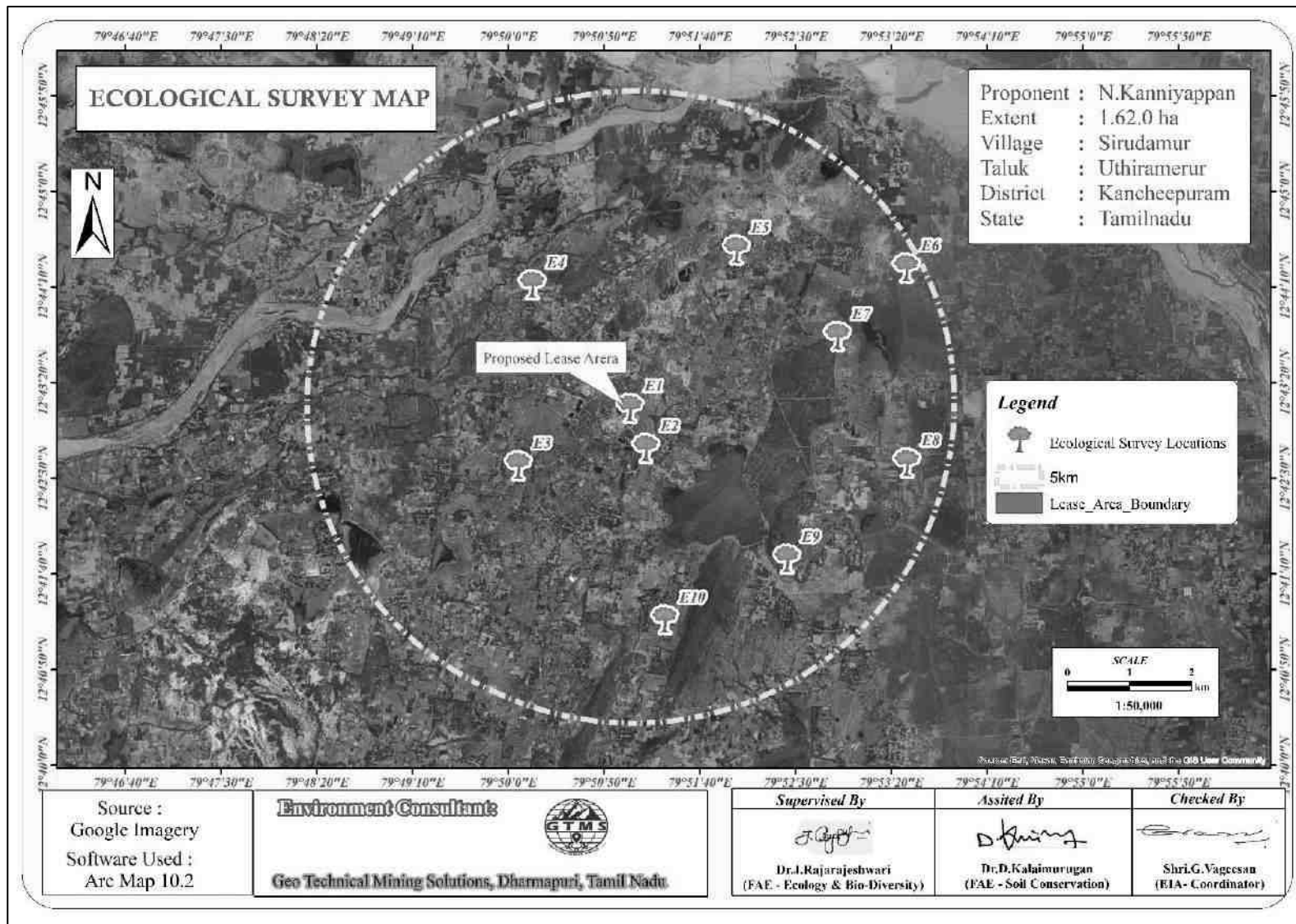


Figure 3.22 Ecological Survey Map 5 km Radius

Table 3.23 Flora in Core Zone

S.No	Local Name	Scientific name	Family name	Total No. of species	Total Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Tree													
1	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae	3	2	5	0.6	40.0	1.5	17.6	16.7	34.3	Not Listed
2	Aya Maram	<i>Holoptelea integrifolia</i>	Ulmaceae	2	1	5	0.4	20.0	2.0	11.8	8.3	20.1	Not Listed
3	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	4	3	5	0.8	60.0	1.3	23.5	25.0	48.5	Not Listed
4	Vembu	<i>Azadirachta indica</i>	Meliaceae	5	4	5	1.0	80.0	1.3	29.4	33.3	62.7	Not Listed
5	Eshamaram	<i>Phoenix Reclinata</i>	Arecaceae	2	2	5	0.6	40.0	1.5	17.6	16.7	34.3	Not Listed
Shrubs													
6	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	6	5	10	0.6	50.0	1.2	21.4	20.8	42.3	Not Listed
7	Avarai	<i>Senna auriculata</i>	Fabaceae	9	8	10	0.9	80.0	1.1	32.1	33.3	65.5	Not Listed
8	Sappathikalli	<i>Cereus pterogonus</i>	Cactaceae	8	7	10	0.8	70.0	1.1	28.6	29.2	57.7	Not Listed
9	Unichedi	<i>Lantana camara</i>	Verbenaceae	5	4	10	0.5	40.0	1.3	17.9	16.7	34.5	Not Listed
herbs													
10	Thumbai	<i>Leucas aspera</i>	Lamiaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
11	Poolai poondu	<i>Aerva lanata</i>	Amaranthaceae	7	6	15	0.5	40.0	1.2	7.0	7.0	14.0	Not Listed
12	Korai	<i>Cyperus rotundus</i>	Cyperaceae	5	4	15	0.3	26.7	1.3	5.0	4.7	9.7	Not Listed
13	Nerunji	<i>Tribulus terrestris</i>	Zygophyllales	8	7	15	0.5	46.7	1.1	8.0	8.1	16.1	Not Listed
14	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
15	Pink Blumea	<i>Blumea axillaris</i>	Asteraceae	5	4	15	0.3	26.7	1.3	5.0	4.7	9.7	Not Listed
16	Rail Pindu	<i>Croton bonplandianus</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
17	Communist pacha	<i>Chromolaena odorata</i>	Asteraceae	7	6	15	0.5	40.0	1.2	7.0	7.0	14.0	Not Listed
18	veattukayapundu	<i>Tridax Procumbens</i>	Asteraceae	8	7	15	0.5	46.7	1.1	8.0	8.1	16.1	Not Listed
19	Mosukkattan	<i>Passiflora foetida</i>	Passifloraceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
20	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	9	8	15	0.6	53.3	1.1	9.0	9.3	18.3	Not Listed
21	Arugam Pill	<i>Cynodon dactylon</i>	Poaceae	10	9	15	0.7	60.0	1.1	10.0	10.5	20.5	Not Listed

Table 3.24 Calculation of Species Diversity in Core Zone

S.No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Tree						
1	Velikathan maram	<i>Prosopis juliflora</i>	3	0.18	-1.73	-0.31
2	Aya Maram	<i>Holoptelea integrifolia</i>	2	0.12	-2.14	-0.25
3	Panai maram	<i>Borassus flabellifer</i>	4	0.24	-1.45	-0.34
4	Vembu	<i>Azadirachta indica</i>	5	0.29	-1.22	-0.36
5	Eshamaram	<i>Phoenix Reclinata</i>	2	0.12	-2.14	-0.25
H (Shannon Diversity Index) =1.54						
Shrubs						
6	Erukku	<i>Calotropis gigantea</i>	6	0.21	-1.54	-0.33
7	Avarai	<i>Senna auriculata</i>	9	0.32	-1.13	-0.36
8	Sappathikalli	<i>Cereus pterogonus</i>	8	0.29	-1.25	-0.36
9	Unichedi	<i>Lantana camara</i>	5	0.18	-1.72	-0.31
H (Shannon Diversity Index) =1.36						
Herbs						
10	Thumbai	<i>Leucas aspera</i>	6	0.07	-2.63	-0.19
11	Poolai poondu	<i>Aerva lanata</i>	7	0.08	-2.47	-0.21
12	Korai	<i>Cyperus rotundus</i>	5	0.06	-2.81	-0.17
13	Nerunji	<i>Tribulus terrestris</i>	8	0.10	-2.34	-0.23
14	Nayuruv	<i>Achyranthes aspera</i>	6	0.07	-2.63	-0.19
15	Pink Blumea	<i>Blumea axillaris</i>	5	0.06	-2.81	-0.17
16	Rail Pindu	<i>Croton bonplandianus</i>	6	0.07	-2.63	-0.19
17	Communist pacha	<i>Chromolaena odorata</i>	7	0.08	-2.47	-0.21
18	veattukayapundu	<i>Tridax Procumbens</i>	8	0.10	-2.34	-0.23
19	Mosukkattan	<i>Passiflora foetida</i>	6	0.07	-2.63	-0.19
20	Perandai	<i>Cissus quadrangularis</i>	9	0.11	-2.22	-0.24
21	Arugam Pill	<i>Cynodon dactylon</i>	10	0.12	-2.12	-0.25
H (Shannon Diversity Index) =2.46						

Table 3.25 Species Richness in Core Zone

Details	H	H max	Evenness	Species Richness (Margalef Index)
Tree	1.54	1.61	0.96	1.44
Shrubs	1.36	1.61	0.98	0.90
Herbs	2.46	2.48	9.99	2.49

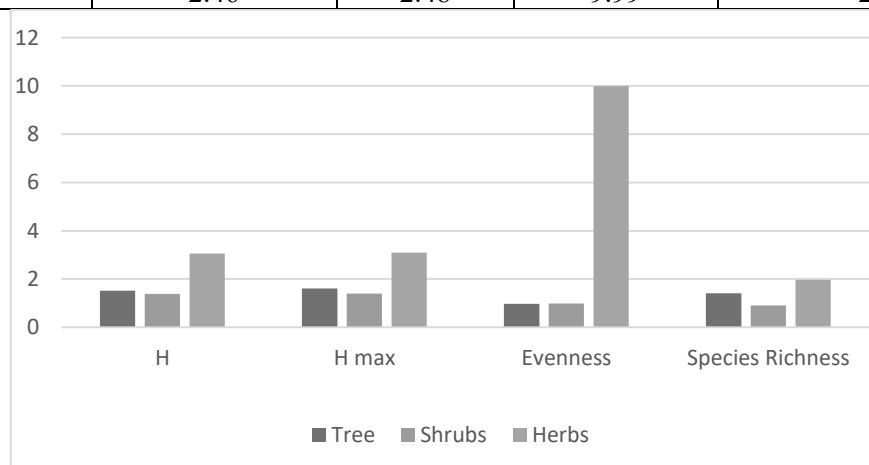


Figure 3.23 Floral diversity species Richness (Index) in Core zone

Table 3.26 Flora in Buffer Zone

S.No	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
TREE													
1	Vembu	<i>Azadirachta indica</i>	Meliaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
2	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
3	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
4	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
5	Puliyamaram	<i>Tamarindus indica</i>	Legumes	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
6	Athi	<i>Ficus recemosa</i>	Moraceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
7	Vazhaimaram	<i>Musa</i>	Musaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
8	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
9	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
10	Perumungil	<i>Bambusa bambos</i>	Poaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
11	Karungali	<i>Acacia sundra</i>	Legumes	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
12	Sapota	<i>Manilkara zapota</i>	Sapotaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
13	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
14	Navalmaram	<i>Sygygium cumini</i>	Myrtaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
15	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
16	Alamaram	<i>Ficus benghalensis</i>	Moraceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
17	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
18	Manga	<i>Mangifera indica</i>	Anacardiaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
19	Thekku	<i>Tectona grandis</i>	Verbenaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
20	Nelli	<i>Emblica officinalis</i>	Phyllanthaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
21	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed

22	Vadanarayani	<i>Delonix elata</i>	Fabaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
23	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
24	Pappali maram	<i>Carica papaya L</i>	Caricaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
25	Nochi	<i>Vitex negundo</i>	Verbenaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
26	Vilvam	<i>Aegle marmelos</i>	Rutaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
27	Nuna maram	<i>Morinda citrifolia</i>	Rubiaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
28	Koyya	<i>Psidium guajava</i>	Myrtaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
29	Seethapazham	<i>Annona reticulata</i>	Annonaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
30	vagai	<i>albizia lebbek</i>	Fabaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
31	Savuku	<i>Casuarina equisetifolia</i>	Casuarinaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
SHRUBS													
32	Avarai	<i>Senna auriculata</i>	Fabaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
33	Sundaika	<i>Solanum torvum</i>	Solanaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
34	Arali	<i>Nerium indicum</i>	Apocynaceae	9	8	15	0.6	53.3	1.1	7.5	7.8	15.3	Not Listed
35	Idlipoo	<i>xoracoc cineae</i>	Rubiaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
36	Neermulli	<i>Hydrophila auriculata</i>	Acanthaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
37	Icham	<i>Phoenix pusilla</i>	Arecaceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
38	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
39	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
40	Thuthi	<i>Abutilon indicum</i>	Meliaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
41	Chemparuthi	<i>Hibiscus rosa-sinensis</i>	Malvaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
42	Kundumani	<i>Abrus precatorius</i>	Fabaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
43	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
44	Kealaka	<i>carissa carandas</i>	Apocynaceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
45	cirututti	<i>Hibiscus vitifolius</i>	Malvaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed

46	rigida	<i>Ehretia rigida</i>	Boraginaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
47	Marul-umattai	<i>Xanthium strumarium</i> L	Asteraceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
48	Venmalar	<i>Ligustrum vulgare</i>	Oleaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
49	Unishedi	<i>Lantana camara</i>	Verbenaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
HERBS&CLIMBER &CREEPER &GRASSES													
50	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	6	5	25	0.2	0.1	0.1	0.4	87.5	7.9	Not Listed
51	Veetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
52	Koraikkilangu	<i>Cyperus articulatus</i>	Cyperaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
53	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
54	Chempu	<i>Colocasia indica</i>	Araceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
55	Karisilanganni	<i>Eclipta prostrata</i>	Asteraceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
56	Korai	<i>Cyperus rotundus</i>	Cyperaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
57	Kunnakora	<i>Cyperus compressus</i>	Cyperaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
58	Milagai	<i>Capsicum frutescens</i>	Solanaceae	7	8	25	0.3	32.0	0.9	2.5	3.3	5.7	Not Listed
59	Kanamvazha	<i>Commelina benghalensis</i>	Commelinaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
60	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
61	Thumbai	<i>Leucas aspera</i>	Lamiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
62	Parttiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
63	Mukurattai	<i>Boerhavia diffusa</i>	Nyctaginaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
64	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
65	Manathakkali	<i>Solanum nigrum</i>	Solanaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
66	Kumipoondur	<i>Gomphrena celosioides</i>	Amaranthaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
67	Kattuthulasi	<i>Ocimum sanctum</i>	Lamiaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
68	Kattukolingi	<i>Tephrosia purpurea</i>	Fabaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
69	Wight, Contrib	<i>Blumea axillaris</i>	Asteraceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed

70	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
71	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
72	Mudakkotan	<i>Cardiospermum helicacabum</i>	Sapindaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
73	Karkakartum	<i>Clitoria ternatea</i>	Fabaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
74	Nannari	<i>Hemidesmus indicus</i>	Asclepiadaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
75	Kovakkai	<i>Coccinia grandis (L.)</i>	Cucurbitaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
76	Malli	<i>Jasminum augustifolium</i>	Oleaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
78	Musumusukkai	<i>Mukia maderaspatana</i>	Cucurbitaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
79	Mosukkattan Poonaipiduku	<i>Passiflora foetida</i>	Passifloraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
80	Ptruukodi	<i>Helinus integrifolius</i>	Rhamnaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
81	Kattuppirantai	<i>Causonis trifolia</i>	Vitaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
82	Vallikeerai	<i>Ipomoea aquatica</i>	Convolvulaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
83	Siru Puladi	<i>Desmodium triflorum</i>	Fabaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
84	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
85	Korai	<i>Cyperus rotandus</i>	Poaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
86	Malai Mookuthi Poondur	<i>Wedelia trilobata</i>	Asteraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
87	Nellu	<i>Oryza sativa</i>	Poaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
88	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	10	9	25	0.4	36.0	1.1	3.5	3.7	7.2	Not Listed
89	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
90	Arugampul	<i>Cynodon dactylon</i>	Poaceae	11	10	25	0.4	40.0	1.1	3.9	4.1	7.9	Not Listed
91	kathalai	<i>Opuntia guatemalensis</i>	Cactaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed

Table 3.27 Calculation of Species Diversity in buffer Zone

S.No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Tree						
1	Vembu	<i>Azadirachta indica</i>	2	0.02	-3.92	-0.08
2	Pongam oiltree	<i>Pongamia pinnata</i>	4	0.04	-3.23	-0.13
3	Karuvelam	<i>Acacia nilotica</i>	2	0.02	-3.92	-0.08
4	Thennai maram	<i>Cocos nucifera</i>	3	0.03	-3.52	-0.10
5	Puliyamaram	<i>Tamarindus indica</i>	2	0.02	-3.92	-0.08
6	Athi	<i>Ficus recemosa</i>	3	0.03	-3.52	-0.10
7	Vazhaimaram	<i>Musa</i>	5	0.05	-3.01	-0.15
8	Nettilinkam	<i>Polylathia longifolia</i>	3	0.03	-3.52	-0.10
9	Amanakku	<i>Ricinus communis</i>	2	0.02	-3.92	-0.08
10	Perumungil	<i>Bambusa bambos</i>	4	0.04	-3.23	-0.13
11	Karungali	<i>Acacia sundra</i>	2	0.02	-3.92	-0.08
12	Sapota	<i>Manilkara zapota</i>	4	0.04	-3.23	-0.13
13	Eucalyptus	<i>Eucalyptus globules</i>	2	0.02	-3.92	-0.08
14	Navalmaram	<i>Sygygium cumini</i>	3	0.03	-3.52	-0.10
15	Ezhumuchaipalam	<i>Citrus lemon</i>	5	0.05	-3.01	-0.15
16	Alamaram	<i>Ficus benghalensis</i>	2	0.02	-3.92	-0.08
17	Panai maram	<i>Borassus flabellifer</i>	3	0.03	-3.52	-0.10
18	Manga	<i>Mangifera indica</i>	4	0.04	-3.23	-0.13
19	Thekku	<i>Tectona grandis</i>	2	0.02	-3.92	-0.08
20	Nelli	<i>Emblica officinalis</i>	5	0.05	-3.01	-0.15
21	Karuvelam maram	<i>Vachellia nilotica</i>	4	0.04	-3.23	-0.13
22	Vadanarayani	<i>Delonix elata</i>	3	0.03	-3.52	-0.10
23	Marudaani	<i>Lawsonia inermis</i>	5	0.05	-3.01	-0.15
24	Pappali maram	<i>Carica papaya L</i>	4	0.04	-3.23	-0.13
25	Nochi	<i>Vitex negundo</i>	3	0.03	-3.52	-0.10
26	Vilvam	<i>Aegle marmelos</i>	2	0.02	-3.92	-0.08
27	Nuna maram	<i>Morinda citrifolia</i>	4	0.04	-3.23	-0.13
28	Koyya	<i>Psidium guajava</i>	5	0.05	-3.01	-0.15
29	Seethapazham	<i>Annona reticulata</i>	4	0.04	-3.23	-0.13
30	vagai	<i>albizia lebbeck</i>	3	0.03	-3.52	-0.10
31	Savuku	<i>Casuarina equisetifolia</i>	2	0.02	-3.92	-0.08
H (Shannon Diversity Index) =3.38						
Shrubs						
32	Avarai	<i>Senna auriculata</i>	7	0.06	-2.84	-0.17
33	Sundaika	<i>Solanum torvum</i>	8	0.07	-2.71	-0.18
34	Arali	<i>Nerium indicum</i>	9	0.08	-2.59	-0.19
35	Idlipoo	<i>xoracoc cineia</i>	6	0.05	-3.00	-0.15
36	Neermulli	<i>Hydrophila auriculata</i>	7	0.06	-2.84	-0.17
37	Icham	<i>Phoenix pusilla</i>	5	0.04	-3.18	-0.13
38	Chaturakalli	<i>Euphorbia antiquorum</i>	8	0.07	-2.71	-0.18

39	Kattamanakku	<i>Jatropha curcas</i>	6	0.05	-3.00	-0.15
40	Thuthi	<i>Abutilon indicum</i>	7	0.06	-2.84	-0.17
41	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	8	0.07	-2.71	-0.18
42	Kundumani	<i>Abrus precatorius</i>	6	0.05	-3.00	-0.15
43	Erukku	<i>Calotropis gigantea</i>	7	0.06	-2.84	-0.17
44	Kealaka	<i>carissa carandas</i>	5	0.04	-3.18	-0.13
45	cirututti	<i>Hibiscus vitifolius</i>	6	0.05	-3.00	-0.15
46	rigida	<i>Ehretia rigida</i>	7	0.06	-2.84	-0.17
47	Marul-umattai	<i>Xanthium strumarium L</i>	5	0.04	-3.18	-0.13
48	Venmalar	<i>Ligustrum vulgare</i>	6	0.05	-3.00	-0.15
49	Unishedi	<i>Lantana camara</i>	7	0.06	-2.84	-0.17
H (Shannon Diversity Index) =2.88						
HERBS&CLIMBER &CREEPER &GRASSES						
50	Nayuruv	<i>Achyranthes aspera</i>	6	0.02	-3.86	-0.08
51	Veetukaayapoondu	<i>Tridax procumbens</i>	7	0.02	-3.71	-0.09
52	Koraikkilangu	<i>Cyperus articulates</i>	5	0.02	-4.04	-0.07
53	Kuppaimeni	<i>Acalypha indica</i>	7	0.02	-3.71	-0.09
54	Chempu	<i>Colocasia indica</i>	6	0.02	-3.86	-0.08
55	Karisilanganni	<i>Eclipta prostata</i>	8	0.03	-3.57	-0.10
56	Korai	<i>Cyperus rotundus</i>	6	0.02	-3.86	-0.08
57	Kunnakora	<i>Cyperus compressus</i>	8	0.03	-3.57	-0.10
58	Milagai	<i>Capsicum frutescens</i>	7	0.02	-3.71	-0.09
59	Kanamvazha	<i>Commelina benghalensis</i>	6	0.02	-3.86	-0.08
60	Nai kadugu	<i>Celome viscosa</i>	5	0.02	-4.04	-0.07
61	Thumbai	<i>Leucas aspera</i>	7	0.02	-3.71	-0.09
62	Parttiniyam	<i>Parthenium hysterophorus</i>	6	0.02	-3.86	-0.08
63	Mukurattai	<i>Boerhavia diffusa</i>	5	0.02	-4.04	-0.07
64	Thulasi	<i>Ocimum tenuiflorum</i>	9	0.03	-3.46	-0.11
65	Manathakkali	<i>Solanumnigrum</i>	8	0.03	-3.57	-0.10
66	Kumipoondu	<i>Gomphrena celosioides</i>	6	0.02	-3.86	-0.08
67	Kattuthulasi	<i>Ocimum sanctum</i>	9	0.03	-3.46	-0.11
68	Kattukolingi	<i>Tephrosia purpurea</i>	7	0.02	-3.71	-0.09
69	Wight, Contrib	<i>Blumea axillaris</i>	6	0.02	-3.86	-0.08
70	Kovai	<i>Coccinia grandis</i>	5	0.02	-4.04	-0.07
71	Perandai	<i>Cissus quadrangularis</i>	9	0.03	-3.46	-0.11
72	Mudakkotan	<i>Cardiospermum helicacabum</i>	6	0.02	-3.86	-0.08
73	Karkakartum	<i>Clitoria ternatea</i>	7	0.02	-3.71	-0.09
74	Nannari	<i>Hemidesmus indicus</i>	5	0.02	-4.04	-0.07
75	Kovakkai	<i>Coccinia grandis (L.)</i>	6	0.02	-3.86	-0.08

76	Malli	<i>Jasminum augustifolium</i>	7	0.02	-3.71	-0.09
78	Musumusukkai	<i>Mukia maderaspatana</i>	8	0.03	-3.57	-0.10
79	Mosukkattan Poonaipiduku	<i>Passiflora foetida</i>	7	0.02	-3.71	-0.09
80	Ptruukodi	<i>Helinus integrifolius</i>	6	0.02	-3.86	-0.08
81	Kattuppirantai	<i>Causonis trifolia</i>	7	0.02	-3.71	-0.09
82	Vallikeerai	<i>Ipomoea aquatica</i>	5	0.02	-4.04	-0.07
83	Siru Puladi	<i>Desmodium triflorum</i>	6	0.02	-3.86	-0.08
84	Sithrapaalavi	<i>Euphorbia prostrata</i>	7	0.02	-3.71	-0.09
85	Korai	<i>Cyperus rotandus</i>	6	0.02	-3.86	-0.08
86	Mookuthi Poondu	<i>Wedelia trilobata</i>	7	0.02	-3.71	-0.09
87	Nellu	<i>Oryza sativa</i>	9	0.03	-3.46	-0.11
88	Pullu	<i>Eragrostis ferruginea</i>	10	0.04	-3.35	-0.12
89	Chevvarakupul	<i>Chloris barbata</i>	8	0.03	-3.57	-0.10
90	Arugampul	<i>Cynodon dactylon</i>	11	0.04	-3.25	-0.13
91	kathalai	<i>Opuntia guatemalensis</i>	9	0.03	-3.46	-0.11

H (Shannon Diversity Index) =3.69

Table 3.28 Species Richness (Index) in Buffer Zone

Details	H	H max	Evenness	Species Richness
Tree	3.38	3.43	0.98	6.50
Shrubs	2.88	2.89	1.00	3.55
Herbs	3.69	3.71	0.99	7.08

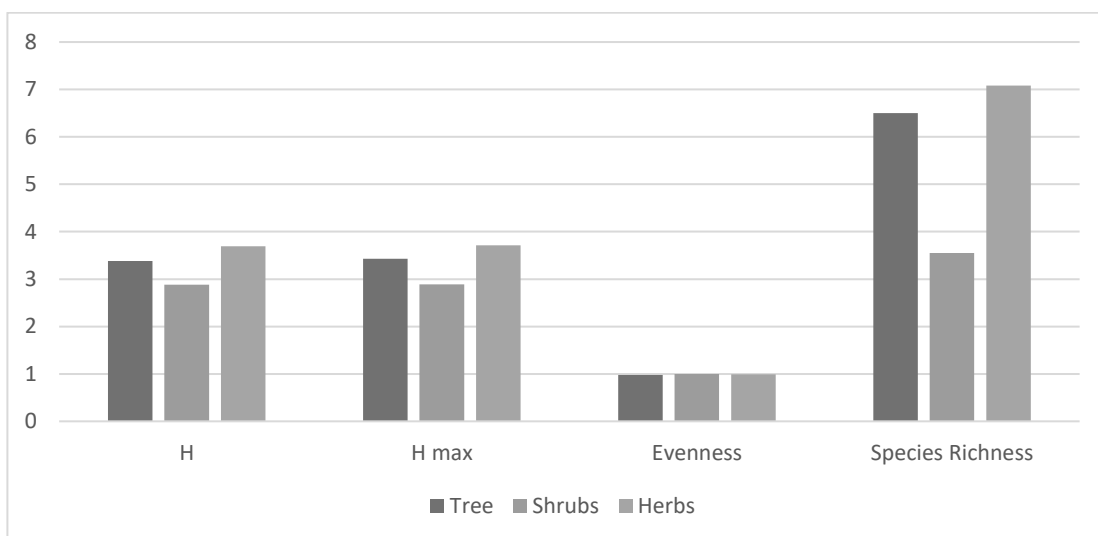


Figure 3.24 Floral diversity species Richness (Index) in buffer zone



Borassus flabellifer



Helinus integrifolius



Cissus quadrangularis



Leucas aspera



Ipomoea carnea



carissa carandas



Ocimum tenuiflorum



Tephrosia purpurea



Phoenix Reclinata



croton bonplandianus



Chloris barbata



Blumea axillaris



Ruellia nudiflora



Ficus hispida



Andrographis echinoides



Ehretia rigida



Prosopis juliflora



Hibiscus vitifolius L



Xanthium strumarium L



Jatropha gossypifolia L



Panicum maximum



Cayratia trifolia (L.)



Coccinia grandis (L.)



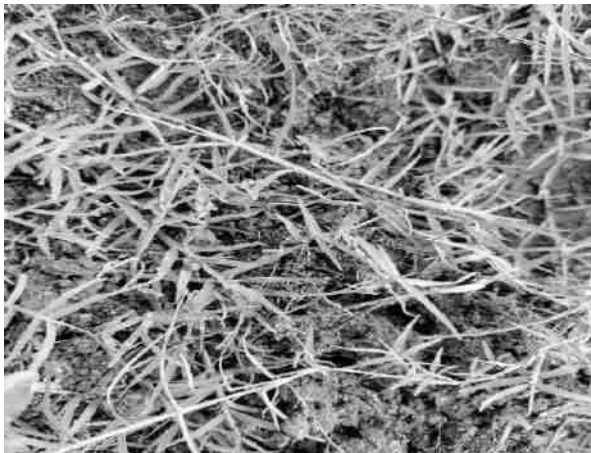
Ligustrum vulgare



Lantana camara



Parthenium hysterophorus



Cynodactylon (L.)



Opuntia guatemalensis



Azadirachta indica



Tectona grandis



Eucalyptus obliqua



Casuarina equisetifolia

Figure 3.25 Flora in Core and buffer Area

3.5.6.3 Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in Table 3.29.

Table 3.29 Aquatic Vegetation

Sl.No	Scientific name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	<i>Eichornia crassipe</i>	Water hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating lace plant	Kottikizhnagu	NA
3	<i>Nymphaea nouchali</i>	Blue water lily	Nellambal	LC
4	<i>Carex cruciata</i>	Cross Grass	Koraipullu	NA
5	<i>Cynodon dactylon</i>	Scutch grass	Arugampul	LC
6	<i>Cyperus exaltatus</i>	Tall Flat Sedge	Koraikizhangu	LC

*LC- Least Concern, NA-Not yet assessed

3.5.6.4 Forest Vegetation

The mine lease area is exhibiting a slightly elevated terrain. Kavanippakkam Reserve Forest has located about 2.1km East side on the Idaimichi RF 2.7 km on the Southeast side and Marudam RF 6.1km on the southwest side, all the reserve forest away from the proposed project site. It is a dense Scrub Forest Land, mostly containing *Calliea cinerea*, *Catunaregam spinosa*, *Carissa spinarum*, *Albizia amara*, *Buchanania lanzan*, and *Dodonaea viscosa*. Reserve Forest Details mentioned in Figure 3.26.

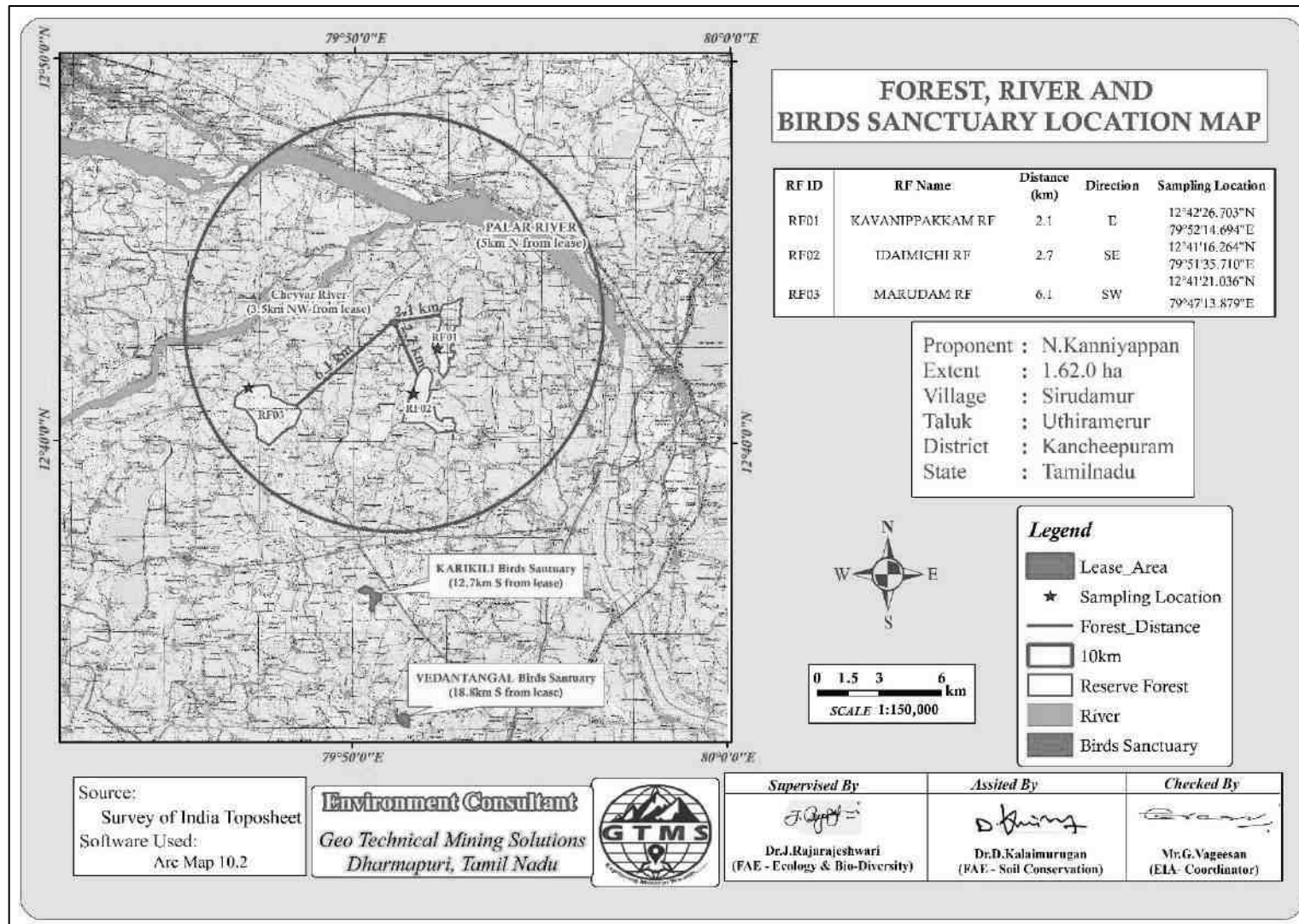


Figure 3.26 Toposheet showing forest and river locations around 10km radius from the proposed project site



Figure 3.27 Baseline study field Photographs

List out endangered and endemic species as per the schedule of the Wildlife Protection Act 1972

1. Rare and Endangered Flora in the Study Area

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among the enumerated flora in the study area, none of them were assigned any threat category.

2. Endemic Plants of the Study Area

De Candolle (1855) first used the concept of “**Endemic**”, which is defined as an area of a taxonomic unit, especially a species which has a restricted distribution or habitat, isolated from its surrounding region through geographical, ecological or temporal barriers. Among recorded plant species none are assigned the status of endemic plant of this region.

3. Biodiversity Hotspots

There are no particular Biodiversity Hotspots in the study area. There is no threat to the Flora and Fauna species.

4. Reserved Forest / Forest / Social Forest / wild life sanctuary etc.

The mine lease area is exhibiting a slightly elevated terrain. Kavanippakkam Reserve Forest has located about 2.1km East side on the Idaimichi RF 2.7 km on the Southeast side and Marudam RF 6.1km on the southwest side, all the reserve forest away from the proposed project site. There are no PF and National park, Wild life sanctuary, Ramsar site, Wildlife Corridors, Tiger/Elephant Reserves, Biosphere Reserves are located near to mining lease area. Hence it is not coming under any violation.

3.5.7 Fauna

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

3.5.7.1 Survey Methodology

The study of fauna takes substantial amount of time to understand the specific faunal 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 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 data base ([wiienvis.nic.in/Database/Schedule Species Database](http://wiienvis.nic.in/Database/ScheduleSpeciesDatabase)) and Zoological Survey of India (ZSI). Detailed faunas are mentioned in the Table 3.30 and 3.31.

Survey and Monitoring of Mammals

Intensive survey has been done by line transect methods (Walking and in vehicle) for all major habitats for surveying of mammals by direct and indirect evidence. Indirect methods such as faecal matter (i.e., scat) and pug mark by establishing 10 × 100 -m linear transects depending on the habitat (i.e., existing wildlife game routes/forest trails used). Direct observation technique has been used for surveying large and medium sized mammals. But this technique is perfectly suitable for surveying of diurnal mammals; however, good photographs were also taken for species identification.

Survey and Monitoring of Birds

Birds are sampled by using point count methods, and opportunistic bird sightings. By the bird vocal sounds and photographs, the species were identified in consultation with village local people. Point count: in these methods, the observer will stand in a randomly chosen point and birds seen or heard in 50m radius are recorded for 5min. This observation is repeated in another point at least 30m from the first point. We have enumerated 20-point counts in each quartile, which constitute a total of 80-point counts (20 x 4) within 10 km radius area. Opportunistic bird sightings: while traveling in study area, many bird species will be detected in survey time. Such species are recoded by their appearance or by their call.

Survey and monitoring of reptiles

Several survey techniques such as standard walk transect visual encounter survey methods were used to sampling reptiles in each and every habitat of the study area. While doing this survey, photographs were taken for identification of species. Species identification was done by using standard field guides in consultation with village people expert. The butterfly was enumerated by 2 linear transects of 10 × 100 m were laid within each quartile at minimum interval of 1 km. Further, amphibians and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts.

3.5.7.2 Fauna in Core Zone

A total of 16 varieties of species observed in the Core zone Of Siruthamur Village, Rough stone and gravel quarry (Table 3.30) among them numbers of Insects 6 Reptiles 3 Mammals 1 and Avian 6 A total of 16 species belonging to 15 families have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and four species are under schedule IV according to Indian wild life Act 1972. A total nine species of bird were sighted in the mining lease area. Dominant species are mostly birds and insects and no amphibians were observed

during the field visit. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Table 3.30 Fauna in Core Zone

SI. No	Common name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
INSECTS					
1	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
2	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
3	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
4	Stick insect	Lonchodidae	<i>carausius morosus</i>	NL	LC
5	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
6	Acraea violae	Nymphalidae	<i>Acraea violae</i>	NL	LC
REPTILES					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Common house gecko	Gekkonidae	<i>Hemidactylus frenatus</i>	NL	LC
3	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
MAMMALS					
1	Indian Field Mouse	<i>Muridae</i>	<i>Mus booduga</i>	Schedule IV	NL
AVES					
1	Asian green bee-eater	Meropidae	<i>Meropsorientalis</i>	NL	LC
2	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
3	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
4	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
5	Koel	Cucalidae	<i>Eudynamys scolopaceus</i>	Schedule IV	LC
6	Grey drongo	Dicruridae	<i>Dicrurus leucophaeus</i>	Schedule IV	LC

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

3.5.7.3 Fauna in Buffer Zone

Taxonomically a total of 36 species belonging to 34 families have been recorded from the buffer mining lease area. Based on habitat classification the majority of species were Birds 16 followed by Insects 10 Reptiles 4 Mammals 3 and, Amphibians 3 There are four Schedule II species and twenty-six are under schedule IV according to Indian wild life Act 1972. A total 20 species of bird were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Dominant species are mostly birds and insects and three amphibians were observed during the extensive field visit (*Hoplobatrachus tigerinus*), (*Rana hexadactyla*), (*Sphaerotheca breviceps*). The result of core & Buffer zone of fauna studies shows that Nymphalidae and

Agamidae, Mantidae are the main dominating species in the study area, it is mentioned in Table. 3.31 There is no schedule I Species in study area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

Table 3.31 Fauna in Buffer Zone

S. No.	Common Name/English Name	Family Name	Scientific Name	Schedule List Wildlife Protection Act 1972	IUCN Red List Data
INSECTS					
1	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
3	Blue tiger	Nymphalidae	<i>Tirumala limniace</i>	Schedule IV	LC
4	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
5	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
6	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
7	Lesser grass blue	Lycaenidae	<i>Danaus plexippus</i>	Schedule IV	LC
8	Praying mantis	Mantidae	<i>mantis religiosa</i>	NL	NL
9	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
10	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
REPTILES					
1	Chameleon	Chamaeleonidae	<i>Chameleon zeylanicus</i>	Sch II (Part II)	LC
2	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
3	Green Vine snake	Colubridae	<i>Ahaetulla nasuta</i>	Schedule IV	LC
4	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
MAMMALS					
1	Indian palm squirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
2	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
3	Home mouse	Muridae	<i>Mus musculus tyleri</i>	NL	LC
AVES					
1	House crow	Corvidae	<i>Corvussplendens</i>	NL	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC

4	Red-vented Bulbul	Pycnonotidae	<i>Pycnonotus cafer</i>	Schedule IV	LC
5	Indian pond heron	Ardeidae	<i>Ardeola grayii</i>	Schedule IV	LC
6	Asian green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
7	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
8	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
9	Blue Rock Pigeon	Columbidae	<i>Columba livia</i>	Schedule IV	LC
10	Common Coot	Rallidae	<i>Fulica atra</i>	Schedule IV	LC
11	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
12	Shikra	Accipitridae	<i>Accipiter badius</i>	NL	LC
13	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
14	Small blue Kingfisher	Alcedinidae	<i>Alcedo atthis</i>	Schedule IV	LC
15	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	NL	LC
16	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC
AMPHIBIANS					
1	Indian Burrowing frog	Dicroglossidae	<i>Sphaerotheca breviceps</i>	Schedule IV	LC
2	Green Pond Frog	Ranidae	<i>Rana hexadactyla</i>	Schedule IV	LC
3	Tiger Frog	Chordata	<i>Hoplobatrachus tigerinus (Rana tigerina)</i>	Schedule IV	LC

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

Table 3.32 Aquatic Fauna Vegetation

S.No	Common Name	Scientific Name
1	Pale carplet	Amblyupharngodon mola
2	Catla catla	Labeo Catla
3	Karnataka labeo	Labio calbasi
4	Mrigal carp	Cirrhina mrigala
5	Mrigel	Cirrhina reba

As per ToR No. 16,

Out of the total mine lease area of 1.62 ha, just about 0.69.80 Ha is proposed to be used for mining activity during the first five years as per the mining plan. Blasting, noise and vibrations and other disturbances including dust generation are likely to have an adverse impact on wildlife. But these impacts are unlikely to extend beyond 500 m from the actual mine area. There are two Schedule II species and twenty-two species are under schedule IV according to

Indian wild life Act 1972. A total 16 species of bird were sighted in the buffer zone area. There are no critically endangered, endangered, vulnerable and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

As per ToR No. 17,

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

As per ToR No. 18,

A detailed biological study of the study area [core zone and buffer zone of 10 km radius of the periphery of the mine lease] has been carried out and the results are presented in Tables 3.30 to 3.31. There are two species under Schedule II and twenty-Five species under schedule IV according to Indian wild life Act 1972. A total 16 species of bird were sighted in the study area. The main threat to the bird is the use of pesticides in agriculture. There is no endangered, endemic and RET Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

3.5.7.4 Rare and Endangered fauna of the study area

1. As per Indian Wild Life (Protection) Act, 1972,

Wild Life (Protection) Act, 1972, as amended on 17th January 2003, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country. Some of the sighted faunas were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedules. Here no endemic, endangered migratory fauna found in the area. This area is not also a migratory path of any faunal species.

2. As per IUCN RED (2013) List,

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most

authoritative guide to the status of biological diversity. Among reported species Schedule II and IV in the buffer zone are presented below,

1. **Schedule II species**

Chameleon, Rat snake, Saw scaled viper, Russell's viper.

2. **Schedule IV species**

Green Pond Frog, Indian Burrowing frog, Black drongo, Red-vented Bulbul, Koel, Indian Field Mouse, Indian palm squirrel, Lesser grass, Common Indian crow, striped tiger, Common Tiger, Blue tiger, Tawny coster, Indian wall lizard, Indian pond heron, Grey Heron etc.,

3.5.8 Results and Discussion

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

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna of terrestrial ecosystem within 10 km radius from the boundary of the proposed quarry site. Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study has also been designed to suggest suitable mitigation measures, if necessary, for protection of wildlife habitats and conservation of REET species if any.

3.6 SOCIO-ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as features 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, thus leading to the improvement of their standard of living.

3.6.1 Objectives of the Study

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

- ❖ To study the socio-economic status of the people living in the study area of the proposed mining project
- ❖ To assess the impact of the project on quality of life of the people in the study area
- ❖ To recommend community development measures to be taken up in the study area

3.6.2 Scope of Work

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

3.6.3 District Profile

Kancheepuram district of Tamil Nadu has total population of 3,998,252 as per the Census 2011. Out of which 1,457,242 are males while 2,012,958 are females. In 2011 there were total 41,807 families residing in Kancheepuram district. The Average Sex Ratio of Kancheepuram district is 986. As per Census 2011 out of total population, 63.49% people live in Urban areas while 36.51% lives in the Rural areas. The average literacy rate in kancheepuram is 84.49%. Also, the Sex Ratio of Urban areas in Kancheepuram district is 986 while that of Rural areas is 986.

The population of Children of age 0-6 years in Kancheepuram district is 431,574 which is 10.79% of the total population. There are 220,341 male children and 211,233 female children between the age 0-6 years. Thus, as per the Census 2011 the Child Sex Ratio of Kancheepuram is 959 which is less than Average Sex Ratio (986) of Kancheepuram district.

The total literacy rate of Kancheepuram district is 84.49%. The male literacy rate is 89.89% and the female literacy rate is 79.02% in Kancheepuram district.

3.6.4 Socio-Economic Status of Study area

Siruthamur is a large village located in Uthiramerur Taluka of Kancheepuram district, Tamil Nadu with total 755 families residing. The Siruthamur village has population of 3097 of which 1555 are males while 1542 are females as per Population Census 2011. In Siruthamur village population of children with age 0-6 is 365 which makes up 11.79 % of total population of village. Average Sex Ratio of Siruthamur village is 992 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Siruthamur as per census is 962, higher than Tamil Nadu average of 943. Siruthamur village has lower literacy rate compared to Tamil Nadu. In

2011, literacy rate of Siruthamur village was 70.28 % compared to 80.09 % of Tamil Nadu. In Siruthamur Male literacy stands at 80.42 % while female literacy rate was 60.09 %. As per constitution of India and Panchyati Raaj Act, Siruthamur village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Siruthamur village.

Table 3.33 Siruthamur village Population Facts

Number of Households	755
Population	3,097
Male Population	1,555
Female Population	1,542
Children Population	365
Sex-ratio	992
Literacy	70.28%
Male Literacy	80.42%
Female Literacy	60.09%
Scheduled Tribes (ST)	49
Scheduled Caste (SC)	1,090

Source: <https://www.census2011.co.in/data/village/629769-sirudamur-tamil-nadu.html>

Table 3.34 Demographics Population of Siruthamur village

Total Population	Male Population	Female Population
3,097	1,555	1,542

Source: <https://www.census2011.co.in/data/village/629769-sirudamur-tamil-nadu.html>

3.6.4.1 Literacy of Siruthamur Village

Siruthamur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Siruthamur village was 70.28 % compared to 80.09 % of Tamil Nadu. In Siruthamur Male literacy stands at 80.42 % while female literacy rate was 60.09 %.

3.6.4.2 Worker's profile of Siruthamur village

In Siruthamur village out of total population, 1520 were engaged in work activities. 86.58 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 13.42 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1520 workers engaged in Main Work, 402 were cultivators (owner or co-owner) while 581 were Agricultural labourer.

Table 3.35 Siruthamur Village Working Population

Type	Total	Male	Female
Main Worker	1,316	-	-
Marginal Workers	204	94	110

Source: <https://www.census2011.co.in/data/village/629769-sirudamur-tamil-nadu.html>

Table 3.36 Population and literacy data of study area

S. NO	Parameters/ Village Name	Total population of village	Total population male	Total population female	Population in the age group 0-6 Male	Population in the age group 0-6 Female	SC Population	ST Population	Total Literacy Rate	Female	
										SC	ST
1	Adavapakkam	765	396	369	41	28	499	8	465	241	2
2	Alanjeri	684	334	350	40	35	679	0	560	347	0
3	Alapakkam	517	246	271	26	30	76	0	318	43	0
4	Angambakkam	1907	963	944	116	103	1408	21	1167	696	9
5	Annadhur	1239	617	622	79	80	263	6	713	129	4
6	Arpakkam	2937	1475	1462	181	197	1626	320	1794	818	149
7	Arumbuliyur	1618	777	841	92	96	470	56	1025	247	29
8	Asoor	1234	609	625	67	65	741	17	822	378	10
9	Athiyur	681	350	331	42	30	255	8	451	134	5
10	Athur	1904	982	922	95	89	706	31	1234	355	15
11	Avalur	3960	1948	2012	240	205	240	73	2377	121	39
12	Chinnalambadi	434	227	207	20	18	91	0	274	41	0
13	Chitalapakkam	592	288	304	32	37	9	0	344	4	0
14	Chithaathur	322	159	163	9	9	0	6	161	0	3
15	Devariyambakkam	875	426	449	48	54	138	0	571	75	0
16	Edamichi	1414	701	713	63	69	514	0	1021	256	0
17	Edayambudur	1304	678	626	117	67	480	19	806	234	11
18	Elapakkam	207	98	109	14	22	155	45	100	85	23
19	Elayanarvelur	1079	544	535	67	57	554	0	643	281	0
20	Ezhichur	1373	658	715	74	78	937	0	886	490	0
21	Gindangarai	391	192	199	23	20	0	85	259	0	46
22	Irumaram	223	104	119	11	16	222	0	134	118	0
23	Kadalmangalam	890	431	459	38	46	408	8	579	210	3
24	Kaithandalam	644	334	310	39	32	157	0	367	75	0
25	Kaliyapettai	1640	829	811	102	93	471	8	1012	227	4

26	Kambarajapuram	1527	766	761	93	79	273	56	944	134	30
27	Karumbakkam	850	438	412	44	37	538	0	518	265	0
28	Kattankulam	1028	514	514	59	41	289	0	606	147	0
29	Kattuputhur	171	92	79	5	7	10	0	111	6	0
30	Kavampair	682	339	343	37	51	343	39	427	171	23
31	Kavanipakkam	780	382	398	39	39	509	0	508	260	0
32	Kavanthandalam	1619	796	823	66	68	392	67	970	200	31
33	Kavithandalam	1814	904	910	89	109	1359	19	1203	681	10
34	Kilakkadi	1072	541	531	52	53	369	20	754	185	9
35	Kilputhur	170	80	90	7	5	1	0	99	0	0
36	Kodithandalam	508	254	254	27	25	366	23	333	180	9
37	Kolathur	508	243	265	35	32	402	0	306	212	0
38	Kunnavakkam	1397	698	699	89	88	622	5	724	306	3
39	Kurumanjeri	666	330	336	40	43	41	16	451	21	8
40	Kurumbarai	1424	701	723	73	74	666	100	980	337	49
41	Magaral	2834	1399	1435	154	149	1777	36	1754	882	20
42	Maiyur	2931	1452	1479	156	158	1324	140	2054	666	69
43	Malayankulam	2390	1218	1172	140	110	937	58	1438	457	23
44	Mamandur	5503	2829	2674	258	284	2844	74	4080	1432	41
45	Mambakkam	627	311	316	37	31	519	0	385	264	0
46	Mambudur	296	164	132	14	5	0	13	204	0	5
47	Marudham	1893	950	943	62	53	372	0	1345	189	0
48	Maruthuvambadi	1560	784	776	79	85	441	29	991	218	13
49	Melmanapakkam	1212	622	590	89	77	697	0	859	331	0
50	Melputhur	430	214	216	27	23	300	0	263	154	0
51	Mulaginimeni	381	201	180	25	18	0	0	241	0	0
52	Nariambakkam	35	14	21	1	0	0	0	24	0	0
53	Nariyambudur	20	11	9	2	1	0	11	8	0	5
54	Nathanallur	2158	1047	1111	113	145	651	72	1288	332	37
55	Neerkundram	314	153	161	7	14	88	0	225	47	0
56	Nelveli	667	322	345	38	50	577	0	403	297	0

57	Nerkundram	624	302	322	45	35	137	5	341	68	2
58	Neyyativakkam	1360	666	694	62	78	682	48	896	366	24
59	Orakkattupettai	744	368	376	42	44	88	18	567	40	12
60	Ozhaiyur	888	444	444	46	47	583	0	554	288	0
61	Padoor	713	365	348	38	53	227	14	463	117	8
62	Palayaseevaram	5634	2792	2842	325	356	2442	33	3563	1234	15
63	Paleswaram	802	400	402	52	54	356	14	450	172	8
64	Palur	840	449	391	60	39	468	29	493	212	12
65	Pandavakkam	220	114	106	9	9	4	0	127	3	0
66	Pazhaveri	727	362	365	36	40	368	5	477	178	2
67	Peranakkavur	926	478	448	54	64	634	9	586	309	4
68	Pilappur	1256	650	606	47	57	53	20	772	25	10
69	Pinayur	1068	520	548	46	58	377	6	759	199	3
70	Pinnampoondi	286	147	139	21	16	0	0	221	0	0
71	Porpandal	941	491	450	59	36	429	43	640	206	16
72	Pulipakkam	719	353	366	42	38	0	0	495	0	0
73	Pulivoy	491	237	254	16	32	217	19	324	112	11
74	Puliyambakkam	2158	1253	905	109	85	813	123	1550	393	60
75	Pullampakkam	872	424	448	64	58	671	44	494	343	20
76	Puthali	1032	510	522	66	76	766	27	674	389	13
77	Rettamangalam	637	307	330	25	42	431	115	369	220	59
78	Sadachivakkam	396	198	198	22	28	16	71	215	5	32
79	Salavakkam	3311	1635	1676	195	174	1144	39	2332	569	23
80	Sampathinallur	257	137	120	22	15	255	0	169	120	0
81	Sathananjeri	2166	1095	1071	131	130	1037	15	1387	514	10
82	Seethanjeri	494	247	247	23	31	285	21	374	142	10
83	Seethapuram	40	20	20	5	5	0	0	26	0	0
84	Sembulam	148	66	82	4	7	54	0	104	31	0
85	Sirudamur	1543	790	753	87	74	517	73	784	252	40
86	Sirumailur	1029	510	519	44	57	699	4	638	348	2
87	Sirupinayur	2053	1028	1025	123	123	1070	107	1269	535	51

88	Sithanakavoor	789	391	398	55	47	675	0	472	338	0
89	Sithandi	939	481	458	70	68	792	0	627	386	0
90	Thammanur	2116	1088	1028	134	114	667	151	1231	337	68
91	Thandarai	1305	644	661	62	79	246	5	801	127	2
92	Thirumukkudal	1673	850	823	91	80	888	44	1216	435	22
93	Thiruvanaikoil	598	288	310	37	40	430	81	386	219	40
94	Thollazhi	980	501	479	60	48	443	0	587	210	0
95	Thonankulam	435	216	219	28	24	287	24	270	142	12
96	Thottanaval	660	338	322	38	33	522	0	445	257	0
97	Ullavur	1749	908	841	101	100	928	38	1096	445	21
98	Uthukadu	4528	2288	2240	241	254	1853	36	3070	928	20
99	Vadathavoor	838	422	416	44	55	724	0	527	362	0
100	Valathodu	409	195	214	22	25	267	0	269	141	0
101	Vayalakkavoor	1429	752	677	90	56	809	0	890	369	0
102	Vendivakkam	202	107	95	10	11	44	0	110	22	0
103	Vengudi	1111	542	569	56	50	614	24	877	317	15
104	Vichoor	883	439	444	47	43	731	0	559	364	0
105	Villiambakkam	1344	673	671	70	52	4	34	879	2	17
106	Vinnamangalam	421	210	211	30	18	0	0	250	0	0
107	Nelveli	351	169	182	22	25	167	49	201	88	29
108	Vitchanthangal	1016	517	499	64	56	343	13	634	168	9
109	Kilottivakkam	1320	660	660	68	69	785	0	1024	399	0
110	Seeyamangalam	564	281	283	29	23	309	0	350	144	0
111	Villivalam	1731	856	875	85	100	326	0	1036	172	0
112	Kannikulam	727	372	355	47	35	421	23	453	207	11
113	Thriupulivanam	1821	892	929	102	104	356	85	1141	190	45
114	Anambakkam	1665	833	832	73	85	534	10	1150	268	4

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

Table 3.37 Educational Facilities & Water & Drainage Facilities Data of Study Area

S.No.	Village Name	Govt Primary School	Govt Vocational Training School/ITI	Primary Health Sub Centre	Tap Water Untreated	River/Canal	Is the Area Covered under Total	Telephone (landlines)	Public Bus Service	Gravel (kuchha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group	Nutritional Centres- Anganwadi Centre	Community Centre with/without TV	Power Supply For Domestic Use
1	Adavapakkam	1	2	1	1	2	2	1	2	1	1	2	1	1	2	1
2	Alanjeri	1	2	0	2	2	2	1	2	1	2	2	1	1	1	1
3	Alapakkam	1	2	0	1	2	2	2	1	1	2	2	1	1	2	1
4	Angambakkam	1	2	0	1	2	2	1	2	1	2	2	1	1	1	1
5	Annadhur	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
6	Arpakkam	1	2	1	1	2	2	1	1	1	2	1	2	1	2	1
7	Arumbuliyur	1	2	1	1	2	2	1	1	1	1	1	1	1	2	1
8	Asoor	1	2	1	1	2	2	1	2	1	2	2	1	1	1	1
9	Athiyur	2	2	0	2	2	1	1	1	1	2	2	1	1	2	1
10	Athur	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
11	Avalur	1	2	1	1	2	1	1	1	1	2	2	1	1	1	1
12	Chinnalambadi	1	2	0	1	2	2	2	1	1	2	2	1	1	1	1
13	Chitalapakkam	1	2	0	2	2	2	2	1	1	2	2	1	1	1	1
14	Chithaathur	1	2	0	2	2	2	2	1	1	2	2	1	1	1	1
15	Devariyambakkam	1	2	0	1	2	2	1	1	1	2	1	1	1	2	1
16	Edamichi	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
17	Edayambudur	1	2	0	1	2	2	1	2	1	2	1	1	1	2	1
18	Elapakkam	2	2	0	2	2	2	1	1	2	2	2	1	1	1	1
19	Elayanarvelur	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
20	Ezhichur	1	2	1	1	2	1	1	1	1	2	2	1	1	2	1
21	Gindangarai	1	2	0	1	2	1	1	1	1	2	2	1	1	2	1
22	Irumaram	2	2	0	1	2	2	1	2	1	2	2	1	2	2	1

23	Kadalmangalam	1	2	0	2	2	1	1	2	1	2	2	1	1	1	1
24	Kaithandalam	1	2	0	1	2	2	1	2	1	2	2	2	1	2	1
25	Kaliyapettai	1	2	0	1	2	2	1	2	1	2	1	1	1	2	1
26	Kambarajapuram	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
27	Karumbakkam	1	2	0	1	2	2	1	1	2	2	2	1	1	1	1
28	Kattankulam	2	2	0	2	2	2	1	1	1	2	2	1	1	2	1
29	Kattuputhur	1	2	0	2	2	2	1	2	1	2	2	1	1	2	1
30	Kavampair	1	2	0	1	2	2	1	2	1	2	2	1	1	2	1
31	Kavanipakkam	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
32	Kavanthandalam	1	2	0	1	2	1	1	1	1	2	1	1	1	2	1
33	Kavithandalam	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
34	Kilakkadi	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
35	Kilottivakkam	1	2	0	1	2	1	1	1	1	2	2	1	1	1	1
36	Kilputhur	1	2	0	1	2	2	2	1	1	2	2	1	1	1	1
37	Kodithandalam	2	2	0	2	2	2	2	1	2	2	2	1	1	2	1
38	Kolathur	1	2	0	1	2	2	2	1	1	2	2	1	1	2	1
39	Kunnavakkam	1	2	1	1	2	1	1	2	1	2	2	1	1	1	1
40	Kurumanjeri	2	2	0	2	2	2	1	1	1	2	2	1	1	2	1
41	Kurumbarai	2	2	0	1	2	2	1	1	1	2	2	1	1	2	1
42	Magaral	1	2	1	1	2	2	1	1	1	1	2	2	1	2	1
43	Maiyur	1	2	1	1	2	2	1	1	1	2	1	1	1	2	1
44	Malayankulam	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
45	Mamandur	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1
46	Mambakkam	1	2	1	1	2	2	1	1	1	2	1	1	1	2	1
47	Mambudur	2	2	0	1	2	2	1	2	1	2	2	1	2	1	1
48	Marudham	1	2	0	2	2	1	2	1	1	2	1	1	1	1	1
49	Maruthuvambadi	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
50	Melmanapakkam	1	2	0	1	2	1	1	2	1	2	2	1	1	2	1
51	Melputhur	2	2	0	1	2	2	1	1	1	2	2	1	1	1	1
52	Mulaginimeni	2	2	0	1	2	2	2	1	1	2	2	1	2	2	1
53	Nariambakkam	2	2	0	2	2	2	2	2	1	2	2	2	2	2	1

54	Nariyambudur	2	2	0	2	2	2	2	2	1	2	2	2	2	2	1
55	Nathanallur	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
56	Neerkundram	1	2	0	1	2	2	2	1	1	2	2	1	1	2	1
57	Nelveli	1	2	0	2	2	2	2	1	1	2	2	1	1	2	1
58	Nerkundram	2	2	0	1	2	2	1	1	1	2	2	1	1	2	1
59	Neyyativakkam	1	2	1	1	2	1	1	1	1	2	1	1	1	2	1
60	Orakkattupettai	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
61	Ozhaiyur	1	2	1	1	2	2	1	1	1	2	2	2	1	2	1
62	Padoor	1	2	1	1	2	2	1	1	1	2	1	1	1	2	1
63	Palayaseevaram	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1
64	Paleswaram	1	2	0	2	2	2	1	1	1	2	2	1	1	1	1
65	Palur	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
66	Pandavakkam	2	2	0	1	2	2	1	2	1	1	1	1	1	2	1
67	Pazhaveri	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
68	Peranakkavur	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
69	Pilappur	1	2	0	1	2	2	1	1	2	2	2	1	1	2	1
70	Pinayur	1	2	1	2	2	1	1	1	1	2	2	1	1	2	1
71	Pinnampoondi	2	2	0	1	2	2	1	1	1	2	2	1	2	2	1
72	Porpandal	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
73	Pulipakkam	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
74	Pulivoy	1	2	0	2	2	2	1	1	1	2	2	2	1	2	1
75	Puliyambakkam	1	2	0	2	2	1	1	2	1	2	2	1	1	2	1
76	Pullampakkam	1	2	0	1	2	1	1	1	1	2	2	1	1	1	1
77	Puthali	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
78	Rettamangalam	1	2	0	2	2	2	1	1	2	2	2	1	1	1	1
79	Sadachivakkam	1	2	0	1	2	2	1	2	1	2	2	1	1	2	1
80	Salavakkam	1	2	1	1	2	2	1	2	1	1	1	1	1	2	1
81	Sampathinallur	2	2	0	2	2	1	1	1	1	2	2	1	2	2	1
82	Sathananjeri	1	2	1	1	2	2	1	1	1	2	1	1	1	2	1
83	Seethananjeri	1	2	0	2	2	2	1	1	1	2	2	1	2	1	1
84	Seethapuram	2	2	0	2	2	2	2	1	1	2	2	1	2	2	1

85	Sembulam	2	2	0	1	2	2	2	1	1	2	2	1	2	2	1
86	Sirudamur	1	2	0	1	2	2	1	2	1	2	2	1	1	2	1
87	Sirumailur	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
88	Sirupinayur	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
89	Sithanakavoor	1	2	0	2	2	2	1	1	1	2	2	1	1	1	1
90	Sithandi	1	2	0	2	2	1	1	1	1	2	2	1	1	1	1
91	Thammanur	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
92	Thandarai	1	2	0	1	2	2	1	1	2	2	2	1	1	2	1
93	Thirumukkudal	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
94	Thiruvanaikoil	1	2	0	2	2	2	1	2	1	2	2	1	1	1	1
95	Thollazhi	1	2	0	2	2	2	1	1	1	2	2	1	1	2	1
96	Thonankulam	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
97	Thottanaval	1	2	0	1	2	2	1	2	1	2	2	1	1	1	1
98	Ullavur	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
99	Uthukadu	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
100	Vadathavoor	1	2	0	1	2	2	1	2	1	2	2	1	1	2	1
101	Valathodu	1	2	0	1	2	2	1	2	1	2	2	1	1	1	1
102	Vayalakkavoor	1	2	0	1	2	1	1	1	1	2	1	1	1	2	1
103	Vendivakkam	2	2	0	1	2	2	1	1	1	2	2	1	1	2	1
104	Vengudi	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1
105	Vichoor	2	2	0	1	2	2	1	1	1	2	2	1	1	1	1
106	Villiambakkam	1	2	1	1	2	2	1	1	1	2	1	1	1	1	1
107	Vinnamangalam	1	2	0	2	2	2	1	1	1	2	2	1	1	1	1
108	Nelveli	1	2	0	2	2	2	2	1	1	2	2	1	1	2	1
109	Vitchanthangal	2	2	0	1	2	2	1	1	1	2	2	1	1	2	1
110	Kilottivakkam	1	2	0	1	2	1	1	1	1	2	2	1	1	1	1
111	Seeyamangalam	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
112	Villivalam	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
113	Kannikulam	1	2	0	2	2	2	1	2	1	2	2	1	1	2	1
114	Thriupulivanam	1	2	1	1	2	2	1	2	1	1	2	1	1	1	1
115	Anambakkam	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1

Table 3.38 Other Facilities in the Study Area

S.NO	Village Name	Tractors	Carts Driven by	Black Topped (pucca) Road	ATM	Commercial Bank	Cooperative Bank	Agricultural Credit Societies	Public Distribution System (PDS)Shop	Mandis/Regular Market	Weekly Haat	Agricultural Marketing Society	Power Supply for Agriculture Use	Power Supply for Commercial Use	Agricultural Commodities (First)	Manu factures Commo ditities (First)	Handicrafts Commodities (First)	Forest Area (in Hectares)	Net Area Sown (in Hectares)
1	Adavapakkam	2	2	1	2	1	2	2	1	2	2	2	1	2	Paddy			2.15	58.23
2	Alanjeri	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			62.67	49.01
3	Alapakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	64.61
4	Angambakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	155.42
5	Annadhur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			1	143.4
6	Arpakkam	2	2	1	2	2	1	1	1	2	2	2	1	1	Paddy	Hollw Blocks		0	272.18
7	Arumbuliyur	2	2	1	2	1	2	1	1	2	2	2	1	2	Paddy			0	184.94
8	Asoor	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	77.95
9	Athiyur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	22.64
10	Athur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	238.45
11	Avalur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	312.79
12	Chinnalambadi	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			21	52.31
13	Chitalapakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy		Clay Pots	1	30.62
14	Chithaathur	2	2	2	2	2	2	2	1	1	2	2	1	2	Paddy			0	54.61
15	Devariyaambakkam	2	2	1	2	2	1	1	1	2	2	1	1	1	Paddy			0	92.42
16	Edamichi	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Clay Pots	180.42	161.61
17	Edayambudur	2	2	1	2	2	2	1	1	2	2	2	1	1	Paddy			20	106.18
18	Elapakkam	2	2	1	2	2	2	2	2	2	2	2	1	2	Paddy			1	67.64
19	Elayanarvelur	2	2	1	2	2	2	2	1	1	2	2	1	2	Paddy			0	165.01
20	Ezhichur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	136.79
21	Gindangarai	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	41.28
22	Irumaram	2	2	1	2	2	2	2	1	2	2	2	2	2	Paddy			0	33.42
23	Kadalmangalam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			82	159.77
24	Kaithandalam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	121.23

25	Kaliyapettai	2	2	1	2	2	2	1	1	1	2	2	1	1	Paddy			2	116.88
26	Kambarajapuram	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	304.98
27	Karumbakkam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	77.91
28	Kattankulam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	161.09
29	Kattuputhur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			2	56.79
30	Kavampair	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			1	51.1
31	Kavanipakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	127.64
32	Kavanthandalam	2	2	1	2	2	1	1	1	2	2	2	1	2	Paddy			0	211.69
33	Kavithandalam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	184.15
34	Kilakkadi	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			16.03	211.32
35	Kilottivakkam	2	2	1	2	2	2	2	2	2	2	2	1	1	Paddy			0	81.5
36	Kilputhur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	63.67
37	Kodithandalam	2	2	1	2	2	2	2	2	2	2	2	1	1	Paddy			0	52.05
38	Kolathur	2	2	1	2	2	2	2	1	2	2	2	2	2	Paddy			0	121.82
39	Kunnavakkam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			29.69	13.15
40	Kurumanjeri	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	23.21
41	Kurumbarai	2	2	1	2	2	2	2	1	2	2	1	1	2	Paddy			0	188.85
42	Magaral	2	2	1	2	1	1	2	1	2	2	2	1	2	Paddy			0	203.23
43	Maiyur	2	2	1	2	2	1	1	1	2	2	2	1	2	Paddy			136.55	143.92
44	Malayankulam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Baskets	0	246.27
45	Mamandur	2	2	1	1	2	2	1	1	2	2	2	1	1	Paddy			0	100.92
46	Mambakkam	2	2	1	1	2	1	1	1	2	2	2	1	2	Paddy			65.1	117.47
47	Mambudur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	90.83
48	Marudham	2	2	1	2	2	2	1	1	2	2	2	1	2	Paddy			2	247.24
49	Maruthuvambadi	2	2	1	2	2	2	2	1	2	2	2	2	2	Paddy			0	198.52
50	Melmanapakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	54.18
51	Melputhur	2	2	1	2	2	2	2	1	2	2	2	2	2	Paddy			0	55.16
52	Mulaginimeni	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	68.67
53	Nariambakkam	2	2	1	2	2	2	2	2	2	2	2	2	2	Paddy			0	36.85
54	Nariyambudur	2	2	1	2	2	2	2	2	2	2	2	1	2	Paddy			104.47	11.42
55	Nathanallur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	190.74

56	Neerkundram	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0.48	34.03
57	Nelveli	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	71.63
58	Nerkundram	2	2	2	2	2	2	2	1	2	2	2	1	1	Paddy			36.61	71.67
59	Neyyativakkam	2	2	1	2	2	2	1	1	2	2	2	1	2	Paddy			0	135.25
60	Orakkattupettai	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			2	28.98
61	Ozhaiyur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			1	88.62
62	Padoor	2	2	1	2	2	1	1	1	2	2	2	1	2	Paddy			5	99.74
63	Palayaseevaram	2	2	1	2	1	2	2	1	2	2	2	1	1	Paddy			0	114.71
64	Paleswaram	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			1	71.55
65	Palur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	278.1
66	Pandavakkam	2	2	1	1	1	1	1	1	2	2	2	1	2	Paddy			0	33.29
67	Pazhaveri	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Sculptures	31	116.48
68	Peranakkavur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			2	101.94
69	Pilappur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			134.99	124.95
70	Pinayur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			7	233.82
71	Pinnampoondi	2	2	1	2	2	2	2	2	2	2	2	1	1	Paddy			0	3.42
72	Porpandal	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			5	118.81
73	Pulipakkam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			8.4	1.28
74	Pulivoy	2	2	1	2	2	2	2	2	2	2	2	1	1	Paddy			0	97.19
75	Puliyambakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	42.81
76	Pullampakkam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Clay Pots	2	138.31
77	Puthali	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			112.2	117.29
78	Rettamangalam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			1	37.98
79	Sadachivakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			2	70.81
80	Salavakkam	2	2	1	2	1	2	1	1	2	2	1	1	1	Paddy			2	259.18
81	Sampathinallur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	27.1
82	Sathananjeri	2	2	2	2	2	2	1	1	2	2	2	1	2	Paddy			2	298.75
83	Seethananjeri	2	2	1	2	2	1	2	1	2	2	2	1	2	Paddy			1	63.11
84	Seethapuram	2	2	1	2	2	2	2	2	2	2	2	2	1	Paddy			0	5.82
85	Sembulam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	29.93
86	Sirudamur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	122.24

87	Sirumailur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			75.03	24.76
88	Sirupinayur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			170.52	281.73
89	Sithanakavoor	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	104.37
90	Sithandi	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Clay Pots	0	44.61
91	Thammanur	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	160.62
92	Thandarai	2	2	1	1	2	2	2	1	2	2	2	1	2	Paddy			84.78	143.59
93	Thirumukkudal	2	2	1	2	2	2	2	1	2	2	1	1	1	Paddy	Cloth	Clay Pots	30	113.65
94	Thiruvanaikoil	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	61.37
95	Thollazhi	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	113.29
96	Thonankulam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	81.29
97	Thottanaval	2	2	1	2	2	1	2	1	2	2	2	1	1	Paddy			1	55.01
98	Ullavur	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy	Cement Slabs		0	153.4
99	Uthukadu	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy		Clay Pots	0	521.43
100	Vadathavoor	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			61.39	91.19
101	Valathodu	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	32.73
102	Vayalakkavoor	2	2	1	2	2	2	1	1	2	2	2	1	2	Paddy			3	200.32
103	Vendivakkam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	35.85
104	Vengudi	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	13.05
105	Vichoor	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	88.8
106	Villimbakkam	2	2	1	2	2	1	1	1	2	2	2	1	1	Paddy			0	89.83
107	Vinnamangalam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			2	64.24
108	Kilottivakkam	2	2	1	2	2	2	2	2	2	2	2	1	1	Paddy			0	81.5
109	Seeyamangalam	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	20.23
110	Villivalam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			0	265.81
111	Vitchanthangal	2	2	1	2	2	2	2	1	2	2	1	1	1				0	125.52
112	Nelveli	2	2	1	2	2	2	2	1	2	2	2	1	2	Paddy			0	71.63
113	Kannikulam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			1	58.98
114	Thriupulivanam	2	2	1	2	2	1	2	1	2	2	2	1	2	Paddy			0	146.55
115	Anambakkam	2	2	1	2	2	2	2	1	2	2	2	1	1	Paddy			2	44.36

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

3.6.5 Recommendation and Suggestion

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

3.6.6 Summary & Conclusion

The socio-economic study in the study area gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from a lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

3.7 TRAFFIC DENSITY

The traffic survey conducted based on the transportation route of material, the rough stone is proposed to be transported mainly through Salavakkam panchayat road that connects to Salavakkam Tirumukkudal Road state highway Road on north western side.

Traffic density measurements were performed at two locations:

1. panchayat road
2. Salavakkam Tirumukkudal Road

Traffic density measurement were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on either

direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.39 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	panchayat road	0.34 km-South	Village road (Single Lane)
TS2	Salavakkam Tirumukkudal Road	1.13 km-West	Salavakkam Tirumukkudal Road

Source: On-site monitoring by GTMS FAE & TM

Table 3.40 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	107	321	15	15	109	55	391
TS2	135	405	28	28	152	76	509

Source: On-site monitoring by GTMS FAE & TM

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

Table 3.41 Rough Stone Hourly Transportation Requirement

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	58	174

Source: Approved Mining Plan

Table 3.42 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
panchayat road	391	174	565	1200
Salavakkam Tirumukkudal Road	509	174	683	1200

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

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

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, National Park and Archaeological monuments within the project area. No Protected and Reserved Forest area is located within the project

area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Tables 3.45 & 3.46.

Table 3.43 Details of Environmentally Sensitive Ecological Features in the Study Area

SI. No	Sensitive Ecological Features	Name	Areal Distance in km from cluster
1	National Park / Wild life Sanctuaries	Karikili birds' sanctuary	12.7km South
		Vedathangal birds' sanctuary	18.8km South
2	Reserve Forest	Kavanippakkam R. F	2.1km East
		Idaimichi R. F	2.6km SE
		Marudam RF	6.1km SW
3	Lakes/Reservoirs/ Dams/Streams/Rivers	Lake	1.4km NE
		Periya Eri	Adjoining the lease area
		Odai	70m NE
		Small pond	0.59km NE
		Sirudamur Near Lake	1.25km SE
		Lake	0.67km SE
		Lake	1.5km NW
		Cheyyar River	3.56km NW
Palar River	5.1km North		
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10km radius
5	Critically Polluted Areas	None	Nil within 10km radius
6	Mangroves	None	Nil within 10km radius
7	Mountains/Hills	None	Nil within 10km radius
8	Notified Archaeological Sites	Thirumukkoodal Sri Appan Prasanna Venkatesa Perumaal Temple	4.9km North
9	Industries/ Thermal Power Plants	None	Nil within 10km radius
10	Defence Installation	None	Nil within 10km radius

Source: Survey of India Toposheet

Table 3.44 Water Bodies nearby the Proposed Project Site

S. No.	Name	Distance & Direction
1	Lake	1.4km NE
2	Periya Eri	Adjoining the lease area
3	Odai	70m NE
4	Small pond	0.59km NE
5	Sirudamur Near Lake	1.25km SE
6	Lake	0.67km SE
7	Lake	1.5km NW
8	Cheyyar River	3.56km NW
9	Palar River	5.1km North

Source: Village Cadastral Map and Field Survey

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

Environmental impacts both direct and indirect on various environmental attributes due to proposed mining activity will be created in the surrounding environment, during the operational and post-operational phases. The occurrence of mineral deposits, being site specific, their exploitation, often, does not allow for any choice except adoption of eco-friendly operation. The methods are required to be selected in such a manner, so as to maintain environmental equilibrium ensuring sustainable development.

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause-and-effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning / consultation / extrapolation. The following parameters are of significance in the environmental impact assessment and are being discussed in detail:

- ❖ Land environment
- ❖ Soil environment
- ❖ Water environment
- ❖ Air environment
- ❖ Noise environment
- ❖ Socio economic environment
- ❖ Biological environment

Based on the baseline environmental status at the project site, the environmental factors that are likely to be affected are identified, quantified and assessed.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

- ❖ Permanent or temporary change on land use and land cover

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

4.1.2 Common Mitigation Measures from Proposed Project

- ❖ The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.
- ❖ Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- ❖ Greenbelt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- ❖ Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- ❖ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimize dust emissions
- ❖ Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

The proposed project area is covered by a thin layer of gravel of 3 m thickness. The gravel will be excavated and directly sold to needy customers in open market. Therefore, no impact is anticipated due to this project.

4.3 WATER ENVIRONMENT

As the water required for this project will be purchased from approved water vendors, the project will not abstract water neither from the lease area nor from the nearby area. Therefore, no

impact is anticipated on the water environment due to use of water. But, impacts due to other activities are anticipated and have been discussed below.

4.3.1 Anticipated Impact

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

- ❖ Generation of waste water from vehicle washing
- ❖ Washouts from surface exposure or working areas
- ❖ Domestic sewage
- ❖ Disturbance to drainage course in the project area
- ❖ Mine pit water discharge
- ❖ Increase in sediment load during monsoon in downstream of lease area
- ❖ This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of oil & grease, suspended solids
- ❖ The sewage from soak pit may percolate to the ground water table and contaminate it
- ❖ Surface drainage may be affected due to Mining

4.3.2 Common Mitigation Measures for the Proposed Project

- ❖ Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ❖ Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 10 m x 3 m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system
- ❖ Benches will be provided with inner slopes and through a system of drains and channels, rain water will be allowed to descent into surrounding drains to minimize the effects of erosion and water logging arising out of uncontrolled descent of water
- ❖ The water collected will be reused during storm for dust suppression and greenbelt development within the mines
- ❖ Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse

- ❖ Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons
- ❖ Periodic (once every 6 months) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- ❖ Domestic sewage from site office and urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- ❖ Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- ❖ De-silting will be carried out before and immediately after the monsoon season
- ❖ Regular monitoring (once every 6 months) and analysing the quality of water in open well, bore wells and surface water

4.4 AIR ENVIRONMENT

The air borne particulate matter is the main air pollutant in this opencast mining. The impact of the project on air environment has been discussed below.

4.4.1 Anticipated Impact for Proposed Project

The air borne particulate matter generated by quarrying operation, and transportation. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of granite and overburden, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM₁₀) affecting ambient air of the area. Prediction of impacts on air environment has been carried out taking into consideration proposed production of **1,25,360 m³** (ROM) on air environment and net increase in emissions by open pit source modelling in AERMOD Software.

4.4.1.1 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chaulya et al., 2001. The equations used for SPM, SO₂, and NO_x emission estimation have been given in Table 4.1.

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

	Pollutant	Source Type	Empirical Equation	Parameters
Overall mine	SPM	Area	$E = [u^{0.4} a^{0.2} \{9.7 + 0.01p + b / (4 + 0.3b)\}]$	u = Wind speed (m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm ³ /yr); a = Lease area (km ²); E = Emission rate (g/s).
Overall mine	SO ₂	Area	$E = a^{0.14} \{u / (1.83 + 0.93u)\} [\{p / (0.48 + 0.57p)\} + \{b / (14.37 + 1.15b)\}]$	u = Wind speed (m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm ³ /yr); a = Lease area (km ²); E = Emission rate (g/s).
Overall mine	NO _x	Area	$E = a^{0.25} \{u / (4.3 + 32.5u)\} [1.5p + \{b / (0.06 + 0.08b)\}]$	u = Wind speed (m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm ³ /yr); a = Lease area (km ²); E = Emission rate (g/s).

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. As the SPM emission calculation for overall mine is not considering pollution control measures, one-third of the SPM value is taken for derivation of PM₁₀ keeping in mind that proper control measures are followed. It is important to note that PM₁₀ emission rate is derived from the SPM estimation in the background that PM₁₀ constitutes 52% of SPM emission. The PM₁₀, SO₂ and NO_x emission results have been given in Table 4.2.

Table 4.2 Estimated Emission Rate

Activity	Pollutant	Calculated value (g/s)	Lease area in m ²	Calculated value (g/s/m ²)
Overall mine	PM ₁₀	0.085319564	16200	5.26664E-06
Overall mine	PM _{2.5}	0.050511295	16200	3.11798E-06
Overall mine	SO _x	0.040512296	16200	2.50076E-06
Overall mine	NO _x	0.022121719	16200	1.36554E-06

4.4.1.2 Frame Work of Computation & Details

By using the above-mentioned inputs, ground level concentrations due to the quarrying activities have been estimated to know the incremental concentration in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modelling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by quarrying activities. PM₁₀ was the major pollutant occurred during quarrying activities. The prediction included the impact of excavation, drilling, blasting (occasionally), loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and Cloud cover.

Impact was predicted over the distance of 5 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts.

4.4.1.3 Modelling of Incremental Concentration

The air borne particulate matter such as PM₁₀ and PM_{2.5} generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) due to excavation and loading equipment's and vehicles plying on haul roads are the significant air pollutants arising from mining operation, leading to an adverse impact on the ambient air environment in and around the project area.

Anticipated incremental concentration and net increase in emissions due to quarrying activities within 500 m around the project area is predicted by open pit source modelling using AERMOD software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.3-4.6.

PROJECT TITLE:
KANNIYAPPAN ROUGHSTONE AND GRAVEL QUARRY-PM2.5

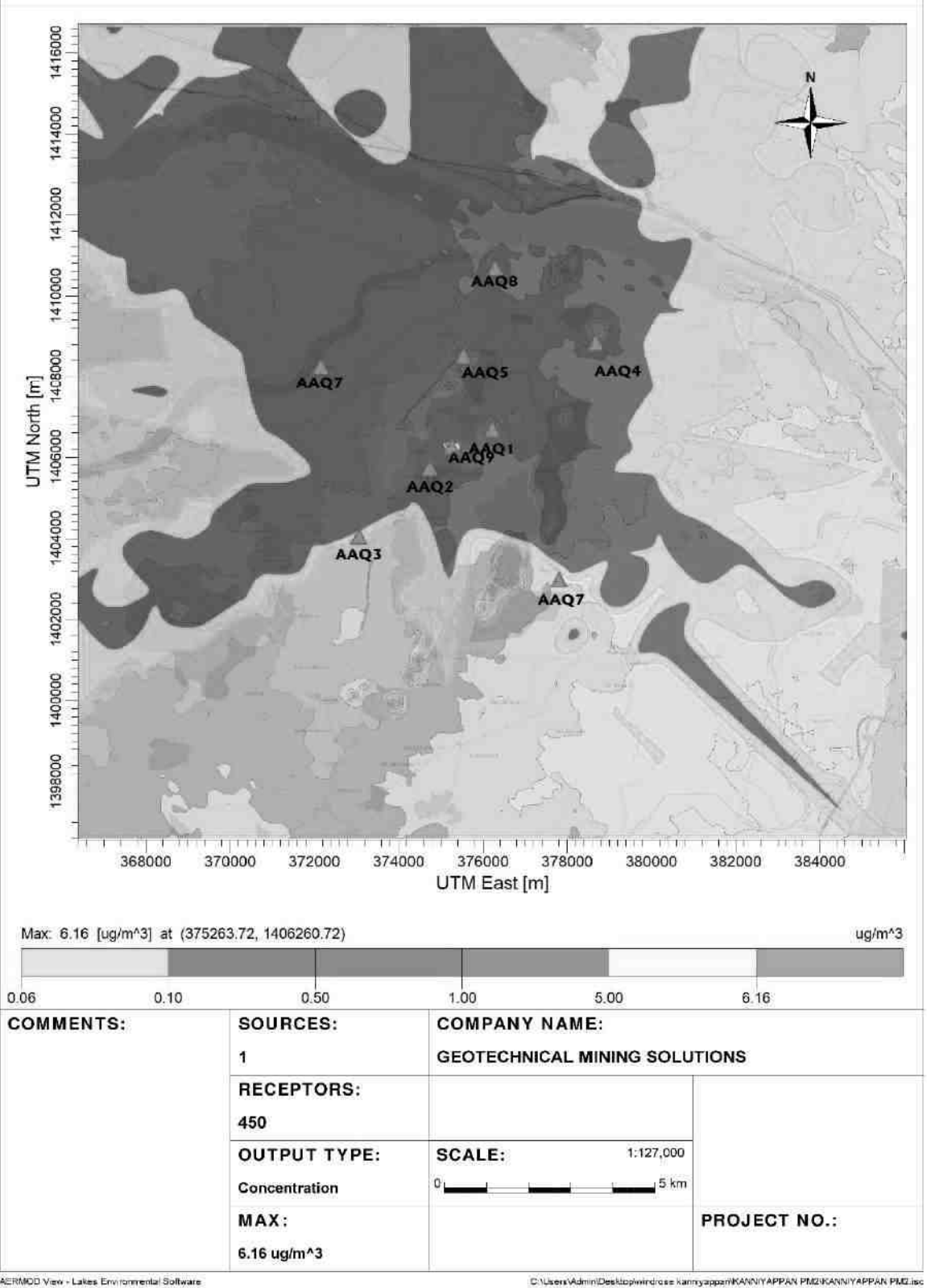
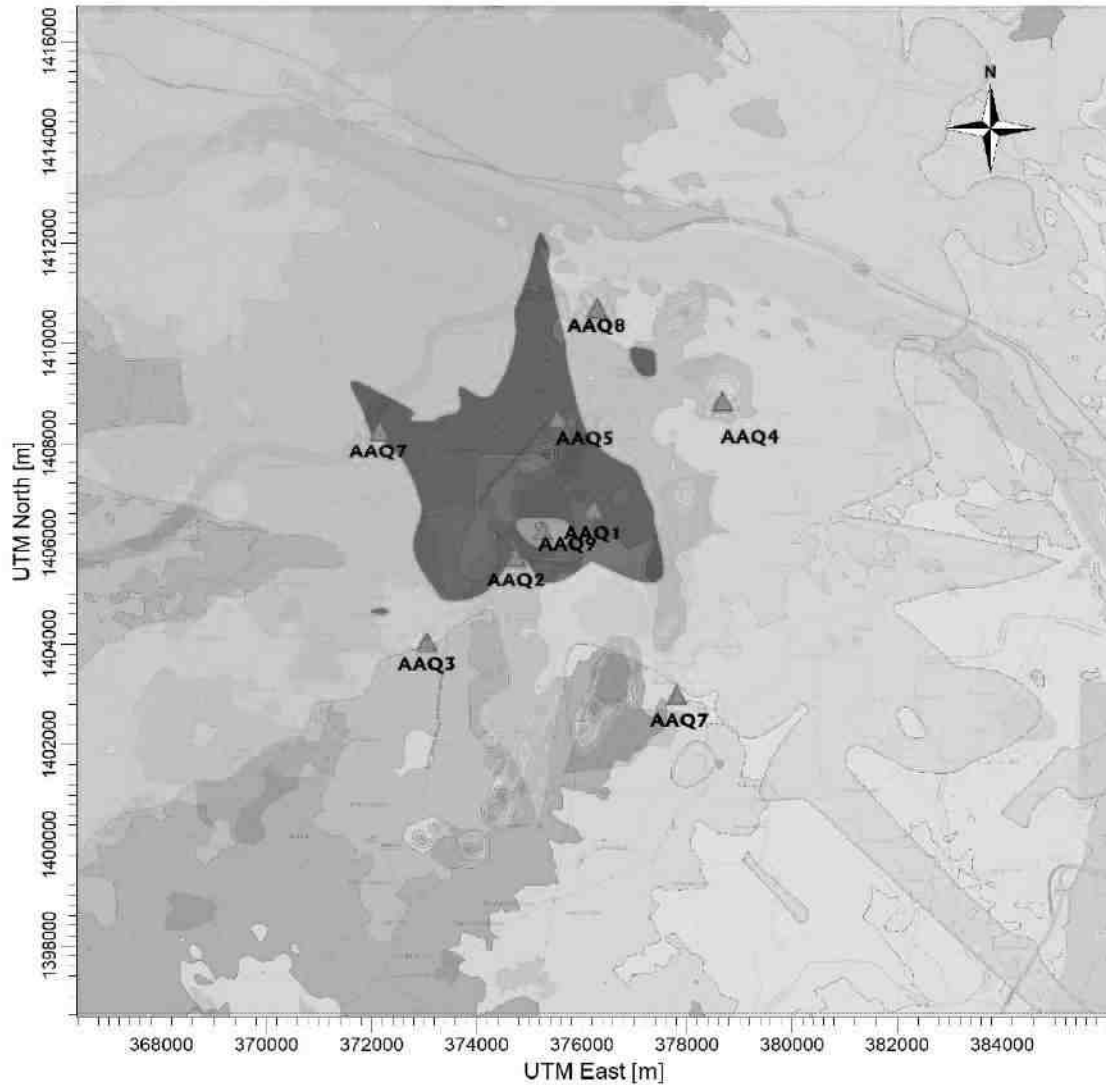
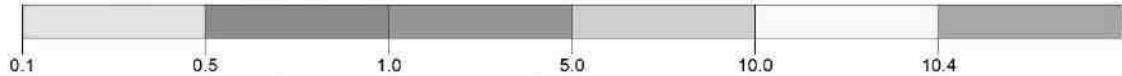



Figure 4.1 Predicted incremental concentration of PM_{2.5}

PROJECT TITLE:
KANNIYAPPAN ROUGHSTONE AND GRAVEL QUARRY-PM10



Max: 10.4 [ug/m³] at (375263.72, 1406260.72) ug/m³



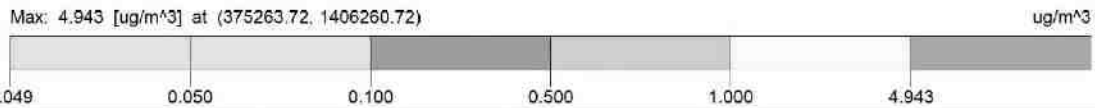
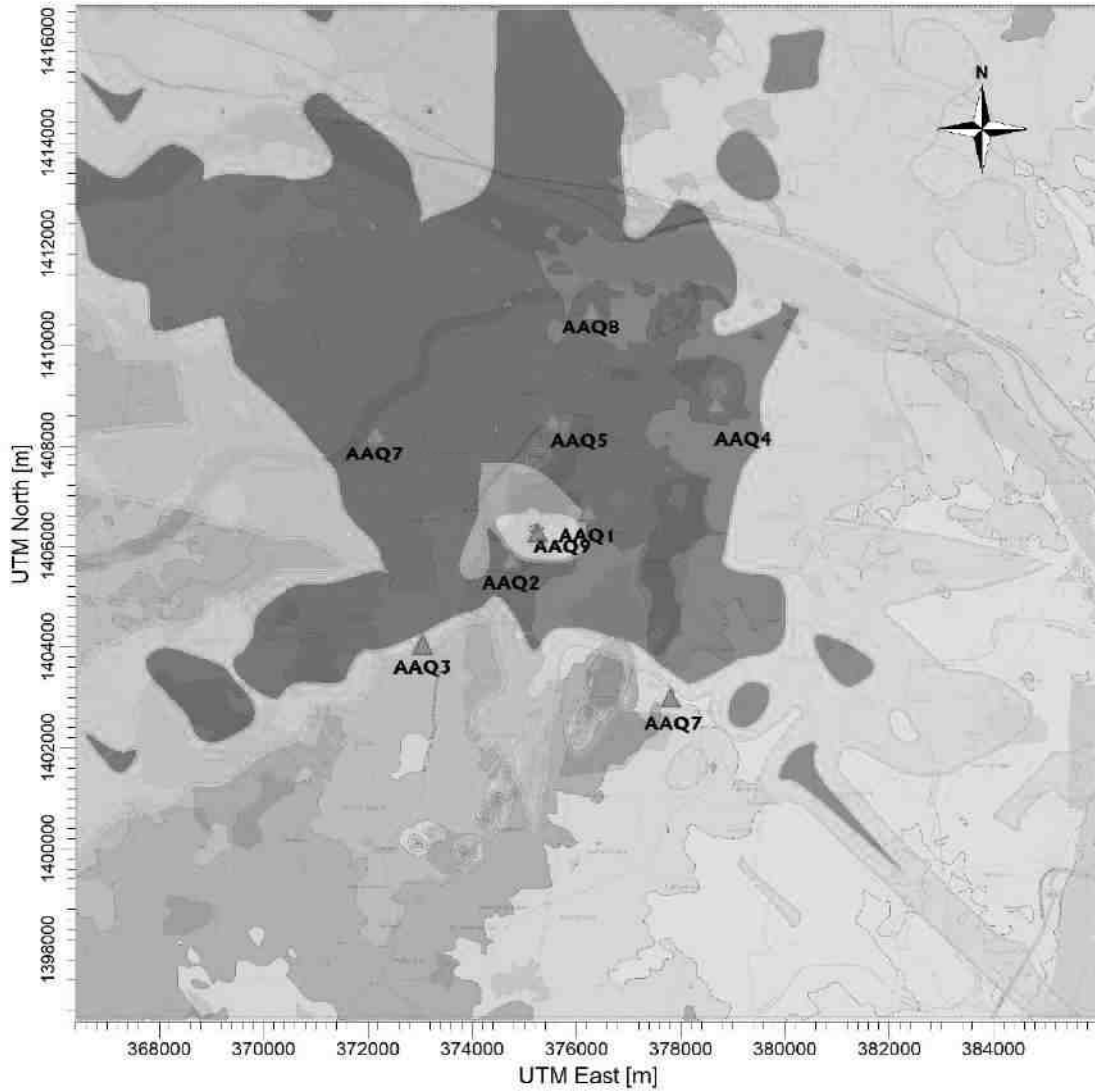
COMMENTS:	SOURCES:	COMPANY NAME:	
	1	GEOTECHNICAL MINING SOLUTIONS	
	RECEPTORS:		
	450		
	OUTPUT TYPE:	SCALE:	1:127,000
Concentration	0  5 km		
MAX:		PROJECT NO.:	
10.4 ug/m ³			

AERMOD View - Lakes Environmental Software

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Figure 4.2 Predicted incremental concentration of PM₁₀

PROJECT TITLE:
KANNIYAPPAN ROUGHSTONE AND GRAVEL QUARRY-SO2



COMMENTS:	SOURCES: 1	COMPANY NAME: GEOTECHNICAL MINING SOLUTIONS	
	RECEPTORS: 450		
	OUTPUT TYPE: Concentration	SCALE: 1:127,000	
	MAX: 4.943 ug/m ³		PROJECT NO.:

AERMOD View - Lakes Environmental Software

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Figure 4.3 Predicted incremental concentration of SO₂

PROJECT TITLE:
KANNIYAPPAN ROUGHSTONE AND GRAVEL QUARRY-NO_x

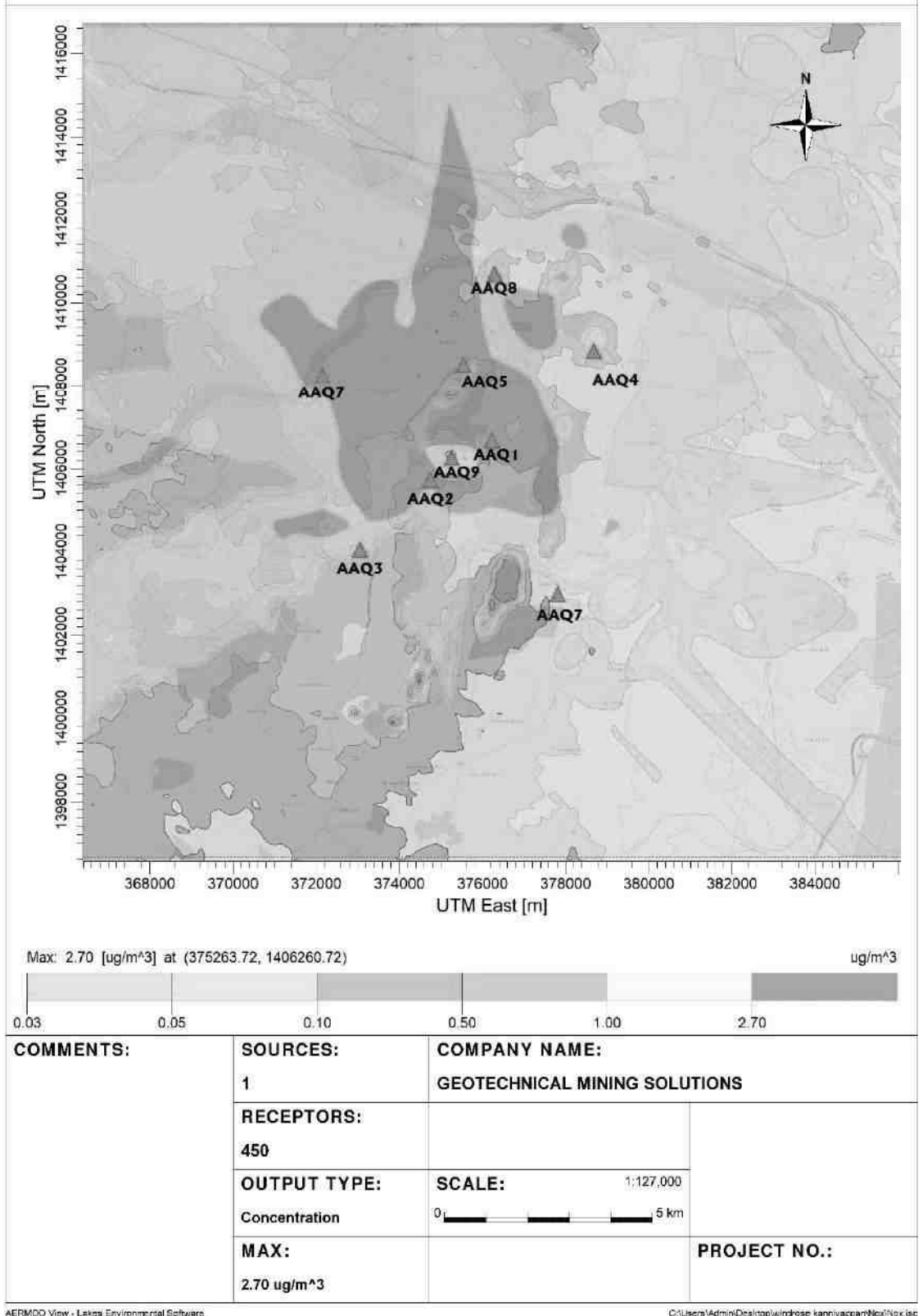


Figure 4.4 Predicted incremental concentration of NO_x

4.4.1.4 Model Results

The post project resultant concentrations of PM₁₀, PM_{2.5}, SO₂, and NO_x (GLC) has been given in Table 4.3-4.6.

Table 4.3 Incremental & Resultant GLC of PM_{2.5}

Station code	Location	Average baseline PM _{2.5} (µg/m ³)	Incremental value of PM _{2.5} dueto mining (µg/m ³)	Total PM _{2.5} (µg/m ³)
AAQ1	12°43'19.87"N, 79°51'35.87"E	32.40	1	33.4
AAQ2	12°42'48.39"N, 79°50'46.86"E	25.08	0.5	25.58
AAQ3	12°41'53.58"N, 79°49'51.00"E	20.27	0.1	20.37
AAQ4	12°44'30.33"N, 79°52'56.85"E	22.30	0.5	22.8
AAQ5	12°44'19.05"N 79°51'12.97"E	24.39	0.5	24.89
AAQ6	12°44'10.33"N, 79°49'20.52"E	20.10	0.5	20.6
AAQ7	12°41'20.08"N, 79°52'28.96"E	23.30	0	23.3
AAQ8	12°45'30.23"N, 79°51'37.33"E	23.52	0.5	24.02
AAQ9	12°43'05.93"N 79°51'03.91"E	33.05	6.16	39.21

Table 4.4 Incremental and Resultant GLC of PM₁₀

Station code	Location	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ dueto mining (µg/m ³)	Total PM ₁₀ (µg/m ³)
AAQ1	12°43'19.87"N, 79°51'35.87"E	52.23	1	53.23
AAQ2	12°42'48.39"N, 79°50'46.86"E	45.23	0.5	45.73
AAQ3	12°41'53.58"N, 79°49'51.00"E	39.58	0.5	40.08
AAQ4	12°44'30.33"N, 79°52'56.85"E	40.99	0.5	41.49
AAQ5	12°44'19.05"N 79°51'12.97"E	43.43	1	44.43
AAQ6	12°44'10.33"N, 79°49'20.52"E	38.86	1	39.86
AAQ7	12°41'20.08"N, 79°52'28.96"E	44.68	0	44.68
AAQ8	12°45'30.23"N, 79°51'37.33"E	42.18	0.5	42.68
AAQ9	12°43'05.93"N 79°51'03.91"E	53.02	10.41	63.43

Table 4.5 Incremental & Resultant GLC of SO₂

Station Code	Location	Average Baseline SO₂ (µg/m³)	Incremental value due to mining (µg/m³)	Total SO₂ (µg/m³)
AAQ1	12°43'19.87"N, 79°51'35.87"E	11.53	0.5	12.03
AAQ2	12°42'48.39"N, 79°50'46.86"E	8.70	0.5	9.2
AAQ3	12°41'53.58"N, 79°49'51.00"E	5.89	0.1	5.99
AAQ4	12°44'30.33"N, 79°52'56.85"E	6.48	0.5	6.98
AAQ5	12°44'19.05"N 79°51'12.97"E	7.23	0.5	7.73
AAQ6	12°44'10.33"N, 79°49'20.52"E	6.08	0.5	6.58
AAQ7	12°41'20.08"N, 79°52'28.96"E	8.66	0	8.66
AAQ8	12°45'30.23"N, 79°51'37.33"E	8.63	0.5	9.13
AAQ9	12°43'05.93"N 79°51'03.91"E	12.13	4.94	17.07

Table 4.6 Incremental & Resultant GLC of NO_x

Station code	Location	Average baseline NO_x (µg/m³)	Incremental value due to mining (µg/m³)	Total NO_x (µg/m³)
AAQ1	12°43'19.87"N, 79°51'35.87"E	23.85	0.5	24.35
AAQ2	12°42'48.39"N, 79°50'46.86"E	22.24	0.1	22.34
AAQ3	12°41'53.58"N, 79°49'51.00"E	16.78	0.05	16.83
AAQ4	12°44'30.33"N, 79°52'56.85"E	18.75	0.1	18.85
AAQ5	12°44'19.05"N 79°51'12.97"E	20.85	0.5	21.35
AAQ6	12°44'10.33"N, 79°49'20.52"E	18.70	0.5	19.2
AAQ7	12°41'20.08"N, 79°52'28.96"E	22.40	0	22.4
AAQ8	12°45'30.23"N, 79°51'37.33"E	21.72	0.1	21.82
AAQ9	12°43'05.93"N 79°51'03.91"E	24.64	2.69	27.33

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

4.4.2 Common Mitigation Measures

Drilling

To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

Advantages of Wet Drilling

- ❖ In this system dust gets suppressed close to its formation. Dust suppression becomes very effective and the work environment will be improved from the point of view of occupational comfort and health
- ❖ Due to dust free atmosphere, the life of engine, compressor etc., will be increased
- ❖ The life of drill bit will be increased
- ❖ The rate of penetration of drill will be increased
- ❖ Due to the dust free atmosphere visibility will be improved resulting in safer working conditions

Blasting

- ❖ Suitable time of blasting will be chosen according to the local conditions and water will be sprinkled on blasting face
- ❖ Blasting will be avoided when temperature inversion is likely to occur and strong wind blows towards residential areas
- ❖ Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone
- ❖ Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours
- ❖ Before loading of material water will be sprayed on blasted material
- ❖ Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road and Transportation

- ❖ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ❖ Water sprinkling on haul roads and loading points will be carried out twice a day

- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process and reduces pollution
- ❖ The un-metalled haul roads will be compacted weekly before being put into use
- ❖ Overloading of tippers will be avoided to prevent spillage
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials

Green Belt

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

Occupational Health

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

4.5 NOISE ENVIRONMENT

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

Predictions have been carried out to compute the noise level at various distances around the working pit due to these major noise-generating sources. Noise modelling has been carried out to assess the impact on surrounding ambient noise levels.

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed of 1,10°ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship. i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

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

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

Where,

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

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

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

4.5.1 Anticipated Impact

Attenuation due to Greenbelt has been taken to be 4.9 dB (A). The inputs required for the model are:

- ❖ Source data
- ❖ Receptor data
- ❖ Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.7

Table 4.7 Activity and Noise Level Produced by Machinery

S. No.	Machinery / activity	Impact on environment?	Noise produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total			95.8

*50 feet from source = 15.24 meters

Source: U.S. Department of Transportation (Federal Highway Administration) – Construction Noise Handbook.

The total noise to be produced by mining activity is calculated to be 95.8 dB (A). Generally, most mining operations produce noise between 100-109 dB (A). We have considered equipment and operation noise levels (max) to be approx. 109 dB (A) for noise prediction modelling.

Table 4.8 Predicted Noise Incremental Values

Noise monitoring location	Distance from project site (m)	Baseline noise level in dB (A) m during day time	Predicted noise level in dB (A)	Total in dB (A)
Sirudamur	920	48.6	37.88	48.95
Sirudamur	1000	45.6	37.16	46.18
Kattankulam	3000	42.5	27.62	42.64
Pazhaveri	4100	42.9	24.90	42.97
Madhur	2200	40.2	30.31	40.62
Vayalakkavoor	3520	39.8	26.23	39.99
Edamichi	4000	38.0	25.12	38.22
Thirumukkudal	4400	44.9	24.29	44.94
Core Zone	100	50.05	57.16	57.93
Neerkundram	720	45.54	40.01	46.61
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time - 55 dB (A) & Night Time- 45 dB (A)			

The incremental noise level is found to be 57.93 dB (A) in core zone and ranges between 38.22 and 48.95 dB (A) in buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The noise level resulting from monitored values and calculated values at the receptors is based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations are within permissible limits of Industrial area (core zone) & Residential area (buffer zone) as per the noise pollution (regulation and control) rules, 2000 (The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E), dated 11.01.2010 under the Environment (Protection) Act, 1986.).

4.5.2 Common Mitigation Measures

The following noise mitigation measures are proposed for control of noise:

- ❖ Usage of sharp drill bits while drilling which will help in reducing noise
- ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained

- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ❖ Silencers / mufflers will be installed in all machineries
- ❖ Greenbelt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness
- ❖ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects

4.5.3 Ground Vibrations

Ground vibrations due to the proposed mining activities are anticipated due to operation of mining machines like excavators, drilling and blasting, transportation vehicles, etc., however, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the proposed project areas is listed in below table. The ground vibrations due to the blasting in the quarry are calculated using the empirical equation.

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

$$V = K [R/Q^{0.5}]^{-B}$$

Where,

V = peak particle velocity (mm/s)

K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

B = constant related to the rock and site (usually 1.6)

R = distance from charge (m)

Table 4.9 Predicted PPV Values due to Blasting

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	21	720	0.36

The peak particle velocity produced by the charge of 21 kg is well below that of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But, the project proponent ensures that the charge per blast shall be less than 21 kg and that the proponent shall carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.5.3.1 Common Mitigation Measures

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines
- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ❖ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2nd Class Mines Manager/ 1st Class Mines Manager) will be appointed
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire

- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

4.6 ECOLOGY AND BIODIVERSITY

4.6.1. Anticipated Impact on Flora

The impact of the mining activity on the biological environment is as follows:

- A. The mining lease area does not include any forest land. There will be no cutting of trees during the mining activity so no deforestation activity will be under taken.
- B. The existing vegetation within the ML area includes few trees and scrub vegetation which are sparsely scattered. They will not be disturbed due to the mining activity. So, the impact on the vegetation is very less.
- C. The transportation of Rough stone and gravel quarry waste may create dust pollution which may create loss of biodiversity of the area.
- D. Dust in atmosphere, contributed by mining and associated activities, when deposited on the leaves of the plants in the surrounding areas may retard their growth.
- E. The growth of vegetation and agriculture in and around the complexes. Noise and vibrations due to blasting and operation of the machines drive away the wild animals and birds from the nearby areas.
- F. The lease area and its buffer zone are devoid of any Eco sensitive area. The impact on the biodiversity and wild life is minimal.

4.6.2 Mitigation Measures

4.6.2.1. Green Belt Development

The project site should have a land to develop greenbelt in and around the limits of the mine, along roads and other vacant area. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. Although, the project will not lead to

any tree cutting, it is proposed to improve the greenery of the locality by plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

- ❖ Plants that grow fast will be preferred.
- ❖ Preference for high canopy covers plants with local varieties.
- ❖ Perennial and evergreen plants will be preferred.
- ❖ It improves the ambient air quality by controlling Suspended Particulate Matter (SPM) in air.
- ❖ It helps in noise abatement for the surrounding area.
- ❖ It helps in settlement of new birds and insects within itself.
- ❖ It maintains the ecological balance.
- ❖ It increases the aesthetic value of site.

4.6.2.2. Green Belt Plan

Greenbelt is an important sink of air pollutants and noise. Green cover in mining area not only helps in reducing pollution level, but also improves the ecological conditions and prevents soil erosion to great extent. It further improves the aesthetics and beneficially influences the microclimate of the surrounding. However, green belts of the lease area will include the local species which are suitable for the area. Plant species, selected for greenbelt have rapid growth, ever green, large crown volume and small/pendulous leave with smooth surface. A combination of different plant species is sought while selecting trees for vegetation cover. Greenbelt should be developed in following areas:

- ❖ Along mine boundary
- ❖ Along the side of major roads
- ❖ On backfill areas

The species of plantation should be selected considering the soil quality, place of plantation, chances of survival, commercial value etc. Only indigenous species will be planted. Mixed plantation should be done keeping optimum spacing between the saplings.

4.6.2.3. Afforestation

More number of trees has been observed along the approach road in the lease area, which is developed by the lease owner. The 7.5m and 50m Safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like *Azadirachta indica*, *Nerium indicum*, and *Albizia lebbeck* will be planted along the lease boundary and avenue plantation will be

carried out in respective proposed project. Recommended species for greenbelt development plan is given in Table 4.10. The rate of survival expected to be 80% in this area. Afforestation Plan is given in Table 4.11 and budget of green belt development plan are given in Table 4.12.

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

4.6.2.4. Species Recommendation for Plantation Granted in the District

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

- ❖ Natural growth of existing species and survival rate of various species
- ❖ Suitability of a particular plant species for a particular type of area
- ❖ Creating of biodiversity
- ❖ Fast growing, thick canopy copy, perennial and evergreen large leaf area
- ❖ Efficient in absorbing pollutants without major effects of natural growth
- ❖ The following species may be considering primary for plantation best suited for the prevailing climate condition in the area

4.6.2.5. Physiological Features of Plant Leaf for Efficient Dust Capture

The following Leaf functions are directly or indirectly help in efficient dust capture by

- ❖ Photosynthesis (production of carbohydrates from CO₂ and H₂O using light energy)
- ❖ Transpiration (water absorbed by the roots and transported throughout the plant evaporates into the atmosphere)
- ❖ Water movement and cooling
- ❖ Abscission (seasonal shedding of leaves in deciduous plants)
- ❖ Nutrient recycling and waste elimination
- ❖ There are two physiological Features, which are controlled by leaf morphology & anatomical feature, help in dust capturing efficiency of leaf as well as plants.
- ❖ Photosynthesis process
- ❖ Transpiration process.

Table 4.10 Recommended Species for Greenbelt Development Plan

S. No	Botanical name of the Ppant	Family name	Common name	Category	Dust capturing efficiency features
1	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree	Well distinct thick at both the layer Well distinct in Palisade & spongy parenchyma.spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series
2	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree	
3	<i>Polyalthia longifolia</i>	Annonaceae	Nettilingam	Tree	
4	<i>Albizia lebbeck</i>	Fabaceae	Vagai	Tree	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir konrai	Tree	
6	<i>Bauhinia racemosa</i>	Fabaceae	Aathi	Tree	
7	<i>Cassia fistula</i>	Fabaceae	Sarakondrai	Tree	
8	<i>Aegle marmelos</i>	Rutaceae	Vilvam	Tree	
9	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree	
10	<i>Thespesia populnea</i>	Malvaceae	Puvarasu	Tree	

Source: Central Pollution Control Board (Ministry of Environment & Forests) Parivesh Bhawan', East Arjun Nagar Delhi-110 03

Table 4.11 Greenbelt Development Plan

No. of trees proposed for plantation	No. of trees expected to be grown@80% survival rate	Area to be covered(m ²)	Name of the species
Number of plants inside the mine lease area			<i>Azadirachta indica, Albizia lebbeck, Delonix regia, Tectona grandis, etc.,</i>
324	259	2916	
Number of plants outside the mine lease area			
486	389	4374	

Table 4.12 Budget for greenbelt development plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital cost (Rs.)	Recurring cost-per annum
Plantation inside the mine lease area (in safety margins)	324	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	64800	9720
Plantation outside the area	486	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	145800	14580
Total			210600	24300

4.6.3. Anticipated Impact on Fauna

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

4.6.3.1. Measures for Protection and Conservation of Wildlife Species

- ❖ Topsoil has a large number of seeds of native plant species in the mining area
Topsoil will be used for restoration and suitable surface for planted seedlings
- ❖ Checks and controls on the movement of vehicles in and out of the mine

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

4.6.3.2. Mitigation Measures

- ❖ Suitable plan for conservation of Schedule-I Species have prepared and necessary fund for implement for the same will be made
- ❖ All the preventive measures will be taken for growth & development of fauna
- ❖ Creating and development awareness for nature and wildlife in the adjoin villages
- ❖ The workers shall be trained to not harm any wildlife, should it come near the project site and no work shall be carried out after 6.00 pm

4.6.4. Impact on Aquatic Biodiversity

Mining activities will not disturb the existing aquatic ecology as there is no effluent discharge proposed from the rough stone quarry. There is no natural perennial surface water body within the mine lease area. There are few seasonal water bodies on the North and eastern side. It is away from the applied lease area. There are no impacts to aquatic biodiversity. Aquatic biodiversity is observed in the water body.

4.6.5. Impact Assessment on Biological Environment

This chapter highlights the various impacts on ecology and biodiversity due to mining activity. It addresses the baseline data and its Effect on flora and wild life fauna especially threatened species (Critically Endangered, Endangered, and Vulnerable) in core mining lease area. A detail of impact and assessments was mentioned in Table 4.13.

Table 4.13 Ecological impact assessments

S. No	Attributes	Assessment
1	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.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area.

3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	No national park or eco-sensitive zone around 10 km radius. Kavanippakkam Reserve Forest has located about 2.1 km East side on the Idaimichi RF 2.7 km on the Southeast side and Marudam RF 6.1 km on the southwest side, all the reserve forest away from the proposed project site.
4	Proposed project restricts access to waterholes for wildlife	No.
5	Proposed mining project impact surface water quality that also provide water to wildlife	No scheduled or threatened wildlife animal sighted regularly core in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management such as drains is constructed properly. So, there will be no siltation affect in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	No.
8	The project release effluents into a water body that also supplies water to a wildlife	No water body near to core zone so chances of water become polluted is low.
9	Mining project effect the forest Based livelihood/ any specific forest product on which local livelihood depended	No.
10	Project likely to affect migration routes	No migration route observed during monitoring period.
11	Project likely to affect flora of an area, which have medicinal value	No.
12	Forestland is to be diverted, has carbon high sequestration	No. There was no forest land diverted.
13	The project likely to affect wetlands, Fish breeding grounds, marine ecology	No. Wetland was not present in near core mining lease area. No breeding and nesting ground is present in core mining area.

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

4.6.6. Impact evaluation

Table 4.14 Impact Evaluation for Biological Resources

Impact Evaluation Element	Change in the biological resources of the area due to mine development & operation and generation of emissions.			
Potential Effect/ Concern	Loss of habitat, Impact on health of biological receptors due to area and line sources of air emissions including fugitive dust emissions during rough stone and gravel quarry development & operation activities.			
Characteristics of Impacts				
Nature	Positive		Negative	Neutral
	○		●	○
Type	Direct	Indirect	Cumulative	
	●	○	○	
Extent	Project Area	Local	Zonal	Regional
	●	○	○	○
Duration	Short – term		Long- term	
	○		●	
Intensity	Low		Medium	High
	●		○	○
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
	○	○	○	●
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
	●	○	○	○

*Note: Mark ‘●’ indicates the Yes and ‘○’ indicates the No.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.0 INTRODUCTION

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

5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE

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

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

5.2 ANALYSIS OF ALTERNATIVE SITE

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

5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

Semi Mechanized open cast mining operation with drilling and blasting method will be used to extract rough stone in the area. The proposed mining lease areas have following advantages:

- ❖ As the mineral deposition is homogeneous and batholith formation, therefore opencast method of working is preferred over underground method.
- ❖ The material will be loaded with the help of excavators into tractors / trippers and transported to the need by customers.
- ❖ Blasting and availability of drills along with controlled blasting technology gives desired fragmentation so that the mineral is handled safely and used without secondary blasting.
- ❖ Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

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

CHAPTER VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 GENERAL

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

6.1 METHODOLOGY OF MONITORING MECHANISM

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

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

- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

- ❖ Seeking expert's advice when needed.

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

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

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

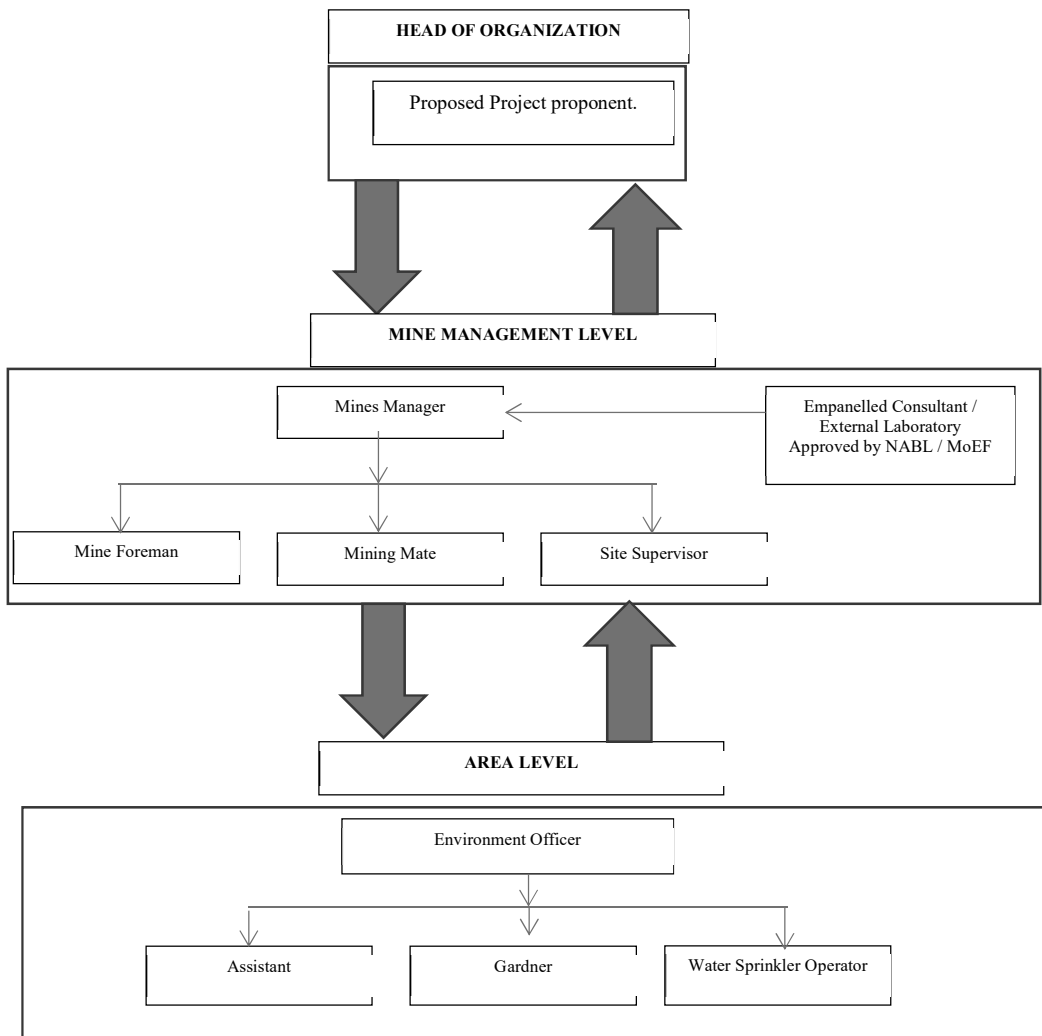


Figure 6.1 Proposed environmental monitoring chart

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

Table 6.1 Implementation Schedule for Proposed Project

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

6.3 MONITORING SCHEDULE AND FREQUENCY

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

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

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil Quality and
- ❖ Greenbelt Development

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

Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in m BGL
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

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

approved by NABL / MoEF. The proposed capital cost for Environmental Monitoring Programme Cost is Rs 320,000/- and the recurring cost is Rs 64,000/- per annum for the proposed project site.

Table 6.3 Environment Monitoring Budget

S. No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs. 3,20,000/-	Rs. 64,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		Rs 3,20,000/-	Rs 64,000/-

Source: Approved Mining Plan

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

CHAPTER VII

ADDITIONAL STUDIES

7.0 GENERAL

The following additional studies were done as per items identified by project proponents and items identified by regulatory authority and items identified by public and other stakeholders will be incorporated after public hearing.

- ❖ Public consultation
- ❖ Risk assessment
- ❖ Disaster management plan
- ❖ Cumulative impact study
- ❖ Plastic waste management
- ❖ Post-COVID health management plan

7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

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

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a qualified competent mine manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Risk assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

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

Table 7.1 Risk Assessment & Control Measures for Proposed Project

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	<p>All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations;</p> <p>Workers will be sent to the Training in the nearby group vocational training centre entry of unauthorized persons will be prohibited;</p> <p>Fire-fighting and first-aid provisions in the mine office complex and mining area;</p> <p>Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use</p> <p>Working of quarry, as per approved plans and regularly updating the mine plans;</p> <p>Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut;</p> <p>Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a mine manager;</p> <p>Maintenance and testing of all mining equipment as per manufacturer 's guidelines.</p>
2	Drilling	Improper and unsafe practices	Safe operating procedure established for drilling (SOP) will be strictly followed.

		<p>Due to high pressure of compressed air, hoses may burst</p> <p>Drill rod may break</p>	<p>Only trained operators will be deployed.</p> <p>No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough examination of all places,</p> <p>Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</p> <p>Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual.</p> <p>All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</p> <p>Operator shall regularly use all the personal protective equipment.</p>
3	Blasting	<p>Fly rock, ground vibration, Noise and dust.</p> <p>Improper charging, stemming & Blasting/ fining of blast holes</p> <p>Vibration due to movement of vehicles</p>	<p>Restrict maximum charge per delay as per regulations and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blasting can be conducted safely.</p> <p>SOP for charging, stemming & blasting/firing of blast holes will be followed by blasting crew during initial stage of operation</p> <p>Shots are fired during daytime only.</p> <p>All holes charged on any one day shall be fired on the same day.</p> <p>The danger zone will be distinctly demarcated (by means of red flags)</p>
4	Transportation	Potential hazards and unsafe	Before commencing work, drivers personally check the truck/tipper for

		<p>workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal & overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p>	<p>oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.</p> <p>Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle.</p> <p>Concave mirrors should be kept at all corners</p> <p>All vehicles should be fitted with reverse horn with one spotter at every tipping point</p> <p>Loading according to the vehicle capacity</p> <p>Periodical maintenance of vehicles as per operator manual</p>
6	Natural Calamities	Unexpected happenings	<p>Escape Routes will be provided to prevent inundation of storm water</p> <p>Fire Extinguishers & Sand Buckets</p>
7	Failure of mine benches and pit slope	Slope geometry, Geological structure	Ultimate or over all pit slope shall be below 60° and each bench height shall be 5 m height.

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated.

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

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

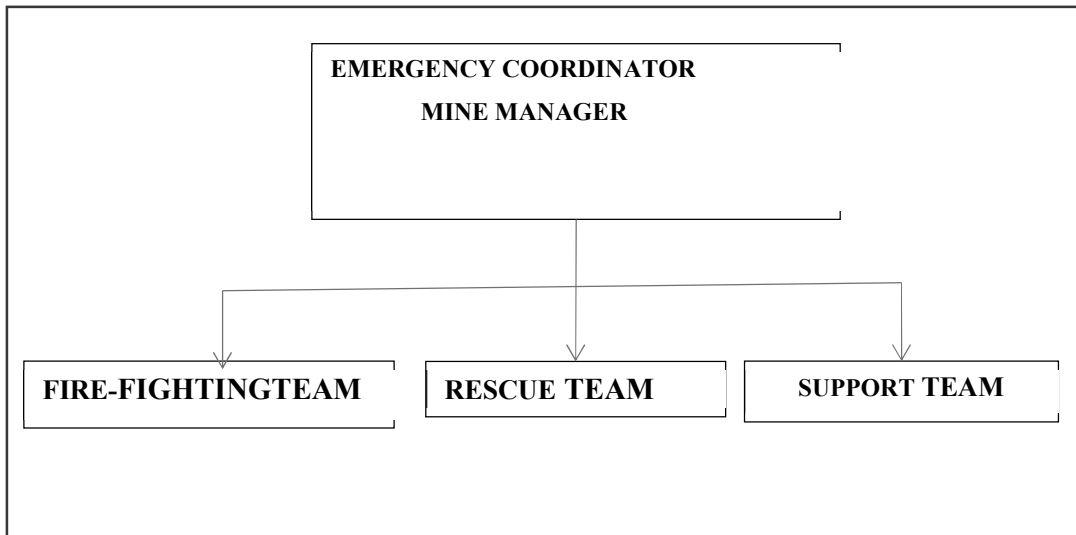


Figure 7.1 Disaster management team layout for proposed project

The emergency organization shall be headed by emergency coordinator who will be qualified competent mines manager. In his absence senior most people available at the mine shall be emergency coordinator till arrival of mines manager. There would be three teams for taking care of emergency situations – Fire-Fighting Team, Rescue Team and Support Team. The proposed composition of the teams is given in Table 7.2.

Table 7.2 Proposed Teams for Emergency Situation

DESIGNATION	QUALIFICATION
FIRE-FIGHTING TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
RESCUE TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
SUPPORT TEAM	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Assistant Team Leader	Environment Officer
Team Member	Mining Mate
Security Team Leader/ Emergency Security Controller	Mines Foreman

Once the mine becomes operational, the above table along with names of personnel will be prepared and made easily available to workers for respective proposed quarries. A mobile communication network and wireless shall connect Mine Emergency Control Room (MECR) to control various departments of the mine, fire station and neighbouring industrial units/mines.

7.3.1 Roles and Responsibilities of Emergency Team

(a) Emergency coordinator (EC)

The emergency coordinator shall assume absolute control of site and shall be located at MECR.

(b) Incident controller (IC)

Incident controller shall be a person who shall go to the scene of emergency and supervise the action plan to overcome or contain the emergency. Shift supervisor or Environmental Officer shall assume the charge of IC.

(c) Communication and advisory team

The advisory and communication team shall consist of heads of Mining Departments i.e., Mines Manager

(d) Roll call coordinator

The Mine Foreman shall be Roll Call Coordinator. The roll call coordinator will conduct the roll call and will evacuate the mine personnel to assembly point. His prime function shall be to account for all personnel on duty.

(e) Search and rescue team

There shall be a group of people trained and equipped to carryout rescue operation of trapped personnel. The people trained in first aid and fire-fighting shall be included in search and rescue team.

(f) Emergency security controller

Emergency Security Controller shall be senior most security person located at main gate office and directing the outside agencies e.g., fire brigade, police, doctor and media men etc.,

7.3.2 Emergency Control Procedure

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

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

7.3.3 Proposed Fire Extinguishers

The following type of fire extinguishers has been proposed at strategic locations within the mine.

Table 7.3 Proposed Fire Extinguishers at Different Locations in P1

Location	Type of Fire Extinguishers
Electrical Equipment's	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

7.3.4 Alarm System

On receiving the message of disaster from Site Controller, fire-fighting team, the mine control room attendant will sound siren wailing for 5 minutes. Incident controller will arrange to broadcast disaster message through public address system. On receiving the message of "Emergency Over" from Incident Controller the emergency control room attendant will give "All Clear Signal", by sounding alarm straight for 2 minutes.

The features of alarm system will be explained to one and all to avoid panic or misunderstanding during disaster. In order to prevent or take care of hazard / disasters if any the following control measures have been adopted.

- ❖ Fire-fighting and first-aid provisions in the mines office complex and mining area are provided.
- ❖ Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring.
- ❖ Training and refresher courses for all the employees working in hazardous premises.
- ❖ Working of mine, as per approved plans and regularly updating the mine plans.
- ❖ Cleaning of mine faces is regularly done.
- ❖ Handling of explosives, charging and blasting are carried out only by qualified persons following SOP.
- ❖ Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- ❖ Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.

- ❖ A blasting SIREN is used at the time of blasting for audio signal.
- ❖ Before blasting and after blasting, red and green flags are displayed as visual signals.
- ❖ Warning notice boards indicating the time of blasting and NOT TO TRESPASS are displayed at prominent places.
- ❖ Regular maintenance and testing of all mining equipment were carried out as per manufacturer's guidelines.

7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative study, only two proposed projects, known as P1, P2 and P3 were taken into consideration. The details of P1 have been given in Table 1.2 and the details of P2 and P3 in Table 7.4.&7.5.

Table 7.4 Salient Features of Proposed Project Site (P2)

Name of the Quarry	N.Prabakaran	
Toposheet No	57- P/14	
Latitude between	12°43'08.55"N to 12°43'14.57"N	
Longitude between	79°51'00.64"E to 79°51'07.08"E	
Highest Elevation	53m AMSL	
Proposed Depth of Mining five years period	20m BGL (2m Topsoil +18mRoughstone)	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	845784	43376
Minable Reserves	379434	34176
Five-year Production	237284	34176
Existing Pit Dimension	-	
Ultimate Pit Dimension	128m (L) x 117m (W) x 20m (D)	
Water Level in the surrounding area	55-58m BGL	
Method of Mining	Opencast Semi Mechanized Mining involving drilling and blasting	
Topography	The applied lease area is exhibits plain topography covered with top soil with altitude of 53m maximum from the MSL. The area is sloping towards South-	

	eastern side covered clayey soil with Rough Stone which does not sustain any type of vegetation.	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Excavator	1
	Tippers	4
Blasting Method	Controlled blasting method by shot hole drilling and small dia. of 25mm slurry explosives are proposed to be used for shattering and heaping effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Project Cost	Rs. 5, 41,45,000/-	
CER Cost @ 2% of Project Cost	Rs. 10,82,900/-	
Proposed Water Requirement	4.300 KLD	

Table 7.5 Salient Features of Proposed Project Site (P3)

Name of the Quarry	Thiru. D. Arunkumar Rough stone quarry	
Toposheet No	57- P/14	
Latitude between	12° 42'55"07 N to 12°43'07"84N	
Longitude between	79°50'56"27 E to 79°51'08"58 E	
Highest Elevation	98m AMSL	
Proposed Depth of Mining five years period	57m BGL	
Geological Resources	Rough Stone in m ³	Top Soil in m ³
	2770376	49471
Minable Reserves	749746	16724
Five-year Production	749746	16724
Existing Pit Dimension	PIT-I 99m (L) x 38m (W) x 40m (D) PIT-II 112m (L) x 37m (W) x 40m (D)	
Ultimate Pit Dimension	421m (L) x 97m (W) x 57m (D)	
Water Level in the surrounding area	65-68m BGL	

Method of Mining	Opencast Semi Mechanized Mining involving drilling and blasting	
Topography	The applied lease area is exhibits plain with altitude of 98m maximum from the MSL. The area is sloping towards North eastern side covered Top soil with Rough Stone which does not sustain any type of vegetation.	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Excavator	1
	Tippers	5
Blasting Method	Controlled blasting method by shot hole drilling and small dia. of 25mm slurry explosives are proposed to be used for shattering and heaping effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Project Cost	Rs. 69,58.0000/-	
CER Cost @ 2% of Project Cost	Rs. 13,91,600/-	
Proposed Water Requirement	4.0 KLD	

The cumulative impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the quarries (proposed and existing) within the cluster and major impact anticipated is on Air & Noise Environment and Ground vibrations due to blasting.

7.4.1 Air Environment

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.6 & 7.7

Table 7.6 Cumulative Production Load of Rough Stone

Quarry	Production for five years	Annual Production in m ³	Daily Production in m ³	Number of Lorry Load Per Day
P1	98276	19,655	66	11
P2	237284	47,457	158	26
P3	749746	149,949	500	83
Total	1085306	217,061	724	120

Table 7.7 Cumulative Production Load of Gravel / Topsoil

Quarry	Yearly Production(m ³)	Daily Production in m ³	Number of Lorry Load Per Day
P1	27084	90	15
P2	34176	114	19
P3	16724	56	9
Total	77984	260	43

The cumulative study shows that the overall production of rough stone from the three quarries is 724 m³ per day with a capacity of 120 trips of rough stone per day and that production of gravel and topsoil from the three 3 proposed quarry is 260m³ per day accounting for 43 trips/day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the 3 proposed projects on air environment of the cluster have been provided in Table 7.8. The cumulative values resulting from the 3 projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.8 Cumulative Impact Results from the 3 proposed projects

Pollutants	Baseline Data(µg/m ³)	Incremental Values (µg/m ³)			Cumulative Value (µg/m ³)
		P1	P2	P3	
PM _{2.5}	33.05	6.16	6.64	11.28	57.13
PM ₁₀	53.02	10.41	9.22	20.6	93.25
SO ₂	12.13	4.94	5.31	10.12	32.50
NO ₂	24.64	2.64	3.6	9.65	40.53

7.4.2 Noise Environment

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

Table 7.9 Predicted Noise Incremental Values from Cluster

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	720m	S	45.54	40.01	46.61	55
Habitation Near P2	830m	S	45.54	38.78	46.37	
Habitation Near P3	520m	S	45.54	42.84	47.41	
Cumulative Noise (dB(A))					51.60	

Source: Lab Monitoring Data

The cumulative analysis of noise due to 3 proposed projects shows that habitation near P1, P2, P3 will receive about 53.0dB (A), as shown in Table 7.9. The cumulative results for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.

7.4.3 Ground Vibrations

Cumulative results of ground vibrations due to mining activities in the all the 6 mines have been shown in Table 7.10.

Table 7.10 Ground Vibrations at 6 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	21	720m	0.36
P2	52	830m	0.58
P3	166	520m	3.08
E1	69	930m	0.60
E2	21	770m	0.31
E3	28	880m	0.32
Total			5.25

Source: Blasting Calculations

From the above table, the charge per blast is considered as maximum in each mine and the resultant cumulative PPV is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

7.4.4 Socio Economic Environment

Socio Economic benefits of the 3 proposed projects were calculated and the results have been shown in Table 7.11 the three projects together will contribute Rs. 25,96,420/-towards CER fund.

Table 7.11 Socio Economic Benefits From 3 Mines

Location ID	Project Cost	CER @ 2%
P1	Rs. 60,96,000/-	Rs. 1,21,920/-
P2	Rs. 5, 41,45,000/-	Rs. 10,82,900/-
P3	Rs. 6,95,80000/-	Rs. 13,91,600/-
Total	Rs 12,37,25,000/-	Rs 25,96,420/-

Table 7.12 Employment Benefits From 3 Mines

Description of quarries	Employment
P1	26
P2	29
P3	30
Total	85

A total of 85 people will get employment due to three proposed mine in cluster

Table 7.13 Greenbelt Development Benefits From 3 Mines

CODE	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	810	80	7290	Neem, Casuarina, etc	648
P2	300	80	4000		240
P3	500	80	4500		400
Total	1610		15790		1288

Based on the proposed mining plans it's anticipated that 810 native tree species like Neem, Casuarina, etc will be planted in the project premises over a period of 5 Years with Survival Rate of 80%. The expected growth is around 648 Trees over an area of 7290 Sq.m. in Proposed Quarry.

7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

All the Project Proponent shall comply with Tamil Nadu Government Order (Ms) No. 84 Environment and Forest (EC.2) Department Dated: 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.

7.5.1 Objective

- ❖ To investigate the actual supply chain network of plastic waste.
- ❖ To identify and propose a sustainable plastic waste management by installing bins for collection of recyclables with all the plastic waste
- ❖ Preparation of a system design layout, and necessary modalities for implementation and monitoring.

Table 7.14 Action Plan to Manage Plastic Waste

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

Source: Proposed by FAE's and EC

7.6 POST COVID HEALTH MANAGEMENT PLAN FOR PROPOSED PROJECT

COVID – 19 diseases caused by SARS-CoV-2 Coronavirus is relatively a new disease, with fresh information being known on a dynamic basis about the natural history of the disease, especially in terms of post-recovery events.

After acute COVID-19 illness, recovered patients may continue to report wide variety of signs and symptoms including fatigue, body ache, cough, sore throat, difficulty in breathing, etc. As of now there is limited evidence of post-COVID sequelae and further research is required and is being actively pursued. A holistic approach is required for follow up care and well-being of all post COVID recovering patients.

7.6.1 Post-COVID Follow Up Protocol

- ❖ Continue COVID appropriate behaviour (use of mask, hand & respiratory hygiene, physical distancing).
- ❖ Drink adequate amount of warm water (if not contra-indicated).
- ❖ Make sure your workplaces are clean and hygienic
- ❖ Surfaces (e.g., desks and tables) and objects (e.g., telephones, helmet) need to be wiped with disinfectant regularly
- ❖ Put sanitizing hand rub dispensers in prominent places around the workplace. Make sure these dispensers are regularly refilled
- ❖ Display posters promoting hand-washing
- ❖ Make sure that staff, contractors and customers have access to places where they can wash their hands with soap and water
- ❖ Display posters promoting respiratory hygiene.
- ❖ Brief your employees, contractors and customers that if COVID-19 starts spreading in your community anyone with even a mild cough or low-grade fever (37.3°C or more) need to stay at home. They should also stay home (or work from home) if they have had to take simple medications, such as paracetamol/acetaminophen, ibuprofen or aspirin, which may mask symptoms of infection
- ❖ Keep communicating and promoting the message that people need to stay at home even if they have just mild symptoms of COVID-19.
- ❖ Consider whether a face-to-face meeting or event is needed. Could it be replaced by a teleconference or online event?
- ❖ Could the meeting or event be scaled down so that fewer people attend?

- ❖ Pre-order sufficient supplies and materials, including tissues and hand sanitizer for all employees. Have surgical masks available to offer anyone who develops respiratory symptoms.
- ❖ It is also suggested by the Ministry of AYUSH that the use of Chyawanprash in the morning (1 teaspoonful) with Luke warm water/milk is highly recommended (under the direction of Registered Ayurveda physician) as in the clinical practice Chyawanprash is believed to be effective in post-recovery period.
- ❖ If there is persistent dry cough / sore throat, do saline gargles and take steam inhalation. The addition of herbs/spices for gargling/steam inhalation. Cough medications, should be taken on advice of medical doctor or qualified practitioner of Ayush.
- ❖ Look for early warning signs like high grade fever, breathlessness, Sp O₂ < 95%, unexplained chest pain, new onset of confusion, focal weakness.
- ❖ Avoid smoking and consumption of alcohol.
- ❖ Communicate to your employees and contractors about the plan and make sure they are aware of what they need to do – or not do – under the plan. Emphasize key points such as the importance of staying away from work even if they have only mild symptoms or have had to take simple medications (e.g., paracetamol, ibuprofen) which may mask the symptoms.

The plan should address how to keep your business running even if a significant number of employees, contractors and suppliers cannot come to your place of business - either due to local restrictions on travel or due to illness.

CHAPTER VIII

PROJECT BENEFITS

8.0 GENERAL

The proposed project at Sirudamur Village aims to produce **98276 m³** of roughstone and **27084 m³** of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

- ❖ Increase in Employment Potential
- ❖ Improvement in Socio-Economic Welfare
- ❖ Improvement in Physical Infrastructure
- ❖ Improvement in Social infrastructure

8.1 EMPLOYMENT POTENTIAL

It is proposed to provide employment to about 26 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to 15 persons in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

The impact of mining activity in the area will be more positive on the socio-economic environment in the immediate project impact area. The employment opportunities both direct and indirect will contribute to enhanced money incomes to job seekers with minimal skill sets especially among the local communities.

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

The proposed quarry is located in Sirudamur Village, Uthiramerur Taluk and Kancheepuram District of Tamil Nadu and the area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to proposed mine.

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labour will be more. A major part of the

labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

8.5 OTHER TANGIBLE BENEFITS

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

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

8.6 CORPORATE SOCIAL RESPONSIBILITY

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

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 10 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas –

- ❖ Health Services
- ❖ Social Development
- ❖ Infrastructure Development
- ❖ Education & Sports
- ❖ Self-Employment
- ❖ CSR Cost Estimation
- ❖ CSR activities will be taken up in the Sirudamur Village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is \leq 100 crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

Table 8.1 CER Action Plan

S. No.	Activity	Budget (Rs.in Lakh)
1	The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby school library, etc.	Rs.5,00,000
Total		Rs.5, 00,000

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

CHAPTER IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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

CHAPTER X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 GENERAL

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

10.1 ENVIRONMENTAL POLICY

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

- ❖ Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities.
- ❖ Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- ❖ Allocate necessary resources to ensure the implementation of the environmental policy.
- ❖ Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- ❖ Implement monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- ❖ Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

10.1.1 Description of the Administration and Technical Setup

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

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

10.2 LAND ENVIRONMENT MANAGEMENT

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (unutilized areas, infrastructure, haul roads) will be utilized for greenbelt development. Aesthetic of the environment will not be affected. There is no major vegetation in the project area. During the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development program. A detailed land environment management plan has been provided in Table 10.1.

Table 10.1 Proposed Controls for Land Environment

Control	Responsibility
Design vehicle wash-down areas so that all runoff water is captured and passed through oil water separators and sediment catchment devices.	Mines Manager
Refueling to be undertaken in a safe location away from vehicle movement pathways & 100 m away of any watercourse. Refueling activity to be under visual observation at all times. Drainage of refueling areas to sumps with oil/water separation.	Mine Foreman & Mining Mate
Soil and groundwater testing as required following up a particular incident of contamination.	Mines Manager
At conceptual stage, the mining pits will be converted into Rain Water	Mines Manager

Harvesting. Remaining area will be converted into greenbelt area.	
No external dumping i.e., outside the project area.	Mine Foreman
Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.	Mines Manager
The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.3 SOIL MANAGEMENT

As there is no top soil excavated in this project, there are no measures proposed to preserve the topsoil.

10.4 WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash and domestic sewage from mines office is anticipated. The quarrying operation is proposed up to a depth of 20 m. The water table in the area is at 50 m below ground level. Hence, the proposed project will not intersect the ground water table during entire quarry period. A detailed water environment management plan has been provided in Table 10.2.

Table 10.2 Proposed Controls for Water Environment

Control	Responsibility
To maximize the reuse of pit water for water supply	Mines Foreman
Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas	Mines Manager
Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations	Mines Manager
Ensure there is no process effluent generation or discharge from the project area into water bodies	Mines Foreman
Domestic sewage generated from the project area will be disposed in septic tank and soak pit system	Mines Foreman
Monthly or after rainfall, inspection for performance of water management structures and systems	Mines Manager
Conduct ground water and surface water monitoring for parameters specified by CPCB	Manager Mines

Source: Proposed by FAEs & EIA Coordinator

10.5 AIR QUALITY MANAGEMENT

The proposed quarrying activity would result in the increase of particulate matter concentrations in the ambient air. Daily water sprinkling on the haul roads, approach roads in the vicinity will be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements. A detailed ambient air environment management plan has been provided in Table 10.3.

Table 10.3 Proposed Controls for Air Environment

Control	Responsibility
Generation of dust during excavation is minimized by daily (twice) water sprinkling on working face and daily (twice) water sprinkling on haul road	Mines Manager
Wet drilling procedure /drills with dust extractor system to control dust generation during drilling at source itself is implemented	Mines Manager
Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution	Mines Manager
Ambient Air Quality Monitoring carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted air pollution control measures	Mines Manager
Provision of dust mask to all workers	Mines Manager
Greenbelt development all along the periphery of the project area	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.6 NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time. A detailed noise environment management plan has been provided in Table 10.4.

Table 10.4 Proposed Controls for Noise Environment

Control	Responsibility
Development of thick greenbelt all along the Buffer Zone (7.5 meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager

Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring is carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAEs & EIA Coordinator

10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone quarry operation creates vibration due to the blasting and movement of Heavy Earth moving machineries, fly rocks due to the blasting. A detailed ground vibration management plan has been provided in Table 10.5.

Table 10.5 Proposed Controls for Ground Vibrations & Fly Rock

Control	Responsibility
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager

Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAEs & EIA Coordinator

10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

The proponent will take all necessary steps to avoid the impact on the ecology of the area by adopting suitable management measures in the planning and implementation stage. During mining, thick plantation will be carried out around the project periphery, on safety barrier zone, on top benches of quarried out area etc. Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- ❖ Greenbelt development all along the safety barrier of the project area.
- ❖ It is also proposed to implement the greenbelt development program and post plantation status will be regularly checked for every season.
- ❖ The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- ❖ Year wise greenbelt development will be recorded and monitored based on:
 - ❖ the area of plantation
 - ❖ Period of plantation
 - ❖ Type of plantation
 - ❖ Spacing between the plants
 - ❖ Type of manuring and fertilizers and its periods
 - ❖ Lopping period, interval of watering
 - ❖ Survival rate
 - ❖ Density of plantation
- ❖ The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1 Green Belt Development Plan

About 810 saplings are proposed to be planted in and around the lease area. Of the 810 saplings, about 80% of the saplings is expected to survive in the environment. The main objectives of the greenbelt development plan are to:

- ❖ Combat the dispersal of dust in the adjoining areas.
- ❖ Protect the erosion of the soil and conserve moisture of the soil.
- ❖ Increase the rate of recharge of ground water.
- ❖ Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

The proposed green belt development plan has been given in Table 10.6.

Table 10.6 Proposed Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered(m²)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	324	259	2916
	Number of plants outside the mine lease area		
	486	389	4374
Total	810	648	7290

Source: Proposed by FAEs & EIA Coordinator

A well-planned green belt of trees with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

10.9 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The main factors of occupational health impact in quarries are fugitive dust and noise. Safety of employees during quarrying operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

10.9.1 Medical Surveillance and Examinations

- ❖ Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.
- ❖ Evaluating the effect of noise on workers.
- ❖ Enabling corrective actions to be taken when necessary.

- ❖ Providing health education.

The health status of workers in the mine shall be regularly monitored under an occupational surveillance program. Under this program, all the employees are subjected to a detail medical examination at the time of employment. The medical examination covers the following tests under mines act 1952.

- ❖ General Physical Examination and Blood Pressure.
- ❖ X-ray Chest and ECG.
- ❖ Sputum Test, Sperm Count Test.
- ❖ Detailed Routine Blood and Urine Examination.

The medical histories of all employees will be maintained in a standard format annually. Thereafter, the employees will be subject to medical examination annually. The below tests (Table 10.7) keep upgrading the database of medical history of the employees.

Table 10.7 Medical Examination Schedule

S. No.	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check – up					
B	Audiometric Test					
C	Eye Check – up					
D	Respiratory Test					
3	Medical Camp (Mine Workers&Nearby Villagers)					
4	Training (Mine Workers)					
Medical Follow ups: Work force will be divided into three targeted groups age wise as follows:						
Age Group		PME as per Mines Rules 1955		Special Examination		
Less than 25 years		Once in a Three Years		In case of emergencies		
Between 25 to 40 Years		Once in a Three Years		In case of emergencies		
Above 40 Years		Once in a Three Years		In case of emergencies		
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.						

10.9.2 Proposed Occupational Health and Safety Measures

- ❖ The mine site will have adequate drinking water supply so that workers do not get dehydrated.
- ❖ Lightweight and loose-fitting clothes having light color will be preferred to wear.
- ❖ Noise exposure measurements will be taken to determine the need for noise control strategies.
- ❖ The personal protective equipment will be provided for mine workers.
- ❖ Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment.
- ❖ At noisy working activity, exposure time will be minimized.
- ❖ Dust generating sources will be identified and proper control measure will be adopted.
- ❖ Periodic medical examinations will be provided for all workers.
- ❖ Strict observance of the provisions of DGMS Acts, Rules and Regulations in respect of safety both by management and the workers.
- ❖ The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- ❖ In respect of contract work, safety code for contractors and workers will be implemented. They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centers. All personal protective equipment's will be provided to them.
- ❖ A safety committee meeting every month will be organized to discuss the safety of the mines and the persons employed.
- ❖ Celebration of annual mines safety week and environmental week in order to develop safety awareness and harmony amongst employees and co quarry owners.

10.9.3 Health and Safety Training Program

The Proponents will provide special induction program along with machinery manufacturers for the operators and co-operators to run and maintain the machinery effectively and efficiently. The training program for the supervisors and office staffs will be arranged in the Group Vocational Training Centers in the State and engage Environmental Consultants to provide periodical training to all the employees to carry out the mining operation in and eco-friendly manner, as shown in Table 10.8.



Figure 10.1 Personal Protective Equipment to the Mine Workers

Table 10.8 List of Periodical Trainings Proposed for Employees

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	<ul style="list-style-type: none"> ✓ Employee rights, ✓ Supervisor responsibilities ✓ Self-rescue ✓ Respiratory devices ✓ Transportation controls ✓ Communication systems ✓ Escape and emergency evacuation ✓ Ground control hazards ✓ Occupational health hazards ✓ Electrical hazards and First aid Explosives

Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul Road maintenance.	Employees assigned to new work tasks	Before new Assignments	Variable	<ul style="list-style-type: none"> ✓ Task-specific health & safety procedures and SOP for various mining activity ✓ Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	<ul style="list-style-type: none"> ✓ Required health and safety standards ✓ Transportation controls ✓ Communication systems ✓ Escape ways, emergency evacuations ✓ Fire warning ✓ Ground control hazards ✓ First aid on electrical hazards ✓ Accident prevention ✓ Explosives ✓ Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	<ul style="list-style-type: none"> ✓ Hazard recognition and avoidance ✓ Emergency evacuation procedures ✓ Health standards ✓ Safety rules ✓ Respiratory devices

Source: Proposed by FAEs & EIA Coordinator as per DGMS Norms

10.9.4 Budgetary Provision for Environmental Management

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

Table 10.9 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost (Rs.)	Recurring Cost/annum(Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	16200	16200
	Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers	Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring	800000	50000
	Air quality will be regularly monitored as per norms within ML area & ambient area	Yearly compliance as per CPCB norms	0	50000
	Muffle blasting – To control fly rocks during blasting	Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts	0	5000
	Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit	Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance	50000	55000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000

	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000
	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed	20000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	5000
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labors @ Rs.10,000/ labor (Contractual)	0	20000
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0

	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for Portable blaster shed	Installation of portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	0
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	16200	8100
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal).	25000	20000
		Installation of dust bins	5000	2000

	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Implementation of EC, Mining Plan & DGMS Condition Occupational Health and Safety	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000
	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	104000	26000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	26000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	6480
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	Barbed Wire Fencing to quarry area will be provisioned.	Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum	623000	31150
	No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost	81000	16200

	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits / trenches, soil amendmets, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	64800	9720
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	145800	14580
Mine Closure Activity	Closure includes Greenbelt development, wire fencing, drains	Provision made in Closure Cost	0	0
Total EMP Budget			1802000	1121480

Table 10.10 Estimation of Overall EMP Budget After Adjusting 5% Annual Inflation

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year	Total
2923480	1177554	1236432	1298253	1363166	7998885

In order to implement the environmental protection measures, an amount of **Rs. 29,23,480** /- as capital cost and recurring cost as **Rs. 11,77,554** /- as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 79,98,885**, /- as shown in Table 10.10.

10.10 CONCLUSION

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

CHAPTER XI

SUMMARY AND CONCLUSION

11.0 INTRODUCTION

This EIA report is prepared by considering cumulative load of all proposed & existing quarries of Siruthamur rough stone and gravel cluster quarries consisting of 4 proposed and 3 existing quarries with total extent of cluster of 18.19.80 ha in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) dated 1st July 2016.

This EIA report is prepared in compliance with ToR obtained – **ToR Letter No. SEIAA-TN/F.No.8997/ToR-1256/2022 dated 20.09.2022** and the baseline monitoring study has been carried out during the period of to March - May 2022.

11.1 PROJECT DESCRIPTION

Table 11.1 Salient Features- Proposed quarry

Name of the Quarry	Thiru. N. Kanniyappan Rough Stone & Gravel Quarry	
Toposheet No	57- P/14	
Latitude	12°43'04.71"N to 12°43'09.69"N	
Longitude	79°51'00.49"E to 79°51'07.15"E	
Highest Elevation	53m AMSL	
Proposed Depth of Mining five years period	20m BGL (3m Gravel +17mRoughstone)	
Geological Resources	Rough Stone in m³	Gravel m³
	517376	48504
Minable Reserves	141596	27084
Five-year Production	98276	27084
Existing Pit Dimension	-	
Ultimate Pit Dimension	122m (L) x 74m (W) x 20m (D)	
Water Level in the surrounding area	50 m BGL	
Method of Mining	Opencast Semi Mechanized Mining involving drilling and blasting	
Topography	The applied lease area is exhibits plain with altitude of 53m maximum and minimum of 52m from the MSL. The area is sloping towards Southwestern side covered	

	clayey soil with Rough Stone which does not sustain any type of vegetation.	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Excavator	1
	Tippers	4
Blasting Method	Controlled blasting method by shot hole drilling and small dia. of 25mm slurry explosives are proposed to be used for shattering and heaping effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Project Cost	Rs. 60,96,000/-	
CER Cost @ 2% of Project Cost	Rs. 1,21,920/-	
Proposed Water Requirement	3.8 KLD	
Nearest Habitation	0.720 km South	

Table 11.2 Land use data at present, during scheme of mining, and at the end of mine life

Description	Present Area (ha)	Area at the end of life of quarry (ha)
Area under quarry	Nil	0.69.80
Infrastructure	Nil	0.01.00
Roads	Nil	0.01.00
Green Belt	Nil	0.48.23
Unutilized area	1.62.00	0.41.97
Total	1.62.00	1.62.00

Source: Approved mining plan

Table 11.3 Estimated Resources and Reserves of the Project

Resource Type	Rough Stone in m ³	Gravel in m ³
Geological Resource in m ³	517376	48504
Mineable Reserves in m ³	141596	27084
Production for five-year plan period	98276	27084

Source: Approved mining plan

Table 11.4 Ultimate Pit Dimension

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	122	74	20 m bgl

Source: Approved mining plan

Table 11.5 Water Requirement of the Proposed Project

Purpose	Quantity	Source
Dust Suppression	1.0 KLD	Existing bore wells nearby the lease area
Green Belt development	1.5 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.3 KLD	Existing bore wells and approved water vendors
Total	3.8 KLD	

Source: Prefeasibility report

11.2 DESCRIPTION OF THE ENVIRONMENT

The baseline monitoring study was carried out during **March, April and May 2022** to assess the existing environmental scenario in the area. For the purpose of EIA studies, project area was considered as the core zone and area outside the project area up to 10km radius from the periphery of the project site was considered as buffer zone.

Baseline Environmental data has been collected with reference to proposed mine for:

- a) Land
- b) Water
- c) Air
- d) Noise
- e) Biological
- f) Socio-economic status

11.2.1 Land Environment

The existing land use pattern of the study area based on the latest satellite imagery is given below:

Table 11.6 LULC Statistics of the Study Area

S. No.	Classification	Area (Hectare)	Area (%)
1	Barren Land	446	2
2	Crop Land	13858	47
3	Dense Forest	1482	5
4	Fallow Land	2919	10
5	Scrub Land	3293	11
6	Mining lands	167	1
7	Plantations	3712	12
8	Settlements	352	1
9	Water bodies	3521	12
Total Area		29751	100

Source: LISS III Satellite Imagery

The land use/land cover map (Fig.3.1) shows that majority of the land in the study area is cropland land covering 47% of the total land area, followed by plantations (12%), water bodies (12%), land with scrub (11%), fallow land (10%), dense forest (5%), mining area and settlement (1% each). The total mining area within the study area is 167 ha. The

cluster area of 18.19.80 ha contributes about 0.06 % of the total land use land cover within the study area. This small percentage of mining activities shall not have any significant impact on the environment.

11.3 SOIL CHARACTERISTICS

11.3.1 Physical Characteristics

- ❖ The soil texture found in the study area is sandy loam.
- ❖ PH of the soil varies from 6.09 to 7.26 indicating slightly alkaline nature.
- ❖ Electrical conductivity of the soil varies from 58.97 to 120.4 $\mu\text{s}/\text{cm}$ and
- ❖ The water content varies from 5.13 to 10.24 %.

11.3.2 Chemical Characteristics

- ❖ Nitrogen ranges between 75.1 and 150 mg/kg.
- ❖ Phosphorus ranges between 0.89 and 1.90 mg/kg.
- ❖ Potassium ranges between 308 and 910 mg/kg.
- ❖ Sodium ranges between 420 and 654 mg/kg.
- ❖ Dry matter content ranges between 89.76 and 94.71.

11.4 WATER ENVIRONMENT

11.4.1 Surface Water

- ❖ The pH of surface water sample is 6.9 and 7.1
- ❖ Turbidity is 5 NTU.
- ❖ TDS is 72-142 mg/l, whereas TH is 41-48 mg/l.
- ❖ Calcium is 21.6-54.72 mg/l and magnesium 18-27 mg/l.
- ❖ Chloride is 42-52 mg/l and sulphate 28-37 mg/l.

11.4.2 Ground Water

- ❖ The pH of the water samples ranges from 7.35 to 7.59.
- ❖ TDS are found in the range of 289 - 9122 mg/l.
- ❖ The total hardness varies between 290 -561 mg/l.
- ❖ Calcium varies from 32 to 92mg/l and magnesium from 17 mg/l to 21.
- ❖ Chloride varies from 138 to 275 mg/l; sulphate from 32-84 mg/l; and fluoride from 0.41 to 0.72 mg/l.
- ❖ When speaking about microbiological parameters, the water samples from all the locations meet the requirement.

When compared to IS 10500:2012 all the parameters thus analyzed fall within the prescribed limits.

11.5 AIR ENVIRONMENT

11.5.1 Site Specific Meteorology

Site specific meteorology during the study period was recorded by an automated weather station.

Table 11.7 Onsite Meteorological Data

S. No.	Parameters		Mar-2022	Apr-2022	May-2022
1	Temperature (°C)	Min	25.75	25.88	25.53
		Max	36.49	36.46	34.31
		Avg	29.72	30.14	28.98
2	Relative Humidity (%)	Min	41.50	42.69	50.31
		Max	94.88	97.25	94.81
		Avg	73.88	74.61	77.58
3	Wind Speed (m/s)	Min	0.08	0.03	0.06
		Max	6.08	8.10	6.29
		Avg	3.43	4.01	3.61
4	Wind Direction (degree)	Min	0.00	5.66	1.02
		Max	359.78	343.15	356.50
		Avg	150.21	207.16	222.97
5	Surface Pressure(kPa)	Min	99.83	99.40	99.73
		Max	101.05	100.62	100.51
		Avg	100.44	100.05	100.12

Source: On-site monitoring/sampling by Accuracy Analabs Laboratory in association with GTMS

11.5.2 Ambient Air Quality Results

The results of ambient air quality monitoring for the period (**March, April and May 2022**) are presented in the report. Data has been compiled for three months.

As per the monitoring data, PM₁₀ ranges from 41.23 µg/m³ to 47.00µg/m³; PM_{2.5} from 20.81µg/m³ to 27.26 µg/m³; SO₂ from 6.42µg/m³ to 10.20 µg/m³; NO₂ from 17.08 µg/m³ to 24.17µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 10 locations around the proposed project area. Noise levels recorded in core zone during day time was 50.05.6 dB (A) Leq and during night time was 37.11 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 38 to 48.6dB (A) Leq and during night time from 27.6 to 36.5 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.7 Biological Environment

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

11.8 Socio-Economic Environment

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

11.9 Anticipated Environmental Impacts and Mitigation Measures for Proposed Project

The summary of anticipated adverse environmental impacts due to the proposed project and mitigation measures are given below:

Table 11.8 Anticipated Impacts & Mitigation Measures

Impact	Mitigation Measure
Land Environment	
<ul style="list-style-type: none">❖ Destruction of natural landscapes❖ Changes in soil characteristics❖ Soil erosion and slope instability	<ul style="list-style-type: none">❖ Mining will be carried out as per approved mine plan in scientific and systematic way❖ Safety Zone or Buffer area will be maintained and will not be mined and instead plantation will be carried out in the safety zone❖ Barbed wire fencing will be provided all along the proposed mine boundary

	<ul style="list-style-type: none"> ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir ❖ Construction of garland ❖ Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
Water Environment	
<ul style="list-style-type: none"> ❖ Decrease in aquifer recharge and increase in surface runoff; ❖ Disturbance to land drainage, overload and erosion of watercourses; ❖ Changes to the surface over which water flows; ❖ Changes to surface and groundwater resources quantity and quality due to stream blockage and contamination by particulate matter or waste; ❖ Contamination of aquifers due to removal of the natural filter medium. 	<ul style="list-style-type: none"> ❖ Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area ❖ De-silting will be carried out before and immediately after the monsoon season and the settling tank and drains will be cleaned weekly, especially during monsoons ❖ Domestic sewage from site office & urinals/latrines provided in project area will be discharged through septic tank followed by soak pit system. ❖ Tippers & HEMM will be washed in a designated area and the washed water will be routed through drains to a settling tank, which has an oil & grease trap, only clear water will be reused for greenbelt development.
Air Environment	
<ul style="list-style-type: none"> ❖ Generation of Fugitive Dust 	<ul style="list-style-type: none"> ❖ Haul roads will be well maintained by sprinkling water twice a day

<ul style="list-style-type: none"> ❖ Dust will be generated mainly during excavation, loading & unloading activities. ❖ Gaseous pollutants will be generated mostly by the traffic. ❖ Reduction in visibility due to dust plumes. ❖ Coating of surfaces leading to annoyance and loss of amenity. ❖ Physical and/or chemical contamination and corrosion. ❖ Increase in the concentration of suspended particles in runoff water. ❖ Coating of vegetation leading to reduced photosynthesis, ❖ Inhibited growth, destroying of foliage, degradation of crops; ❖ Increase in health hazards due to inhalation of dust. 	<ul style="list-style-type: none"> ❖ The access road will be cleaned and brushed to ensure that mud and dust deposits do not accumulate. ❖ To ensure that dust and debris is minimized on the access road, all the tipper drivers will be instructed to use water spray system on all the tyres and spray water on the loaded material that is provided at the compound area before leaving the site ❖ Speed restrictions will be imposed to avoid spillage of loaded materials upon the road and to reduce wear and tear of the road. ❖ Weekly inspections of the condition of the access road by competent person employed, and immediate action will be taken to address any potholes or damage to the road surface. ❖ Dust wetting agents can be mixed with the water applied to haul roads during hot, dry weather conditions to increase the duration that the road surface remains damp. ❖ Personal Protective Equipment's will be provided to all workers ❖ All drilling rods used will have dust suppression systems fitted which injects water into the hole. ❖ Wet gunny bags will be used as a cover while drilling. ❖ The blast zone will be kept damp by the application of water from the rain gun fitted to the water tanker prior to each blast to control any fugitive dust emissions that could arise from the surface during detonation. ❖ A daily visual inspection shall be conducted by the site manager who will keep a daily log of all process operations and site activities and note any
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	<p>malfunctions which could lead to abnormal emissions from the quarry operations.</p> <ul style="list-style-type: none"> ❖ A site speed limit of 20 km/h will be set to minimize the potential for dust generation ❖ Weekly maintenance program me to identify machinery due for maintenance, based on the number of hours it has been in operation. ❖ Air filters are renewed after every 1000 hours of use, unless otherwise indicated by an on-board computer system. ❖ All site machineries & tippers will be serviced and maintained 6 months once and drivers will report any defects immediately to the site manager to enable repairs to be carried out promptly.
Noise & Vibration	
<ul style="list-style-type: none"> ❖ Annoyance and deterioration of the quality of life; ❖ Propelling of rocks fragments by blasting. ❖ Shaking of buildings and people due to blasting; 	<ul style="list-style-type: none"> ❖ Usage of sharp drill bits while drilling which will help in reducing noise; ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders; ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained; ❖ The blasting will be carried out during favorable atmospheric condition and less human activity timings by using nonelectrical initiation system; ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise; ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;

	<ul style="list-style-type: none"> ❖ Silencers / mufflers will be installed in all machineries; ❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise; ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
Biological Environment	
<ul style="list-style-type: none"> ❖ Direct impacts include land clearance and excavation causing destruction of flora and fauna and loss of habitats; ❖ Indirect impacts include habitat degradation due to noise, dust, and human activity. 	<ul style="list-style-type: none"> ❖ Only some common herbs, shrubs and grass will be cleared. So, there will be no impact on the biodiversity. ❖ Green belt development with suitable species will enhance the biodiversity of the project area. ❖ The core zone or buffer zone does not encompass any threatened flora or fauna species.
Socio-Economic Environment	
<ul style="list-style-type: none"> ❖ Health and safety of workers and the general public; ❖ Increase in traffic volumes and sizes of road vehicles; ❖ Economic issues, including the increase in employment opportunities; 	<ul style="list-style-type: none"> ❖ The mining activity puts negligible change in the socio-economic profile. ❖ Around 28 local workers will get employment opportunities along with periodical training to generate local skills. ❖ New patterns of indirect employment/ income will generate. ❖ Regular health check-up camp. ❖ Assistance to schools and scholarship to children will be provided.

Occupational Health & Safety	
<ul style="list-style-type: none"> ❖ Exposure to Dust ❖ Noise and Vibration Exposure ❖ Physical Hazards ❖ Respiratory hazards due to Dust exposure 	<ul style="list-style-type: none"> ❖ Provision of rest shelters for mine workers with amenities like drinking water etc. ❖ All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc. ❖ Training of employees for use of safety appliances and first aid in vocational training center. ❖ Weekly maintenance and testing of all equipment as per manufacturers' guidelines. ❖ Pre placement and Yearly Medical Examination of all workers by a medical Officer ❖ First Aid facility will be provided at the mine site. ❖ Close surveillance of the factors in working environment and work practices which may affect environment and worker's health by the mines manager employed. ❖ Working of mine as per approved mining plan and environmental plans

11.10 ANALYSIS OF ALTERNATIVES

There are no alternatives suggested as the proposed mining area has the following advantages

- ❖ The mineral deposit occurs in a non-forest area.
- ❖ There is no habitation within the applied lease area; hence no R & R issues exist.
- ❖ There is no river, stream, nallas and water bodies in the or passing through the applied mine lease area.
- ❖ Availability of skilled, semi-skilled and unskilled workers in this region.
- ❖ All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are accessible.
- ❖ Mine connectivity through road and rail is good.
- ❖ The proposed mining operations do not intersect the ground water level. Hence, no impact on ground water environment.

11.11 ENVIRONMENTAL MONITORING PROGRAM

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.

Table 11.9 Post Project Monitoring Program for Proposed Project

S.NO.	ACTIVITY	SCHEDULE
Air Pollution Monitoring		
1	Ambient Air Monitoring of parameters specified by TNPCB/SEIAA in their CTO/EC Order within the Applied Area	Once in every Six Months
2	Ambient Air Monitoring of parameters specified by TNPCB/SEIAA in their CTO/EC Order outside the Applied Area	Once in every Six Months
Water Quality Monitoring		
3	Monitoring water quality of rain water collected in mine pit area. Rain water will be used for plantation purpose.	Once in every Six Months
4	Monitoring of samples of tube well and open well or Surface Water bodies in nearby location. Parameters as per IS: 10500:1991	Once in every Six Months
5	Monitoring of water spray units	Log-sheet of water spray will be maintained on daily basis
Noise Quality Monitoring		
6	Noise in the ambient atmosphere within and outside the applied area	Once in every Six Months
Greenbelt Maintenance		
7	Monitor schedule for Greenbelt development as per approved mining plan	Once in every Six Months
Soil Quality Monitoring		
8	Grab Samples within and around the applied area	Once in every Six Months

11.12 ADDITIONAL STUDIES

11.12.1 Public Consultation for Proposed Project

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

11.12.2 Risk Analysis & Disaster Management Plan for Proposed Project

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31stDecember, and 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

In the unlikely event that a consequence has occurred, disaster management kicks in. This includes instituting procedures pertaining to a number of issues such as communication, rescue, and rehabilitation. These are addressed in the disaster management plan. Both, the RA and DMP, are living documents and need to be updated whenever there are changes in operations, equipment, or procedures Assessment is all about preventing accidents and taking necessary steps to prevent it from happening.

The Disaster Management Plan (DMP) is a guide, giving general considerations, directions, and procedures for handling emergencies likely to arise from planned operations. The DMP has been prepared on the basis of the Risk Assessment and related findings covered in the report.

11.13 PROJECT BENEFITS FOR PROPOSED PROJECT

Various benefits are envisaged due to the proposed mine and a comprehensive description of various advantages and benefits anticipated from the proposed project to the locality, neighborhood, region and nation as a whole are:

- ❖ Improved road communication
- ❖ Rain water harvesting structures to augment the water availability for irrigation and plantation and ground water recharge

- ❖ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ❖ Strengthening of existing community facilities through the Community Development Program
- ❖ Skill development & capacity building like vocational training
- ❖ Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.

In order to implement the environmental protection measures, an amount of **Rs. 29,23,480** /-as capital cost and recurring cost as **Rs. 11,77,554** /- as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs. 79,98,885** /-.

11.14 CONCLUSION

EIA study was performed as per the approved ToR and Standard ToR. Various environmental attributes were studied relating with aspects of mining activities. The related impacts were identified and evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and accordingly fund was allocated. The EMP has been dynamic, flexible and subject to periodic review. CER activities were identified and for its time bound implementation, fund has been allocated.

The project will increase the revenue of the State Govt. as well as it will help in the social upliftment of the local community. The green belt development program will help in increasing the green cover in the area. Thus, the proposed project is not likely to affect the environment or adjacent ecosystem adversely.

The mine management will be responsible for the project review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.

CHAPTER XII

DISCLOSURES OF CONSULTANT

The Project Proponent – **Thiru. N. KANNIYAPPAN** have engaged **Geo Technical Mining Solutions**, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO TECHNICAL MINING SOLUTIONS

No: 1/213B Natesan Complex,
Oddapatti, Dharmapuri – 636705,
Tamil Nadu, India.

Email: info.gtmsdpi@gmail.com

Web: www.gtmsind.com

Phone: 04342 232777.

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

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

Team Members					
16.	Dr.S. Malar	In-house, FAE	1(a)(i)	TM for EC	B
17.	M.Saravanan	In-house	1(a)(i)	TM for HG & LU	B
18.	R.Revathy	In-house	1(a)(i)	TM for WP, SHW, & RHW	B
19.	M.Jalandar	In-house	1(a)(i)	TM for SE	B
20.	Dr.D.Kalaimurugan	In-house	1(a)(i)	TM for EB	B
Abbreviations					
EC	EIA Coordinator	NV	Noise and Vibration		
FAE	Functional Area Expert	SE	Socio Economics		
FAA	Functional Area Associates	HG	Hydrology, ground water and water conservation		
TM	Team Member	SC	Soil conservation		
GEO	Geology	RH	Risk assessment and hazard management		
WP	Water pollution monitoring, prevention and control	SHW	Solid and hazardous wastes		
AP	Air pollution monitoring, prevention and control	MSW	Municipal Solid Wastes		
LU	Land Use	ISW	Industrial Solid Wastes		
AQ	Meteorology, air quality modeling, and prediction	HW	Hazardous Wastes		
EB	Ecology and bio-diversity	GIS	Geographical Information System		

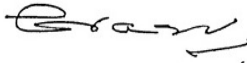
DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

Declaration by experts contributing to the Cluster EIA/EMP for Siruthamur Village Rough Stone and Gravel Quarry project over a Cluster Extent of 18.19.8 hectares in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District of Tamil Nadu. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

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

Name : Mr.G.Vageesan



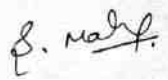


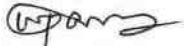



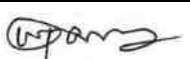

Designation : EIA Coordinator







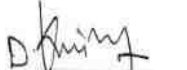
Signature : 


Date : 18.11.2022

Period of Involvement : January 2021 to till date







FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT

S. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity	Mr. J.N. Manikandan	
		○ Prediction of air pollution and propose mitigation measures / control measures	Mr.P.Venkatesh	
2	WP	○ Suggesting water treatment systems, drainage facilities ○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.	Dr.S. Malar	
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	Dr.M. Vijay Prabhu	
			Mr.G. UmaMaheswaran	
			Dr.S. Karuppannan	
4	GEO	○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	Mr.G. Gopala Krishnan	
			Mr.G. UmaMaheswaran	
			Dr.M. Vijay Prabhu	
			Dr.S. Karuppannan	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr.G. Prabhakaran	

6	EB	<ul style="list-style-type: none"> ○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna. ○ Suggesting species for greenbelt development. 	Dr.J. Rajarajeshwari	
7	RH	<ul style="list-style-type: none"> ○ Identification of hazards and hazardous substances ○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety. 	Mr.J.N. Manikandan	
8	LU	<ul style="list-style-type: none"> ○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures. 	Dr.S. Karuppannan	
9	NV	<ul style="list-style-type: none"> ○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP. 	Dr.R. Arun Balaji	
10	AQ	<ul style="list-style-type: none"> ○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ Recommending mitigations measures for EMP 	Dr.R. ArunBalaji	
11	SC	<ul style="list-style-type: none"> ○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr.J. Rajarajeshwari	
			D.Kalaimurugan	

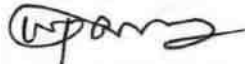
12	SHW	<ul style="list-style-type: none"> ○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	Mr.J.N. Manikandan	
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LIST OF FUNCTIONAL AREAS ASSOCIATE ENGAGED IN THIS PROJECT

S.No.	Name	Functiona l Area	Involvement	Signature
1	Mr.G. Prithviraj	LU, HG	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU and HG 	
2	Mr.C. Kumaresan	NV	<ul style="list-style-type: none"> ○ Assistance in data collection to FAE ○ Assistance in noise prediction modeling 	
3	Mr.P. Vellaiyan	HG & GEO	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Assist FAE with collection of data 	
4	Ms.S.Vasugi	AQ	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Assist FAE with collection of data 	
5	Mrs.P.Dhatchayini	AQ	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Assistance to FAE in collection of both primary and secondary data 	
6	Mrs.V.Malavika	NV, SHW	<ul style="list-style-type: none"> ○ Site visit with FAE ○ Assistance in report preparation 	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT
ORGANIZATION

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the Cluster EIA/EMP for Siruthamur village Rough Stone and Gravel project over a cluster extent of 18.19.8 hectares in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District of Tamil Nadu. It is also certified that information furnished in the EIA report is true and correct to the best of our knowledge.

Signature : 

Date : 18.11.2022

Name : **Dr. S. Karuppannan**

Designation : Managing Partner

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

NABET Certificate No & Issue Date : NABET/EIA/2023/IA0067 & March 30, 2021

Validity : Valid till 29.12.2023



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.8997/SEAC/ToR-1256/2022 Dated:20.09.2022

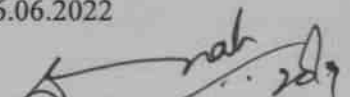
To

Thiru.N.Kanniyappan
S/o.Narayanapillai
No.55, Mariyamman Kovil, Aanampakkam Post
Neerkundram
Uthiramerur Taluk
Kancheepuram District-603107

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough stone & gravel quarry lease over an extent of 1.62.0 Ha in S.F.Nos. 319/1, 319/2, 319/3 & 319/4, Sirudamur Village, Uthiramerur Taluk Kancheepuram District, Tamil Nadu by Thiru N. Kanniyappan - 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/72047/2022 Dt: 07.02.2022.
 2. Your application submitted for Terms of Reference dated: 15.02.2022
 3. Minutes of the 273th Meeting of SEAC held on 14.5.2022
 4. Minutes of the 518th meeting of Authority held on 06.06.2022


MEMBER SECRETARY
SEIAA-TN

5. Proponent request to re- consider TOR dated: 18.07.2022
6. Minutes of the 307th Meeting of SEAC held on 26.08.2022
7. Minutes of the 552nd meeting of Authority held on 20.09.2022.

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

The proponent, Thiru N. Kanniyappan has submitted application for ToR, in Form-I, Pre-Feasibility report for the Proposed Rough stone & gravel quarry lease over an extent of 1.62.0 Ha in S.F.Nos. 319/1, 319/2, 319/3 & 319/4, Sirudamur Village, Uthiramerur Taluk Kancheepuram District, Tamil Nadu

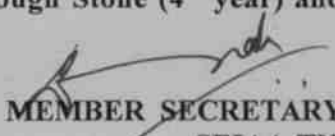
Discussion by SEAC and the Remarks:-

Proposed Rough stone & gravel quarry lease over an extent of 1.62.0 Ha in S.F.Nos. 319/1, 319/2, 319/3 & 319/4, Sirudamur Village, Uthiramerur Taluk Kancheepuram District, Tamil Nadu by Thiru N. Kanniyappan - For Terms of Reference. (SIA/TN/MIN/72047/2022 Dt: 07.02.2022)

The proposal was placed in 273rd SEAC meeting held on 14.5.2022. The project proponent has given a detailed presentation. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

SEAC noted the following:

1. The Project Proponent, Thiru N. Kanniyappan has applied for Terms for Reference for the proposed Rough stone & gravel quarry lease over an extent of 1.62.0 Ha in S.F.Nos. 319/1, 319/2, 319/3 & 319/4, Sirudamur Village, Uthiramerur Taluk Kancheepuram District, Tamil Nadu
2. The project/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan, the lease period is 10 years. The production as per mining plan for 5 years not to exceed – 98276 m³ of Rough Stone and 27084 m³ of Gravel. The Annual peak production as per mining plan is 21600 m³ of Rough Stone (4th year) and


MEMBER SECRETARY
SEIAA-TN



27084 m3 of Gravel (1st year) with ultimate depth of 20m BGL.

Earlier, this proposal was placed in the 273rd SEAC meeting held on 14.5.2022. Based on the presentation and documents furnished by the project proponent, SEAC noted that **as per OM No. F.No.23-43/2018-IA.III Dt. 8.8.2019, para 4(iv)**

“Proposals involving mining of minerals within the ESZ (or) one kilometer from the boundaries of National Parks and Sanctuaries whichever is higher is prohibited in accordance with the order of the Hon'ble Supreme Court dated 4.08.2006 in the matter of T.N. Godavarman Thirumulpad Vs. UOI in W.P.(C) No. 202 of 1995 and dated 21.4.2014 in the matter of Goa Foundation Vs. UOI in W.P.(C) No. 435 of 2012”.

In the present case, the Karikili Bird sanctuary is located within 10Km and as the ESZ for the Karikili Bird sanctuary is yet to be notified. The Committee, therefore, decided to **not recommend** the proposal.

Meanwhile the Project Proponent made a request vide letter dt: 18.07.2022 and the PP has stated the following,

“I have applied for Terms of Reference (ToR) for a Rough Stone and Gravel Quarry. The SEAC noted that Karikili Birds Sanctuary is located at a distance of 12.91km south and directed me to obtain NBWL Clearance. Since I have applied for only Terms of Reference (ToR), the same may please be granted and i will produce the NBWL Clearance, if any applicable by then, when I apply for the Environmental Clearance.”

Now, the proposal was placed for reappraisal in this 307th SEAC meeting held on 26.08.2022. Based on the presentation made by the proponent, SEAC noted that the O.M dated **06.05.2022, para 1.6 states that,**

“...Notifications of Eco Sensitive Zones(ESZ) specify the activities which are prohibited, regulated and promoted in the ESZ. Proposals for prohibited activities should not be forwarded for consideration of the SCNBWL. For taking up any activity within an ESZ, if notified, or within 10km zone of the boundary of National Park/Wildlife Sanctuaries, if ESZ has not been



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notified, prior approval of the NBWL/SCNBWL, shall be required if the activity/project is listed in the schedule of the EIA Notification 2006 as amended from time to time".


The proposal was again placed in this 307th SEAC Meeting held on 26.08.2022. Based on the presentation made by the proponent, SEAC decided to recommend grant of Terms of Reference (TOR) with Public Hearing subject to the following **additional 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 proponent shall obtain NBWL Clearance as the Karikili Birds Sanctuary is located within 10 km from the proposed mining area while submitting EIA study along with minutes public hearing.
2. 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 after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.
3. The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, indicating the haul road with keeping the benches intact.
4. 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.
5. 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 20 m from the blast site.


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6. 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.
7. 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.
8. 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).
9. The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc.,
10. 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.
11. 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


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remedial measures for the same.

12. 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.
13. 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.
14. 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.
15. 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.
16. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
17. 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.


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18. 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.
19. 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.
20. 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.
21. Impact on local transport infrastructure due to the Project should be indicated.
22. 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.
23. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
24. 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.
25. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
26. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
27. 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.


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28. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
29. 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
30. 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.
31. 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.
32. 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.
33. 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.
34. 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.
35. Details of litigation pending against the project, if any, with direction /order passed by any


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Court of Law against the Project should be given.

36. 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.
37. 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.
38. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
39. 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 552nd Authority meeting held on 20.09.2022. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal condition in addition to the following conditions:

1. Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.


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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. 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.
 - 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.
 - g) Bio-geochemical processes and its foot prints including environmental stress.
 - h) Sediment geochemistry in the surface streams.
11. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.


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12. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.
13. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.
14. 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.
15. Impact on surrounding agricultural fields around the proposed mining Area.
16. Erosion Control measures.
17. Impact on soil flora & vegetation around the project site.
18. 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.
19. 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.
20. 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.
21. 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.
22. 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.
23. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
24. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.


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25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
26. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
27. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
28. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
29. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.
30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.
31. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.
32. The project proponent shall study and furnish the impact of project on plantations in adjoin patta lands, Horticulture, Agriculture and livestock.
33. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.
34. 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.
35. 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.
36. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.

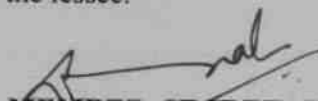

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37. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
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.
39. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.
40. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.
41. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.


A. STANDARD TERMS OF REFERENCE

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.


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- 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


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prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the


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periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air


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quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

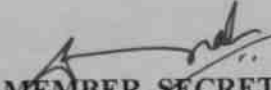
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers


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present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.


- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical


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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.



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- d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
- e) Where the documents provided are in a language other than English, an English translation should be provided.
- f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

In addition to the above, the following shall be furnished:-

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:


MEMBER SECRETARY
SEIAA-TN



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



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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:-


MEMBER SECRETARY
SEIAA-TN



- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
 - After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent willtake 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
SEIAA-TN



Copy to:

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



From
R. Perumal Raja, M.Sc.,
Assistant Director,
Geology and Mining,
Kancheepuram.

To
Thiru. N. Kanniyappan,
S/o. Narayanapillai,
Neerkundram Village,
Uthiramerur Taluk,
Kancheepuram District.

Rc. No.740/Q3/2018, dated:11.12.2020

Sir,

Sub: Mines and Minerals - Proposal seeking Environment Clearance for the grant of Rough Stone & Gravel Quarry in Patta lands comprised in S.F. Nos. 319/1, 319/2, 319/3, 319/4 - Over an Extent of 1.62.00 Hectares in Siruthamur Village - Uthiramerur Taluk - Thiru. N. Kanniyappan S/o. Narayanapillai - details of the quarries located within 500 mts of the periphery of the applied area - requested - furnished - regarding.

- Ref:
1. Application for Rough Stone / Gravel quarry permission preferred by Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District dated 14.12.2018.
 2. The Assistant Director, Kancheepuram, Precise Area Communication letter No.740/Q3/2018, dated.19.10.2020.
 3. Requisition of Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District dated.29.10.2020.
 4. Mining Plan Approved by Assistant Director, Geology and Mining, Kancheepuram in letter Rc.No.740/Q3/2019, dated.10.12.2020.

Reference cited above shall be seen.

The applicant Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District vide the reference 4th cited, has requested to furnish the details of Proposed / Existing / Expired quarries located within 500 mts radius from the periphery of the quarry proposed by him so as to submit the same to the State Level Environment Impact Assessment Authority for obtaining Environmental Clearance.

In this regard, apart from the quarry proposed by the applicant in the patta lands comprised in S.F.Nos. 319/1(0.27.00), 319/2(0.54.00), 319/3(0.40.00), 319/4(0.41.00) Over an Extent of 1.62.00 Hectares in Sirudhamur Village, Uthiramerur Taluk, Kancheepuram District the details for quarries (Proposed / Existing / Expired and abandoned) located within 500 mts radius from the periphery of the applied area are furnished as under:

i) Existing Other Quarries :

Sl. No.	Name of the Owner	Village	S.F. Nos	Extent	Lease Period	Remarks
1	D. Uma sankar S/o. Devaraj No.1, Thiru.Vi.Ka. Salai, Thiruvalluvar Nagar, Salavanpettai, Vellore.	Sirudhamur	334/1B	2.72.00	31.01.2017 To 30.01.2022	Operation
2	S. Vaithialingam S/o. Sivaganapathy subramaniam, No.13, First street, Swamy Nagar Extn -1, Ullagaram, Chennai - 91.	Sirudhamur	314/6B, 314/7A, 314/7B, 314/8, 314/10	1.08.00	22.02.2018 To 21.02.2023	Operation
3	N.Kanniappan, S/o. Narayanapillai, Neerkundram village, Uthiramerur Taluk	Sirudhamur	320/3A, 3B, 4, 332/1A, 1B, 2	2.41.00	15.06.2018 To 14.06.2023	Operation
Total				6.21.00		

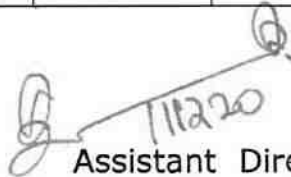
ii) Proposed Area :

Sl. No.	Name of the Owner	Village	S.F. Nos	Extent	Lease Period	Remarks
1.	N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District.	Sirudhamur	319/1, 319/2, 319/3, 319/4	1.62.00	--	Under Processing (Present Application)
2.	K. Prabakaran, S/o. N. Kanniyappan, No.43, Old State Bank Colony Road, West Tambaram, Chennai - 45.	Sirudhamur	320/5 (Govt.)	2.15.30	-	Under Processing

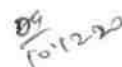
3.	D. Arunkumar, No.30/31, Thirumalai Nagar, Hasthinapuram, Kancheepuram District	Sirudhamur	338/1 (Part1)	4.95.00	-	Under Processing
4.	K. Subramaniam, S/o. Karuppannan, No.40, Kamarajar Street, Tambaram west, Chennai - 45.	Sirudhamur	337/2, 3, 336/3	3.26.50	--	Under Processing
Total				11.98.80		

iii) Lease Expired and Abandoned Area :

Sl. No.	Name of the Owner	Village	S.F. Nos	Extent	Lease Period	Remarks
1.	S. Kothandaraman, Kancheepuram.	Sirudhamur	338(P) Q.No.1 (Govt.)	5.00.0	09.08.2005 To 08.08.2010	Lease Expired
2.	C. Ranganathan No.12, Thiruvalluvar Road, Unamancherry, Chennai - 48.	Sirudhamur	338(P) Q.No.2 (Govt.)	5.00.0	04.10.2005 To 03.10.2010	Lease Expired
3.	K. Subramaniam, S/o. Karuppannan, No.40, Kamarajar Street, Tambaram west, Chennai - 45.	Sirudhamur	337/2	1.93.00	22.09.2007 To 21.09.2012	Lease Expired
4.	PJR Sathishkumar PJR Bluemetals chennai pvt ltd No.8, PJR Square,Sivashanmugam Salai, Tambaram, Chennai - 45	Sirudhamur	334/1	1.80.00	20.05.2010 To 19.05.2015	Lease Expired
5.	K.Subramaniam, Old No.19B, New No.40, Kamarajar Street, West Tambaram, Chennai-45	Sirudhamur	336/3, 337/2,3, 5,6.	3.26.50	12.09.2013 To 11.09.2018	Earlier leased out to 336/3 (1.93.00) K.Subramania m Applicant has applied including the same area & Other fields
Total				15.06.50		
Grand Total				33.26.30		


 11/12/20
 Assistant Director,
 Geology and Mining,
 Kanchipuram.




 10/12/20

MINING PLAN

**FOR SIRUDAMUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE
INCLUDING PROGRESSIVE QUARRY CLOSURE PLAN**

Patta- Ryotwari land /Opencast-Semi Mechanized mining/Non-forest/
Non-Captive Use- "B2' Category

Lease period 10 Years from the date of lease execution

(For the ensuring mining plan prepared for the period of first five year)

(Prepared under rule 41 (3) (i) of Tamil Nadu Minor Mineral Concession Rules, 1959 for a fresh mining lease)

LOCATION OF THE LEASE AREA

STATE : TAMILNADU
DISTRICT : KANCHEEPURAM
TALUK : UTHIRAMERUR
VILLAGE : SIRUDAMUR
S.F.NO : 319/1,319/2,319/3 AND 319/4
EXTENT : 1.62.0HECTARES
PRODUCTION : **98276Cbm** of rough stone and
27084Cbm gravel for 5 years

ADDRESS OF THE APPLICANT

Mr.N.KANNIYAPPAN,

S/o.Mr.Narayanapillai,
No.55, Mariyamman kovil, Aanampakkam post
Neerkundram Village, Uthiramerur Taluk,
Kancheepuram District-603107
Mobile No:9940551261

PREPARED BY

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS

(ISO 9001: 2015 certified Company)

No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 9790462882,

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

Website: www.gtmsind.com

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ANNEXURES

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1.	Copy of precise area communication letter	I
2.	Copy of FMB (Field Measurement book)	II
3.	Copy of Village map	III
4.	Copy of "A" registered	IV
5.	Copy of land documents (Patta, Chitta, Adangal., etc.)	V
6.	Photo copy of the Lease area	VI
7.	Copy of agreement from explosive license holder, explosive license & Blaster certificate	VII
8.	Copy of ID Proof of the authorized signature	VIII
9.	Copy of RQP Certificate	IX

22/05/2024

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
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3	Topo Sheet Map	I-B	1:1,00,000
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5	Environmental Plan	I-D	1: 5,000
6	Mine Lease Plan	II	1:1000
7	Surface and Geological Plan	III	1:1000
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9	Year wise Development and Production Plan	IV	1:1000
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11	Mine Layout Plan and Land Use Pattern	V	1:1000
12	Progressive mine closure plan	VI	1:1000
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14	Conceptual Plan/Final Mine Closure Plan	VII	1:1000
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230
2007 05 15 11 11 AM

Mr.N.KANNIYAPPAN,

S/o.Mr.Narayanapillai,
No.55, Mariyamman kovil,Aanampakkam
Neerkundram Village, Uthiramerur Taluk,
Kancheepuram District-603107
Tamil Nadu, Mobile No:9940551261

CONSENT LETTER FROM THE APPLICANT

The mining plan in respect of rough stone and gravel quarry lease over an extent of 1.62.0hectares in S.F.No's: 319/1, 319/2, 319/3 and 319/4 of Sirudamur Village, Uthiramerur Taluk, Kancheepuram District has been prepared by

Dr. S. KARUPPANNAN., M.Sc., Ph.D., Regn. No. RQP/MAS/263/2014/A

I request the **Assistant Director, Department of Geology and Mining, Kancheepuram District** to make further correspondence regarding modifications of the mining plan with the said Recognized Qualified Person on this following address,

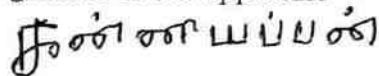
Dr. S.KARUPPANNAN., M.Sc.,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +91 9790462882,
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

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

Place: Kancheepuram, TN

Date:

Signature of the Applicant



(N.KANNIYAPPAN)

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

Mr.N.KANNIYAPPAN,

S/o.Mr.Narayanapillai, No.55
Mariyamman kovil,Aanampakkam
Neerkundram Village, Uthiramerur Taluk,
Kancheepuram District-603107
Tamil Nadu,Mobile No:9940551261

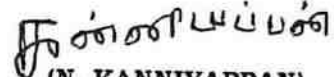
DECLARATION

The mining plan in respect of rough stone and gravel quarry lease over an extent of 1.62.0hectares in S.F.No's: 319/1,319/2,319/3 and 319/4 of Sirudamur Village, Uthiramerur Taluk, Kancheepuram District have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

Place: Kancheepuram, TN

Date:

Signature of the applicant


(N. KANNIYAPPAN)

Dr. S.KARUPPANNAN., M.Sc.,Ph.D.,
RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS
(ISO 9001: 2015 certified Company)

No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 9790462882,

E-mail: info.gtmsdpi@gmail.com

Website: www.gtmsind.com

CERTIFICATE

This is to certify that, the provisions of 19(1) and 20 Tamilnadu Minor Minerals Concession Rules, 1959 have been observed in the mining plan for the grant of rough stone and gravel quarry lease over an extent of 1.62.0hectares, patta land in S.F.No's: 319/1,319/2,319/3 and 319/4 of Sirudamur Village, Uthiramerur Taluk, Kancheepuram District applied to **Mr.N.Kanniyappan**, Kancheepuram -603107.

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

Place: Dharmapuri, TN

Date: 21/10/20

Signature of the Recognized Qualified Person.



Dr. S. KARUPPANNAN, M.Sc.,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
Govt. Regd. Geologist,
13-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705.

Dr. S.KARUPPANNAN., M.Sc.,Ph.D.,
RQP/MAS/263/2014/A

GEO TECHNICAL MINING SOLUTIONS
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No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 9790462882,

E-mail: info.gtmsdpi@gmail.com

Website: www.gtmsind.com

CERTIFICATE

Certified that, in preparation of mining plan for rough stone and gravel quarry lease over an extent of 1.62.0hectares of patta Land in S.F.No's: 319/1, 319/2,319/3 and 319/4 of Sirudamur Village, Uthiramerur Taluk, Kancheepuram District prepared to **Mr.N.Kanniyappan**, Kancheepuram-603107, Covers all the provisions of Mines Act, Rules, and Regulations etc made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date: 21/10/20

Signature of the Recognized Qualified Person.



Dr. S. KARUPPANNAN, M.Sc.,Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
Govt. Regd. Geologist,
1/213-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705.

MINING PLAN

FOR SIRUDAMUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE INCLUDING PROGRESSIVE QUARRY CLOSURE PLAN

Patta-ryothwaryi land/Open-cast-Semi Mechanized mining/Non-forest/
Non-Captive Use- "B2" Category

Lease period 10 Years from the date of lease execution

(For the ensuring mining plan prepared for the period of first five years)

[Prepared under rule 41 (3) (i) of Tamil Nadu Minor Mineral Concession Rules, 1959 for a fresh mining lease]

INTRODUCTORY NOTES:

- a) **Introduction:** The mining plan and progressive quarry closure plan is prepared for Mr.N.KANNIYAPPAN S/o.Mr.Narayanapillai has residing at No.55, Mariyamman kovil, Aanampakkam post, Neerkundran Village, Uthiramerur Taluk, Kancheepuram District-603107 and filed with application for new proposals has submitted to Assistant Director, Department of Geology and Mining (ADG & M), Kancheepuram dated 14.12.2018 grant of quarry lease for rough stone and gravel, over an extent of 1.62.0hectares in S.F.No's: 319/1,319/2,319/3 and 319/4 of Sirudamur Village, Uthiramerur Taluk, Kancheepuram District and the same was received by ADG & M, Kancheepuram dated :29.05.2019.
- b) **Lease area particulars:** The Assistant Director, Department of Geology and Mining, District Collectorate, Kancheepuram has directed to the applicant **Mr.N.KANNIYAPPAN** through his precise area communication letter **Roc. No. 740/Q3/2018 dated 19.10.2020**, before execution of lease deed should submit the mining plan for approval, obtain Environmental Clearance from the competent authority of State Level Environment Impact Assessment Authority-Tamilnadu (SEIAA) and no objection certificate (NOC) for Tamilnadu Pollution Control Board (TNPCB) as per EIA Notification 2006 and S.O.141 (E) dated 15th January, 2016, 1st July 2016 & S.O.3977 (E), dated 14th August 2018 and MoEF & CC office memorandum vide letter no. L-11011/175/2018- IA-II (M) dated: 12th December, 2018. Accordingly, the mining plan and progressive quarry closure plan has prepared for a grant of quarrying of rough stone and gravel over an extent of 1.62.0hectares in S.F.No's. 319/1,319/2,319/3 and 319/4 of Sirudamur

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

Village. Uthiramerur Taluk, Kancheepuram District for a period of 10 years under Rule 19(a) (b) (c) and 20 of Tamilnadu Minor Mineral Concession Rules, 1959 subject to the following conditions,

1. Around the Petitioner quarry work area should be left out a safety distance of 7.5m, 10m (The adjoining own patta quarry land S.F.No.332/2 Should be left out) for the adjoining patta lands and Govt Poramboke land as respectively and should not cause any hindrance to them while quarrying.
2. A 50meters safety distance left out Sirudamur periya eri Lake is situated on eastern side in S.F.No.317 and should not cause any hindrance to while quarrying.
3. Accordingly, approved mining plan to grant lease area should be prepared under 41 of Tamilnadu Minor Mineral Concession Rules, 1959 by the applicant.
4. Environment Clearance has to be submitted by the applicant issued by State Level Environment Impact Assessment Authority before grant of lease as per under 42 of Tamilnadu Minor Mineral Concession Rules, 1959.

c) **Preparation and Submission of Mining Plan:** The mining plan with progressive quarry closure plan has been prepared under rule 41 (3) (i) and submission under rule 41, 42 of Tamilnadu Minor Mineral Concession Rules, 1959 for a mining lease as per conditions mentioned in the precise area communication letter **Roc. No.740 /Q3/2018 dated 19.10.2020.**

d) **Geological Resources and Minable Reserves:** Geological resource of rough stone are estimated as **517376Cbm** and gravel is **48504Cbm** (Refer Plate No's.III & IIIA). Minable reserves of rough Stone are estimated about **141596Cbm** and gravel is **27084Cbm** upto depth of 35m from below the ground level (R.L.53-18m) (Refer Plate No's. VII & VIIA) after leaving necessary safety distance from the lease boundary.

e) **Proposed Production Schedule:** Total proposed production of rough stone is **98276Cbm** and gravel **27804Cbm** up to depth of 20m from below the ground level (R.L. 53-33m) which is 3m gravel and 17m rough stone (Refer Plate No's.IV & IVA) for the first 5 years plan period. Average production shall be **19655Cbm** of rough stone and **27804Cbm** of gravel per year.

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MINING PLAN FOR SIKUDAMUR ROUGH STONE AND GRAVEL QUARRY

f) **Environmental Sensitivity of the Proposed Lease Area:-**

- 1. **Interstate Boundary:** No interstate boundary around 10Km radius periphery of proposed lease area.
- 2. **Wildlife Protection Act, 1972:** There is no wild life animal sanctuary within radius of 10Km from the project site area under the Wildlife (Protection) Act, 1972.
- 3. **Indian Reserve Forest Act, 1980:** The reserve forest within permissible limit. The Kavanippakkam reserve forest is situated about 2.60kms away on the eastern side periphery of the proposed site.
- 4. **CRZ Notification, 1991:** There is no sea coastal zone found around 10km radius and this project site doesn't attract CRZ Notification, 1991.

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

- i) Wet drilling method is to be adopted to control dust emissions.
- ii) Roads shall be graded to mitigate the dust emission
- iii) Unnecessary land degradation should be avoided or damaged land should be reclaimed or rehabilitated.
- iv) Dust Control at source while drilling and blasting,
- v) Dust suppression at loading point and transport haul roads,
- vi) Noise Control in blasting, control of fly rock missiles and vibration by doing peak particle velocity with in standard as prescribed by the DGMS and MOEF.
- vii) And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

1.0 GENERAL:

a.	Name of the Applicant	: Mr. N. KANNIYAPPAN
	Applicant address	: Mr.N.KANNIYAPPAN, S/o.Mr.Narayanapillai, No.55, Mariyamman kovil, Aanampakkam, Neerkundram Village, Uthiramerur Taluk.
	District	: Kancheepuram
	State	: Tamil Nadu
	Pin code	: 603107
	Phone	: +919940551261
	Fax	: Nil
	Gram	: Nil
	Telex	: Nil
	E-mail	: kanniyappan99405@gmail.com

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

b.	Status of the Applicant	
	Private individual	: Private individual
	Cooperative Association	: ---
	Private company	: ---
	Public Company	: ---
	Public Sector Undertaking	: ---
	Joint Sector Undertaking	: ---
	Other (pl. specifies)	: ---
c.	Mineral(s) Which are occurring in the area and which the applicant intends to mine	: Rough stone (Charnockites) and gravel quarry lease
d.	Period for which the mining lease granted /renewed/proposed to be applied	: Mining lease were granted for the period of ten years from the date of lease execution for the ensuring plan period five years.
e.	Name of the RQP preparing the Mining Plan	: Dr. S.KARUPPANNAN., M.Sc.,Ph.D.,
	Address	: Geo Technical Mining Solutions (ISO 9001: 2015 certified Company) No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Web site: www.gtmsind.com
	Phone	: +91 9443937841, 9790462882.
	Fax	: Nil
	e-mail	: info.gtmsdpi@gmail.com
	Telex	: Nil
	Registration Number	: RQP/MAS/263/2014/A
	Date of grant/renewal	: 16.12.2014
	Valid upto	: 15.12.2024
f.	Reference No. and date of consent letter from the state government	: The precise area communication letter was received from the District collectorate, Assistant Director, Department of Geology and Mining, Kancheepuram vide Roc.No.740/ Q3/ 2018 Dated 19.10.2020.

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	: Refer plate no: IA & IB
	District & State	: Kancheepuram, Tamilnadu
	Taluk	: Uthiramerur
	Village	: Sirudamur
	Khasra No./ Plot No./ Block Range / Felling Series etc.	: 319/1, 319/2, 319/3 and 319/4
	Lease area (hectares)	: 1.62.0Hectares
	Whether the area is recorded to be in forest (please specify whether protected, reserved etc)	: The proposed lease area is recorded as patta land.
	Ownership / Occupancy	: This is a patta land of S.F.No. 319/1,

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

	319/2, 319/3 and 319/4 is registered on the name of Mr.N.Kanniyappan S/o Mr.Narayanapillai.(Ref. Annexure No: IV)																					
Existence of Public Road / Railway line if any nearby and approximate distance	<ul style="list-style-type: none"> ✓ Exploited materials shall be transported to through the village road is situated on the south side which is connecting Sirumailur-Sirudamur. ✓ The District road-789 is situated about 1.35kms away from the western side which is connecting Walajabad-Nelvay. ✓ No NH-road found around 5kms radius of the periphery of the site. ✓ No Railway line situated around 5km radius. 																					
Toposheet No. with latitude and longitude	<p>Toposheet No. 57 P/14</p> <p>Latitude: From 12°43'4.71"N to 12°43'9.69"N</p> <p>Longitude: From 79°51'0.49"E to 79°51'7.15"E</p>																					
Geo-Coordinates of the lease boundary:																						
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Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	It is a barren and waste land																					
b) <i>Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However</i>	Refer plate no-IA & IB																					

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.

i) INFRASTRUCTURE AND COMMUNICATION:

a	Nearest post office	:	Post office is available at Madur about 2.7kms away from the site towards north side.
b	Nearest police station	:	Police Station is available at Palur about 7.95kms away from the site towards North side.
c	Nearest fire station	:	Fire Station is available at Uttiramerur about 15.2kms away from the site towards southern side.
d	Nearest Medical facility	:	Primary health center is available at Padur about 4.0kms away from the site towards SW side
e	Nearest school	:	Primary School Education is available at Padur about 4.0kms away from the site towards SW side
f	Nearest Taluk road	:	The District road-789 is situated about 1.35kms away from the western side which is connecting Walajabad-Nelvay
g	Nearest Rail Head	:	The Nearest Railway junction is available at Kancheepuram about 20.1kms away from NW side.
h	Nearest Railway station	:	The Nearest Railway station is available at Palayaseevaram about 7.1kms away from North side.
i	Nearest port facility	:	The Nearest Port is available at Chennai about 65.1kms away from Northeastern side.
j	Nearest Airport	:	The Nearest Airport is available at Salem about 47.5kms away from Southern side
k	Nearest DSP office	:	The Nearest DSP office is available at Kancheepuram about 20.1kms away on the NW side.
l	Nearest Villages	:	i. North - Madur - 2.5kms ii. South - Sirudamur - 1.30kms iii. East - Anambakkam - 1.54kms iv. West - Sirumailur - 1.8kms

ii) BOUNDARY OF THE LEASE AREA:

i.	Boundary	:	i. North - Paremboke land - S.F.No.320 ii. South - Poramboke land - S.F.No.338 iii. East - Poramboke land (sirudamur periya eri) - S.F.No.317, iv. West - Patta land -S.F.No.332
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PART - A

3.0 GEOLOGY AND MINERAL RESERVES:

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

(i)	Topography	: The proposed lease area is flat terrain with elevated about 1-2meters and altitude of 53m maximum and minimum 52m from the MSL. The area is sloping towards SE side covered with gravel and falls in Toposheet no. 57 P/14.
(ii)	General Geology	: a) Geomorphology: The Kancheepuram area is endowed with a complex geological set up with crystalline rocks occurring in the southern part of the area and the northern part of the area the crystalline rocks occur at depths covered by sedimentary formations ranging from gondwana to recent. The depth at which the crystalline rocks occur progressively increase towards north. The eastern part comprises unconsolidated sediments of fluvio-marine and marine origin. The precambrian crystalline rocks are represented by charnockites and contain several enclave's mafic granulite. Garnetiferous and biotite gneisses are also encountered as linear bands. b) Soils: The analysis of the soil type reveals that the proposed lease area is predominantly covered by river alluvium is transported and is seen in coastal area. c) Lineaments: The general trend of the gneiss is NE-SW direction and the regional trend observed is NNE-SSW to NW-SE direction. The deposition

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		<p>of gondwana rocks, the sedimentary rocks, in faulted troughs and in the rugged topography of crystalline rocks took place during jurassic period. The insitu soils laterites and alluvial deposits were deposited along the paralar and cheyyar rivers during the quaternary period. The data have been checked by field studies and survey of India topographical maps at the 1: 50,000 scales.</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Group</th> <th>Rock Formation</th> </tr> </thead> <tbody> <tr> <td>Recent</td> <td>Alluvium and beach sands</td> <td>Sand, gravel, silt and clay</td> </tr> <tr> <td>Pleistocene</td> <td>Laterite, soils, talus</td> <td>Laterites, sandy clay, silt</td> </tr> <tr> <td colspan="3" style="text-align: center;">-----Unconformity-----</td> </tr> <tr> <td>Lower Cretaceous to Jurassic</td> <td>Sandstones & Shales</td> <td>Fine to medium grained sand stone with clay intercalations of greenish soft shale</td> </tr> <tr> <td colspan="3" style="text-align: center;">-----Unconformity-----</td> </tr> <tr> <td>Archaean</td> <td>Crystalline formations</td> <td>Charnockites, granites and associated basic and ultra-basic intrusive</td> </tr> </tbody> </table>	Age	Group	Rock Formation	Recent	Alluvium and beach sands	Sand, gravel, silt and clay	Pleistocene	Laterite, soils, talus	Laterites, sandy clay, silt	-----Unconformity-----			Lower Cretaceous to Jurassic	Sandstones & Shales	Fine to medium grained sand stone with clay intercalations of greenish soft shale	-----Unconformity-----			Archaean	Crystalline formations	Charnockites, granites and associated basic and ultra-basic intrusive
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(iii)	Local / Mine Geology of The Mineral Deposit :	<p>a). Topography of the proposed lease area: The proposed lease area is flat terrain with elevated about 1-2meters and altitude of 53m maximum and minimum 52m from the MSL. The area is sloping towards SE side and charnockite composed mainly of quartz, perthite or antiperthite and orthopyroxene (usually hypersthene) formed at high temperature and pressure, commonly found in granulite facies metamorphic regions, as an end-member of the charnockite series. charnockite is extensively quarried for rough stone productivity / which is used as blue metals for construction of building.</p> <p>b). Mode of origin: The charnockite series originally was assumed to have developed by the fractional</p>																					

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		<p>crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures.</p> <p>c). Physiography of the rocks: Dark colour and clouding of the feldspars are typical features of these rocks as bluish in quartz.</p> <p>d). Chemical composition of rocks: Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common. Order of superposition of the proposed lease area,</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Group</th> <th>Rock Formation</th> </tr> </thead> <tbody> <tr> <td>Recent to sub recent</td> <td>----</td> <td>Fine to medium grained clayey soil</td> </tr> <tr> <td>Archaean</td> <td>Charnockite group</td> <td>Charnockite.</td> </tr> </tbody> </table>	Age	Group	Rock Formation	Recent to sub recent	----	Fine to medium grained clayey soil	Archaean	Charnockite group	Charnockite.
Age	Group	Rock Formation									
Recent to sub recent	----	Fine to medium grained clayey soil									
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(iv)	Drainage Pattern	: The sirudamur periya lake is situated on eastern side in S.F.No.317 which is 50m safety distance left out and drainage is sub-dendritic in nature.									

(b) *The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 : 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already*

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

carried out including evidences of mineral existence should be shown on the geological plan:

a. Present status:	: No exploration carried out. The proposed lease area is a fresh lease grant. Hence, RQP personally examined during mining survey.																														
b. Surface Plan	: Surface plan is prepared as 1: 1000 Scales in ground level at various places in grid pattern behalf various lithological factors like length, width and depth.																														
(c) Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	: Geological plan is prepared as 1: 1000 Scales (Plate No.III) with ground level at various places, lithological factors in grid pattern like length, width and depth and sections are prepared boundary to boundary perpendicular to the strike of the rock with proper scale of 1:1000 is horizontal axis, 1:500 as vertical axis. It is given as plate No-III A.																														
(d) Broadly indicate the yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below :-																															
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Fifth	N.A	---	---	N.A																											
<p>No future programmed proposed in this area. Its massive charnockites homogeneous parent rock. Hence exploration proposal is not required to this mining project.</p>																															
<p>(e) Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.</p> <p>The Geological resources were computed in cross section method on suitably chosen four-line axis. The two longitudinal (XY, X1Y1) axis and two horizontal (AB, CD) axis of deposit have been drawn. Total geological</p>																															

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

resources have been estimated for gravel is **48504Cbm** and rough stone are **517376Cbm** upto a depth of 35m below the ground level of R.L.53-18m. (Refer Plate No's. III & IIIA).

The gravel obtained upto depth of 3m average and a rough stone signs from 4m to 35m depth below the ground level.

GEOLOGICAL RESOURCES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Geologic Resources in CBM	Gravel in CBM
XY-AB	I	172	94	3	48504	.....	48504
	I	172	94	2	32336	32336	.....
	II	172	94	5	80840	80840	.....
	III	172	94	5	80840	80840	.....
	IV	172	94	5	80840	80840	.....
	V	172	94	5	80840	80840	.....
	VI	172	94	5	80840	80840	.....
VII	172	94	5	80840	80840	.....
TOTAL					565880	517376	48504

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

The mineable reserves of gravel estimated as **27084Cbm** and rough stone estimated as **141596Cbm** up to depth of 35m (3m gravel + 32m rough stone) from surface by deducting the reserves blocked under benches from the total geological resources and the commercially viable rough stone has been prepared on 1: 1000 Scales (Refer plate no.VII). Sections are prepared as scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Plate No. VIIA).

MINEABLE RESERVES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Gravel in CBM
XY-AB	I	122	74	3	27084	.....	27084
	I	122	74	2	18056	18056	.....
	II	117	64	5	37440	37440	.....
	III	112	54	5	30240	30240	.....
	IV	107	44	5	23540	23540	.....
	V	97	34	5	16490	16490	.....
	VI	87	24	5	10440	10440	.....
VII	77	14	5	5390	5390	.....
TOTAL					168680	141596	27084

MINING PLAN FOR SIRGUDAMUR ROUGH STONE AND GRAVEL QUARRY

4.0 MINING:

a. Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.
(Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)

: The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 (2) (a) of the Metalliferous Mines Regulations, 1961 in all opencast working in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal.

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

The proposed production of rough stone estimated as **98276Cbm** and gravel **27084Cbm** up to depth of 20m which is 3m gravel and 17m rough stone from below the ground level (R.L. 53-33m) from the surface level for the first five years plan period.

Year	Pit No.(s)	Topsoil (Cbm)	ROM (Cbm)	Saleable rough stone (Cbm) @ 100%	Rough stone rejects(Cbm)	Sub grade/ Weathered rock in (Cbm)	Saleable Gravel (Cbm)	Rough stone to Overburden ratio
First	I	---	45140	18056	---	---	27084	---
Second	I	---	19200	19200	---	---	---	---
Third	I	---	18240	18240	---	---	---	---
Fourth	I	---	21600	21600	---	---	---	---
Fifth	I	---	21180	21180	---	---	---	---
Total	---	---	125360	98276	---	---	27084	---

The market is always fluctuating and flexible one. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated the life of quarry etc., are only a tentative figure.

c. **Composite plans and Year wise sections (In case of 'A' class mines):**

: Not applicable

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

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

YEARWISE PRODUCTION RESERVES								
Section	Year	Bench	length in (m)	Width in (m)	Depth in (m)	Volume in CBM	Production in CBM	Gravel in CBM
XY - AB	I-YEAR	I	122	74	3	27084	.....	27084
			122	74	2	18056	18056	.....
	II - YEAR	I	60	64	5	19200	19200	.....
	III - YEAR	II	57	64	5	18240	18240	.....
	IV-YEAR	II	80	54	5	21600	21600	.....
	V-YEAR	III	32	54	5	8640	8640	.....
		IV	57	44	5	12540	12540	.....
TOTAL						125360	98276	27084

d. Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc. : The proposed area is fresh lease. (Refer Plate No: III)

e. **Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:**

The proposed production is 1638Cbm/month. At this rate of production, the expected life of quarry is calculated for 10 years approved periods and production details are given as below:

Rough Stone

- Minable reserves of rough stone = 141596Cbm
- First five years production = 98276Cbm
- Remaining minable reserves for next five years = 43320Cbm

The regular working of the quarry and its production depends upon the demand from the market. The market is always fluctuating and flexible one. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated the life of quarry etc., are only a tentative figure.

f. **Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:**

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

<p>i) Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame:</p>	<p>: Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about depth of 35m below the ground level (R.L.53-18m) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 5 years.</p>																																																																							
<p>ii) Whether ultimate pit limit has been determined and demarcated on surface and geological plan: - The ultimate pit limit has been determined and demarcated at end of ten years plan periods as given below</p> <table border="1"> <thead> <tr> <th colspan="7">ULTIMATE PIT - SECTION XY-AB</th> </tr> <tr> <th>Bench</th> <th>Years</th> <th>Bench R. L</th> <th>Overburden/ Mineral</th> <th>L (m)</th> <th>W (m)</th> <th>D (m)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td rowspan="5">First 5 years</td> <td>R.L.53-50m</td> <td>Gravel</td> <td>122</td> <td>74</td> <td>3</td> </tr> <tr> <td>I</td> <td>R.L.50-48m</td> <td>Rough stone</td> <td>122</td> <td>74</td> <td>2</td> </tr> <tr> <td>II</td> <td>R.L.48-43m</td> <td>Rough stone</td> <td>117</td> <td>64</td> <td>5</td> </tr> <tr> <td>III</td> <td>R.L.43-38m</td> <td>Rough stone</td> <td>112</td> <td>54</td> <td>5</td> </tr> <tr> <td>IV</td> <td>R.L.38-33m</td> <td>Rough stone</td> <td>107</td> <td>44</td> <td>5</td> </tr> <tr> <td>V</td> <td rowspan="3">Remaining periods of 5 years</td> <td>R.L.33-28m</td> <td>Rough stone</td> <td>97</td> <td>34</td> <td>5</td> </tr> <tr> <td>VI</td> <td>R.L.28-23m</td> <td>Rough stone</td> <td>87</td> <td>24</td> <td>5</td> </tr> <tr> <td>VII</td> <td>R.L.23-18m</td> <td>Rough stone</td> <td>77</td> <td>14</td> <td>5</td> </tr> <tr> <td colspan="6" style="text-align: right;">Total Depth</td> <td>35m</td> </tr> </tbody> </table>		ULTIMATE PIT - SECTION XY-AB							Bench	Years	Bench R. L	Overburden/ Mineral	L (m)	W (m)	D (m)	I	First 5 years	R.L.53-50m	Gravel	122	74	3	I	R.L.50-48m	Rough stone	122	74	2	II	R.L.48-43m	Rough stone	117	64	5	III	R.L.43-38m	Rough stone	112	54	5	IV	R.L.38-33m	Rough stone	107	44	5	V	Remaining periods of 5 years	R.L.33-28m	Rough stone	97	34	5	VI	R.L.28-23m	Rough stone	87	24	5	VII	R.L.23-18m	Rough stone	77	14	5	Total Depth						35m
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<p>iii) Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long-term use in the event of continuation of mining activity: -</p>	<p>: There is no waste rock will be proposed in this lease area.</p>																																																																							
<p>iv) Whether back filling of pits after recovery of mineral upto techno-economically feasible</p>	<p>: As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.</p>																																																																							

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

	depth envisaged. If so, describe the broad features of the proposal:	
	v) Whether post mining land use envisaged: -	: At the end of mining activities over the quarry pit may be utilized fish culture or storage of rain water reservoir used for irrigation purposes.
g.	Open cast Mines:	
	i). Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	: The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 (2) (a) of the Metalliferous Mines Regulations, 1961 in all open cost workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 5m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal. Machineries like tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic excavators and tipper combination are adapted.
	ii) Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice	: The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi-mechanized method. It is a semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using hydraulic excavator and loaded directly to the tippers and transported to the needy customer.

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

			Bench height = 5mts. Bench width = 5mts.			
a. Details of Topsoil/ Overburden	:		There is no topsoil shall be removed.			
b. Rough Stone waste and side burden waste:-	:		There is no waste or side burden shall be proposed.			
h. Underground Mines:	:		Not applicable			
i. Extent of mechanization:	Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.					
(1) Drilling Machines:						
Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Depth of holes shall be 1 to 2m bench height and spacing shall be 0.75m and burden shall be 0.60m from the preface. Details of drilling equipments are given below.						
Type	No s	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.
Jack Hammer	2	32 mm	Hand held	Atlas copco	Diesel	60
Compressor	1	---	Air	Escorts Formtrac	Diesel	42
(2) Loading Equipment:						
Hydraulic excavator (0.90m ³ capacities) and attached with rock breaker shall utilized for internal transport sizeable rough stone lumps and deliver to the consumer area.						
(3) Haulage and Transport Equipment						
(a) Haulage within the mining leasehold:						
Type	Nos	Size / Capacity	Make	Motive power	H.P.	
Tipper	2	15 M.T	BMW	Diesel	110	
Whether the dumpers are fitted with exhaust conditioner should be indicated:				The dump is not used in this quarry area, hence it's a small B2 category mine.		
(b)Transport from mine head to the destination	:					
c. Describe briefly the transport system (please specify)	:					

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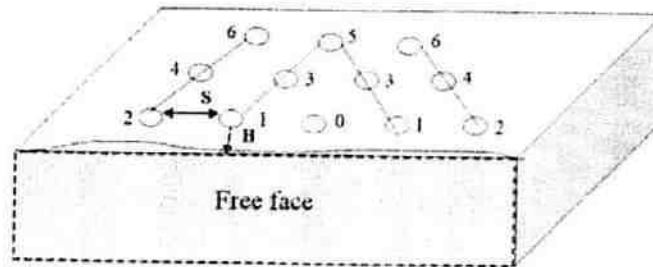
MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		sizeable rough stone lumps and deliver to the customers crusher area.			
d. Ore transported by: own trucks / hired trucks	:	Hired tippers and hydraulic excavator for initially production purposes.			
e. Main destination to which ore is transported (giving to and from distance)	:	The excavated stone materials road metal will be supplied to the consumers like road laying, earth filling, building construction, etc			
f. Details of hauling / transport equipment:					
Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	2	15 M.T	BMW	Diesel	110
(4).Miscellaneous:					
Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.					
(A) Operations	:	The mining operation is opencast, semi mechanized methods are adopted and on single shift basis only.			
(B) Machineries deployed	:	Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic excavators and tipper combination are adapted. (refer Part-A- 4 (i))			
5. BLASTING :					
<i>a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.</i>					
Blasting pattern:					
The quarrying operation is proposed to carried by opencast, semi mechanized mining in conjunction with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.					

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

Depth of each hole	: 1.5m
Diameter of hole	: 30-32mm
Spacing between hole	: 1.2m
Burden for hole	: 1.0m
Pattern of hole	: Zigzag -Multi rows
Inclination of hole	: 80° from horizontal
Use of delay detonators	: 25 millisecond relay
Detonating fuse	: " Detonating" cord
Quantity of rock broken per day	: 66Cbm x 2.8 = 185MT
Blasting efficiency @ 95%	: 1.17 x 95% = 1.05MT / hole
Charge per hole	: 140 gms of 25mm dia cartridge
Quantity of rock broken per day	: 185MT per day
Requirement of explosive per day (6M.T per kg of explosives)	: 31kg per day
Number of holes per day	185/1.05= 176 holes per day

BLASTING PATTERN DRAWING



Staggered "V" pattern of blasting design

Spacing	=	1.2m
Burden	=	1.0m
Depth of hole	=	1.5m
No of holes proposed per day	=	176holes

b) type of explosives used / to be used:

Following explosives are recommended for efficient blasting with safe practice.

Small dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed.

**c) Measures proposed to minimize ground vibration due to blasting:
The control blasting measures is being adopted for minimizing ground vibration and fly rock.**

Shallow depths jackhammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

effect in rough stone for easy excavation and to control fly rock.

Delay detonators:

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals.

The major advantages of delay blasting are:

- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break
- ❖ Improved fragmentation
- ❖ Better control of fly rock


Blasting program for the production per day

No of holes	:	176holes
Yield	:	185tons
Powder factor	:	6 Tons/Kg of explosives
Total explosive required	:	31kg-Slurry explosives
Charge per hole	:	0.5kg
Blasting at day time only	:	12.00-1.00p.m

c) Powder factor in ore and overburden / waste / development heading / stope : Powder factor is proposed as 6 tones per kg of explosives

d) Whether secondary blasting is needed, if so describe it briefly : Irrespective of the method of primary blasting employed, it may be necessary to re-blast a proportion of the rock on the quarry floor so as to reduce it to a size suitable for handling by the excavators and crushers.

e) Storage of explosives (like capacity and type of explosive magazine) : 1.The applicant will engage an authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/mines manager.
2.The blasting time at a day is proposed to be 1 PM to 2 PM.
3.First Aid Box will be keeping

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		ready at all the time.	
		4. Necessary precautionary announcement will be carried out before the blasting operation.	
6. MINE DRAINAGE			
a) Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 65m in summer and 55m in rainy season from the general ground level in the adjacent bore wells of the area.	
b) Workings expected to be _____ m. above / reach below water table by the year _____.	:	Proposed mining depth is 35m from below the ground level. Now, the present mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.	
c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 Lpm and it shall be pumped about periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor.	
7. STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:			
a) Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years:			
	Topsoil/ Overburden (Cbm)	Weathered rock/ Side burden (Cbm)	Mineral rejects/Waste
Year			
First	---	---	---
Second	---	---	---
Third	---	---	---
Fourth	---	---	---
Fifth	---	---	---
Total	----	----	---

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<p>b) Land chosen for disposal of waste with proposed justification:</p>	<p>: There is no topsoil shall be removed.</p>
<p>c) Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Yearwise.</p>	<p>: No weathered rock or overburden or waste are shall proposed.</p>
<p>8. USES OF MINERAL:</p>	
<p>a) Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)</p>	<p>: The excavated rough stone materials are one of the most valuable natural building materials, it is important to realize that because of their different compositions and characteristics, different stone types can be used only for specific purposes. For instance, aggregates are mostly used for building roads and footpaths., etc.</p>
<p>b) Indicate physical and chemical specifications stipulated by buyers</p>	<p>: Rough stone used for its strong physical properties – crushed and sorted into various sizes for use in concrete, coated with bitumen to make asphalt or used 'dry' as bulk fill in construction. Mostly used in roads, concrete and building products. So, there is no chemical specifications are specified.</p>
<p>c) Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.</p>	<p>: Not blending process is involved.</p>
<p>9. OTHERS</p>	
<p>Describe briefly the following a) Site services</p>	<p>: Infrastructure required for such</p>

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	<p>mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provide as per the Metalliferous Mines Rules, 1961 as a welfare amenity for mine laborers. Being a manual mine no stack of spares, lubricant and fuels are required to be maintained at the mine site. Approach road is available from the mine road to the site.</p>																																				
<p>b) Employment potential: As per Mines safety under the provisions of Metalliferous Mines Rules, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified mining mate to keep all the production workers directly under his control and supervision. The following man power is proposed for quarrying rough stone and gravel during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of the patta land norms.</p>	<table border="1"> <tr> <td rowspan="4">1.</td> <td rowspan="4">Highly Skilled</td> <td>Quarry Manager</td> <td>1No.</td> </tr> <tr> <td>Mines Forman</td> <td>---</td> </tr> <tr> <td>Mechanical Engineer</td> <td>---</td> </tr> <tr> <td>Accountant cum & admin</td> <td>1No.</td> </tr> <tr> <td rowspan="4">2.</td> <td rowspan="4">Skilled</td> <td>Earth moving Operator</td> <td>2 No.</td> </tr> <tr> <td>Driver</td> <td>4 Nos.</td> </tr> <tr> <td>Mechanic</td> <td>1 No.</td> </tr> <tr> <td>Blaster/Mat</td> <td>---</td> </tr> <tr> <td>3.</td> <td>Semi - skilled</td> <td>Helpers, Greaser's</td> <td>3 Nos</td> </tr> <tr> <td rowspan="3">4.</td> <td rowspan="3">Unskilled</td> <td>Musdoor / Labours</td> <td>10 Nos</td> </tr> <tr> <td>Cleaners</td> <td>3Nos</td> </tr> <tr> <td>Attendant's</td> <td>1No</td> </tr> <tr> <td colspan="3" style="text-align: right;">Total =</td> <td>26Nos</td> </tr> </table>	1.	Highly Skilled	Quarry Manager	1No.	Mines Forman	---	Mechanical Engineer	---	Accountant cum & admin	1No.	2.	Skilled	Earth moving Operator	2 No.	Driver	4 Nos.	Mechanic	1 No.	Blaster/Mat	---	3.	Semi - skilled	Helpers, Greaser's	3 Nos	4.	Unskilled	Musdoor / Labours	10 Nos	Cleaners	3Nos	Attendant's	1No	Total =			26Nos
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<p>10 MINERAL PROCESSING/BENEFICIATIONS:</p> <p>a) If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and</p>	<p>: Excavated rough stone and gravel materials shall be directly sale to the needy customer. The recovery of rough stone in this quarry is 100%.</p>																																				

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<p>grade of feed material and concentrate (finished marketable product), recovery rate.</p>	
<p>b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).</p>	<p>: No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.</p>
<p>c) A flow sheet or schematic diagram of the processing procedure should be attached.</p>	<p>: Not applicable</p>
<p>d) Specify quantity and type of chemicals to be used in the processing plant.</p>	<p>: Not applicable</p>
<p>e) Specify quantity and type of chemicals to be stored on site / plant.</p>	<p>: Not applicable</p>
<p>f) Indicate quantity (KLD per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.</p>	<p>: Drinking is 0.300KLD, utilized water is 1.0KLD, Dust suppression is 1.0KLD and green belt is 1.5KLD. Minimum quantity of water 3.800KLD per day has to be maintained as per the mine's rules, 1960. It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and green belt development.</p>

PART - B

11.0 ENVIRONMENTAL MANAGEMENT PLAN :

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

11.1	Existing land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present and proposed land use pattern is given as below.	<table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Land Use</th> <th>Present Area (Hect)</th> <th>Area in use during the quarrying period (Hect)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Under quarrying area</td> <td>Nil</td> <td>0.69.80</td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td>Nil</td> <td>0.01.00</td> </tr> <tr> <td>3</td> <td>Roads</td> <td>Nil</td> <td>0.01.00</td> </tr> <tr> <td>4</td> <td>Unutilized</td> <td>1.62.0</td> <td>0.41.97</td> </tr> <tr> <td>5</td> <td>Green belt</td> <td>Nil</td> <td>0.48.23</td> </tr> <tr> <td colspan="2">Total =</td> <td>1.62.0</td> <td>1.62.0</td> </tr> </tbody> </table>	Sl. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)	1.	Under quarrying area	Nil	0.69.80	2	Infrastructure	Nil	0.01.00	3	Roads	Nil	0.01.00	4	Unutilized	1.62.0	0.41.97	5	Green belt	Nil	0.48.23	Total =		1.62.0	1.62.0
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4	Unutilized	1.62.0	0.41.97																											
5	Green belt	Nil	0.48.23																											
Total =		1.62.0	1.62.0																											
11.2	Water Regime	: Water table in this area is noticed at a depth of 55m in summer and 50m in rainy season from the general ground level and presently the quarrying of rough stone and gravel is proposed up to a depth of 35m bgl. Hence, it will not affect the ground water depletion of this area. It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and green belt development.																												
11.3	Flora and Fauna	: There is no major flora found in this area and except acacia bushes, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.																												
11.4	Quality of air, ambient noise level and water	: Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be																												

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		<p>suppressed by periodical wetting of land by water spraying.</p> <p>Quarrying of rough stone and gravel will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.</p>																									
11.5	Climatic conditions	<p>The temperature ranges from a maximum of 37 °C to a minimum of 25°C. Like the rest of the state, April to June is the hottest months and December to January are the coldest. Rainfall of this area is southwest monsoon, with an onset in June and lasting up to September, brings rainfall of 517.1 mm, with September being the rainiest month.</p>																									
11.6	<p>Human Settlement:</p> <p>The nearest villages are found in the buffer zone with population as per 2011 census. The Sirudamur village of 755 houses 3097 peoples both Male (1555) and Female (1542).</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Village</th> <th>Direction</th> <th>Distance in Kms</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Madur</td> <td>North</td> <td>2.0kms</td> <td>1702</td> </tr> <tr> <td>2</td> <td>Sirudamur</td> <td>South</td> <td>1.30kms</td> <td>3097</td> </tr> <tr> <td>3</td> <td>Anambakkam</td> <td>East</td> <td>1.54kms</td> <td>1665</td> </tr> <tr> <td>4</td> <td>Sirumailur</td> <td>West</td> <td>1.8kms</td> <td>1029</td> </tr> </tbody> </table>		S.No	Village	Direction	Distance in Kms	Population	1	Madur	North	2.0kms	1702	2	Sirudamur	South	1.30kms	3097	3	Anambakkam	East	1.54kms	1665	4	Sirumailur	West	1.8kms	1029
S.No	Village	Direction	Distance in Kms	Population																							
1	Madur	North	2.0kms	1702																							
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3	Anambakkam	East	1.54kms	1665																							
4	Sirumailur	West	1.8kms	1029																							
11.7	Public buildings, places of worship and monuments	<p>No infrastructure like residential building, places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.</p>																									
11.8	Attach plans showing the locations of sampling stations	<p>The proposed ambient air quality, water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around</p>																									

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974

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

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

Due to quarrying and exploitation of the rough stone and gravel, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:

Sl. No.	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Under quarrying area	Nil	0.69.80
2	Infrastructure	Nil	0.01.00
3	Roads	Nil	0.01.00
4	Unutilized	1.62.0	0.41.97
5	Green belt	Nil	0.48.23
Total		1.62.0	1.62.0

ii).	Air quality	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.
iii).	Water quality	A water sample from the open bore wells was tested to NABL approved lab to assess hardness, salinity, colour, specific gravity, etc.
iv).	Noise levels	Quarrying of rough stone and gravel will be carried out by drilling and blasting by using low power explosives, and hence,

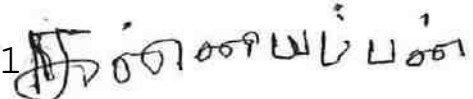
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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.
v).	Vibration levels (due to blasting)	No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity shall be recoded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
vi).	Water regime	It is proposed to make an own borewell for providing uninterrupted supply of RO drinking water, dust suppression and green belt development.
vii).	Socio-economics	1. To provide Employment opportunities of the nearby villagers. 2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.	There are no historical monuments, etc found around 10km radius.

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

i).	temporary storage and utilization of topsoil	:	There is no topsoil shall be removed.
ii).	Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned	:	The present mining is proposed to an average depth of 20m below ground level (R.L.53-33m) has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. Low lying areas with water logging shall be used for fish culture. No immediate proposals for closure of pit as the rough stone persist still at deeper level.

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

	quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given.																															
iii).	<p>Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.</p> <p>7.5m, 50m safety barrier, nearby school area and nearest panchayat approach roads has been identified to be utilized for greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Place</th> <th>Type of trees</th> <th>No.of plants</th> <th>Rate of survival</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>Lease boundary & approach road</td> <td>Neem, Pungan, Palam and other regional trees</td> <td>100</td> <td>80%</td> </tr> <tr> <td>Second</td> <td>Lease boundary & approach road</td> <td>Neem, Pungan, Palam and other regional trees</td> <td>100</td> <td>80%</td> </tr> <tr> <td>Third</td> <td>Lease boundary & approach road</td> <td>Neem, Pungan, Palam and other regional trees</td> <td>100</td> <td>80%</td> </tr> <tr> <td>Fourth</td> <td>Lease boundary & approach road</td> <td>Neem, Pungan, Palam and other regional trees</td> <td>100</td> <td>80%</td> </tr> <tr> <td>Fifth</td> <td>Lease boundary & approach road</td> <td>Neem, Pungan, Palam and other regional trees</td> <td>100</td> <td>80%</td> </tr> </tbody> </table>	Year	Place	Type of trees	No.of plants	Rate of survival	First	Lease boundary & approach road	Neem, Pungan, Palam and other regional trees	100	80%	Second	Lease boundary & approach road	Neem, Pungan, Palam and other regional trees	100	80%	Third	Lease boundary & approach road	Neem, Pungan, Palam and other regional trees	100	80%	Fourth	Lease boundary & approach road	Neem, Pungan, Palam and other regional trees	100	80%	Fifth	Lease boundary & approach road	Neem, Pungan, Palam and other regional trees	100	80%	
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iv).	Stabilization and vegetation of dumps along with waste dump management Year wise for the first five years (and upto conceptual plan period for 'A' category mines).	: No waste or rejects shall be proposed.																														
v).	Measures to control erosion / sedimentation of water courses.	: Not applicable. There are no major dumps are stabilizing in this quarry area.																														
vi).	Treatment and disposal of water from mine.	: It will not be harmful and it does not require any treatment before discharging into the natural courses.																														

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.
viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a small B2 category open cost, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

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

Not applicable. It is B2 category quarry

12.0 PROGRESSIVE MINE CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The present mining is proposed to an average depth of 20m below ground level (R.L.53-33m). The mined-out area will be fenced on top of open cast working with S1 fencing to arrest the entry of cattle's and public in to the quarry site.
12.2	Measures to be under taken on mine closure as per Act & Rules	:	Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by barbed wire fencing. Green belt development at the rate of 100 trees per year will be proposed. No immediate proposals for closure of pit as the

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MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

			rough stone persist still at deeper level.
12.3	Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area	:	The quarry lease is a fresh mining lease.
12.4	Mine closure activity	:	The mined-out area will be fenced on top of opencast working with S1 fencing. Low lying areas with water logging shall be used for fish culture. No immediate proposals for closure of pit as the rough stone persist still at deeper level.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine rules, 1960, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, dust mask, Ear muffs etc. have to be provided as per the circulars and amendments made for mine labours under the guidance of DGMS being a mechanized operation.
12.6	Disaster management and Risk Assessment	:	Opencast mining method is adopted in this quarry. If the benches are made with proposed height and width no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

		the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site.
12.7	Care and maintenance during temporary discontinuance	: During temporary discontinuance the working place will be fenced completely and a board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.
12.8	Economic repercussions of closure of quarry and manpower entrenchments	: During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 26 labors will be improved. During the next five-year compensations will be given as per rules.

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

A	Fixed Asset Cost:	
	1. Land Cost	: Rs.40,51,000/-
	2. Labour Shed	: Rs. 1,50,000/-
	3. Sanitary Facility	: Rs. 50,000/-
	4. Fencing	: Rs. 2,00,000/-
	Total	: Rs. 44,51,000/-
B	B. Machinery cost	: Rs.10,00,000/- (Hire Basis)
C	EMP Cost: per year (Minimum 2 station * 2 season):	
	1. Air quality test	: Rs. 20,000/-
	2. Water quality sampling(2No's)	: Rs. 12,000/-

MINING PLAN FOR SIRUDAMUR ROUGH STONE AND GRAVEL QUARRY

	3. Noise test	: Rs. 15,200/-
	4. Soil analysis	: Rs. 16,800/-
	Total cost	: Rs. 64,000/- per year
	Total cost for 5 Years	: Rs. 3,20,000
D	Total Expenditure cost (for five years)	
	1. Drinking Water Facility	: Rs. 1,00,000/-
	2. Sanitary Maintenance	: Rs. 75,000/-
	3. Water Sprinkling	: ---
	4. Afforestation etc.,	: Rs. 1,00,000/-
	5. Safety Kits	: Rs. 50,000/-
	Total	: Rs. 3,25,000/-
E	Total Project Cost (A+B+C+D)	: Rs. 60,69,000/-

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 rough stone and gravel quarry.

14.0 CERTIFICATES:

All required certificates are enclosed.

15.0 PLAN AND SECTIONS, ETC:

Plan and Sections are submitted along with mining plan.

16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the rough stone and gravel economically without any wastage and to improve the environment and ecology.
- (iii) The mining plan is prepared by incorporating the conditions stipulated in the precise area communication issued by The Assistant Director, Department of Geology and Mining, District collectorate, Kancheepuram vide letter **Rc.No. 740/Q3/2018 Dated 19.10.2020.**
- (iv) Total proposed production of rough stone is **98276Cbm** and gravel **27804Cbm** up to depth of 20m from below the ground level (R.L. 53-33m) which is 3m gravel and 17m rough stone (Refer Plate No's.IV & IVA) for the first 5 years plan period. Average production shall be **19655Cbm** of rough stone and **27804Cbm** of gravel per year.

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17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the lessee @ 2.5% of average net profit of the company for the last three financial years to the neighboring villages on the provisions under section 135(1) of the companies Act, 2013 and Rule 3(2) companies CSR Rules, 2014 as circular no.05/01/2014.

Place: Dharmapuri, TN

Date: 21/10/20

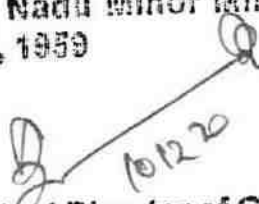
Signature of the Recognized Qualified Person.



Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
Govt. Regd. Geologist,
113-B, Ground Floor, Natesan Complex,
Collectorate Post Office
Oddapatti, Dharmapuri-636705.

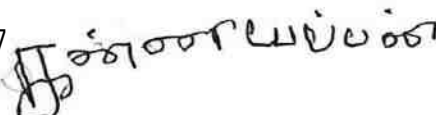
This Mining Plan is approved subject to the conditions / stipulations indicated in the Mining Plan approval Letter No. R.No. 740/Q3/2018. Dated. 10.12.2020.

This Mining Plan is approved as per the powers conferred Under Rule 41 (2) of Tamil Nadu Minor Mineral Concession Rules, 1959



**Assistant Director of Geology and Mining,
Kanchipuram District**

21/10/20



நக.எண். 740/க்யூ3 /2018,
நாள்.19.10.2020

உதவி இயக்குநர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை,
காஞ்சிபுரம்,

அறிவிக்கை

பொருள் : கனிமங்களும் குவாரிகளும் - சாதாரண கற்கள் மற்றும் கிராவல் மண் - காஞ்சிபுரம் மாவட்டம் - உத்திரமேரூர் வட்டம் - சிறுதாமூர் கிராமம் - புல எண்.319/1, 319/2, 319/3, 319/4 - மொத்த பரப்பு 1.62.00 ஹெக்டேர் - பட்டா நிலங்கள் - சாதாரண கற்கள் / கிராவல் மண் வெட்டி எடுக்க திரு. N. கன்னியப்பன் த/பெ. நாராயணப்பிள்ளை என்பவர் தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.19(1) -ன்கீழ் மனு செய்தது - அங்கீகரிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் - மாநில அளவிலான கற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் ஒப்புதல் பெற்று அளிக்க தெரிவித்தல் - தொடர்பாக.

- பார்வை :
1. திரு. N. கன்னியப்பன் த/பெ. நாராயணப்பிள்ளை, நீர்குன்றம் கிராமம், உத்திரமேரூர் வட்டம், காஞ்சிபுரம் மாவட்டம் என்பவரின் விண்ணப்பம் பெறப்பட்ட நாள்.14.12.2018.
 2. காஞ்சிபுரம் சார் ஆட்சியர் அறிக்கை எண். நக.592/2019/அ1, நாள்.29.05.2019.
 3. உதவி இயக்குநர் மற்றும் உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, காஞ்சிபுரம் அவர்களின் கூட்டு இடப்பார்வை அறிக்கை நாள் : .10.2020.
 4. அரசாணை எண்.Ms.No.79, தொழில் (எம்.எம்.சி.1) துறை, நாள். 06.04.2015.
 5. அரசாணை எண்.Ms.No.169, தொழில் (எம்.எம்.சி.1) துறை, நாள். 04.08.2020.
 6. அரசாணை எண்.Ms.No.208, தொழில் (எம்.எம்.சி.1) துறை, நாள். 21.09.2020.

தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.19(1)-ன்கீழ் காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராமம், புன் செய் புல எண்கள். 319/1(0.27.00), 319/2(0.54.00), 319/3(0.40.00), 319/4(0.41.00)-ல் மொத்த பரப்பு 1.62.00 ஹெக்டேர் பட்டா நிலத்தில் சாதாரண கற்கள் மற்றும் கிராவல்மண் வெட்டியெடுக்க ஐந்து ஆண்டுகளுக்கு காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், நீர்குன்றம் கிராமம் திரு. N. கன்னியப்பன் த/பெ. நாராயணப்பிள்ளை என்பவர் குவாரி குத்தகை உரிமம் கோரி விண்ணப்பித்துள்ள மனுவின் பேரில் காஞ்சிபுரம், சார் ஆட்சியர் மற்றும் காஞ்சிபுரம், புவியியல் மற்றும் சுரங்கத்துறை, உதவி இயக்குநர் (கனிமம்) ஆகியோர் மேற்காணும் விண்ணப்ப புலங்களில் தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 திருத்திய விதி எண்.19(a), (b), (c) மற்றும் 20-ன் கீழ் பார்வை 6-ல் கண்ட அரசாணையின்படி பத்து ஆண்டுகளுக்கு சாதாரண கற்கள் மற்றும் கிராவல் மண்

குவாரி குத்தகை அனுமதி கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு வழங்கலாம் என பார்வை 2 மற்றும் 3-ல் கண்டவாறு பரிந்துரை செய்துள்ளனர்.

1. விண்ணப்பப் புலங்களுக்கு அருகிலுள்ள அரசு புறம்போக்கு மற்றும் பட்டா நிலங்களுக்கு (விண்ணப்பதாரருக்கு சொந்தமான பட்டா குவாரிப் புல எண். 332/2 தவிர்த்து) முறையே 10 மீட்டர் மற்றும் 7.5 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு குவாரிப்பணி செய்யப்பட வேண்டும்.
2. விண்ணப்ப புலத்திரை ஒட்டினார் போல் சிறுதாமூர் பெரிய ஏரி புறம்போக்கு புலஎண்.317/-னை எவ்வித ஆக்ரமணமும் செய்யாமல் பாதுகாப்பு இடைவெளி 50 மீட்டர் விடப்பட்டு குவாரிப்பணி செய்ய வேண்டும்.
3. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.41-ன்படி விண்ணப்ப புலங்களுக்கு ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் (Approved Mining Plan) ஒப்புதல் பெற்றளிக்கப்பட வேண்டும்.
4. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.42-ன்படி விண்ணப்ப புலத்திற்கு மாநில அளவிலான சுற்றுச் சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் சுற்றுச்சூழல் ஒப்புதல் (Environment Clearance) பெற்று சமர்ப்பிக்கப்பட வேண்டும்.

எனவே பார்வை 5-ல் கண்ட அரசாணையில் அளிக்கப்பட்டுள்ள அதிகாரங்களின் அடிப்படையில் மேற்காணும் விண்ணப்பப் புலங்களில் சாதாரண கற்கள் மற்றும் கிராவல்மண் வெட்டியெடுக்க குத்தகை உரிமம் வழங்க அங்கீகரிக்கப்பட்ட சுரங்கத் திட்டத்தை (Approved Mining Plan) மூன்று மாதத்திற்குள் மாவட்ட ஆட்சியர் / உதவி இயக்குநர் முன்பு சமர்ப்பிக்க வேண்டியது. மேலும் மேற்காணும் விண்ணப்பப் புலங்களில் சாதாரண கற்கள் & கிராவல் மண் வெட்டியெடுக்க அனுமதி வழங்குவது தொடர்பாக மாநில சுற்றுச் சூழல் தாக்க மதிப்பீட்டு ஆணையம் (SEIAA) ஒப்புதலை பெற்று சமர்ப்பிக்க அறிவுறுத்தப்படுகிறது.

19/10/20
உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
காஞ்சிபுரம்.

பெறுநர்,
திரு. N. கன்னியப்பன்,
த/பெ. நாராயணப்பிள்ளை,
நீர்குன்றம் கிராமம்,
உத்திரமேரூர் வட்டம்,
காஞ்சிபுரம் மாவட்டம்.

21/10/20

நகல் :-

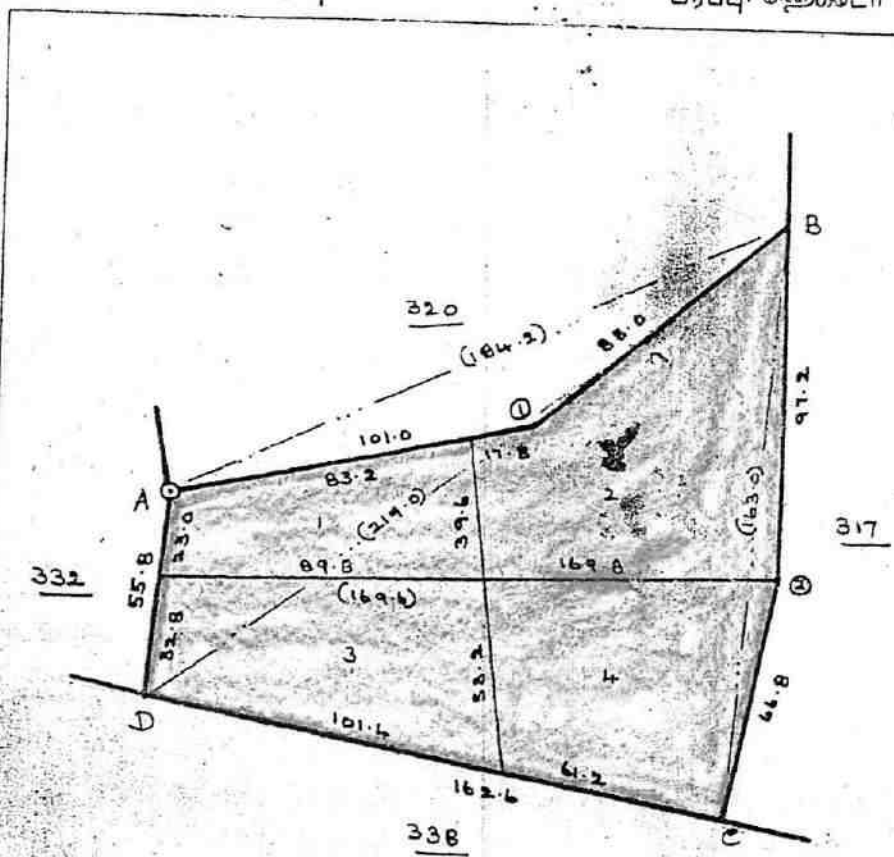
- 1) தலைவர், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம், சென்னை.
- 2) இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, கிண்டி, சென்னை 600 032.

வட்டம். உத்திரமேரூர்

புல எண். 317

கிராமம் {
எண். 83
பெயர். திருதாமூர்

பரப்பு: ஹெக்டேர் 1 ஏர். 62.0



True copy

LEASE APPLIED AREA

11/6/2020
கிராம நிர்வாக அலுவலர்
நெ.83, திருதாமூர்
உத்திரமேரூர் வட்டம்
காஞ்சிபுரம் மாவட்டம்

		C	
2	9.0	96.8	
		B	
		D	
		(219.0)	
		119.4	39.4
C	120.0	110.0	
		B	
		A	
		(84.2)	
1	22.2	85.6	
		B	

அளவு. 1:1 = 2000 ம.கீ.

[Signature]

1429 - ஆம் பசலியில் கர்த்தியம் மாவட்டம் உத்திரமேரூர் வட்டம் 83, சிறுதாழர் கிராமக் கணக்கு

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.					கைப்பற்று தாரகடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரகடைய பெயர்.	சாகுபடி யாளரின் பெயர்.	முதல் போகம்.					
(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)	(11)	(12)
319	1	0270	050	43	4109-கன்னியாகுமரி							
319	2	0540	100	100	4109- do-							
319	3	0400	074	100	4109- do-							
319	4	0410	076	100	4109- do-							

(9) கன்னியாகுமரி
 கிராம நிர்வாக அலுவலர்
 நெ. 83, சிறுதாழர்
 உத்திரமேரூர் வட்டம்
 காரைசிபுரம் மாவட்டம்

எண் 2 கிராமத்தில் வருடவாரி புலவாரி கைப்பற்று சாகுபடி அடங்கல் கணக்கு

இரண்டாம் போகம்.					கிராம அலுவலரின் குறிப்புரை :- (1) புலன்களின் பகுதிகளில் மட்டும் பயிரிடப்பட்ட இளங்களில் விட்டுக்கள் அளவில் கைப்பற்றில் இல்லாத களின் சாகுபடியின் தன்மையும் மாதத்தில் பாப்ச்சல் உதவிவின்றி பயிரிடப்பட்டவை என்று பதிவாகியுள்ள களுக்கு பிந்தைய மாதங்களில் நீர் பாப்ச்சப்பட்ட விவரங்கள்.	கீழ்க்கண்டவகையில் பயிரிடப்படாது உள்ள நிலத்தின் தன்மை மற்றும் பரப்பின் விவரங்கள் ஒவ்வொரு நில அளவை எண் அல்லது அதன் பகுதியில். (அ) வளம், (ஆ) பயளற்ற பயிர் செய்ய இயலாத நிலம், (இ) விவசாயம் மற்றும் இதர காரியங்களுக்கு பயன் படுத்தப் படும் நிலம், (ஈ) பயிரிடத்தக்க தரிக (உ) நிலையான புல் தரைகளும் மற்றும் இதர மேய்ச்சல் நிலங்களும், (ஊ) விதைக்கப்பட்ட நிகர பரப்பில் சேர்க்கப்படாத மரவகைப் பயிர்களும் தோப்புகளும், - (எ) நடப்புத் தரிககள் (ஏ) இதர தரிக நிலங்கள்.	பயிர் பார்வையிடும் அலுவலர் குறிப்புகள்.					
(13)	(14)	(15)	(16)	(17)				(18)	(18அ)	(19)		

கன்னியாகுமரி

No. 269
SRAJDAHOOOR
KANCHERUPURAM TALUK
KANCHERUPURAM DISTRICT

Area by {
 Ponds 225.57 Acres (923.39 Hectares)
 Tanks 228.23 Acres (923.39 Hectares)
 Total 453.80

Published under order 1175 of the
 Madras District Ponds and Canals
 Revenue Act (Madras Act 1928)
 revised with Amendment Act 1933

Map No. 269

Scale of 1 inch = 1 mile

Published in 1933 by the
 Government of Madras
 Printed at the Government Press,
 Madras

Published under order 1175 of the
 Madras District Ponds and Canals
 Revenue Act (Madras Act 1928)
 revised with Amendment Act 1933

Map No. 269

Scale of 1 inch = 1 mile

Published in 1933 by the
 Government of Madras
 Printed at the Government Press,
 Madras

Published under order 1175 of the
 Madras District Ponds and Canals
 Revenue Act (Madras Act 1928)
 revised with Amendment Act 1933

Map No. 269

Scale of 1 inch = 1 mile

Published in 1933 by the
 Government of Madras
 Printed at the Government Press,
 Madras



Group No.	Name
1	Venkataraman Pillai
2	Prasanna Pillai
3	Palayandi Pillai
4	Palayandi Pillai
5	Palayandi Pillai
6	Palayandi Pillai
7	Palayandi Pillai
8	Palayandi Pillai
9	Palayandi Pillai
10	Palayandi Pillai
11	Palayandi Pillai
12	Palayandi Pillai
13	Palayandi Pillai
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15	Palayandi Pillai
16	Palayandi Pillai
17	Palayandi Pillai
18	Palayandi Pillai
19	Palayandi Pillai
20	Palayandi Pillai
21	Palayandi Pillai
22	Palayandi Pillai
23	Palayandi Pillai
24	Palayandi Pillai
25	Palayandi Pillai
26	Palayandi Pillai
27	Palayandi Pillai
28	Palayandi Pillai
29	Palayandi Pillai
30	Palayandi Pillai
31	Palayandi Pillai
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33	Palayandi Pillai
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37	Palayandi Pillai
38	Palayandi Pillai
39	Palayandi Pillai
40	Palayandi Pillai
41	Palayandi Pillai
42	Palayandi Pillai
43	Palayandi Pillai
44	Palayandi Pillai
45	Palayandi Pillai
46	Palayandi Pillai
47	Palayandi Pillai
48	Palayandi Pillai
49	Palayandi Pillai
50	Palayandi Pillai

M 3 - This village is now surveyed and shown on the map of the village as usual before.

Under Order 1175 of the
 Madras District Ponds and Canals
 Revenue Act (Madras Act 1928)
 revised with Amendment Act 1933

Scale of 1 inch = 1 mile

Scale of 1 inch = 1 mile

Scale of 1 inch = 1 mile

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
 ROP/MAS/263/2014/A

சுப்பண்ணா



தமிழ்நாடு TAMILNADU

N. சின்னையப்பன்
நிதி அலுவலர்

BP 360420
S. Jayachitra

S. ஜெயசித்ரா
உ.எண். 08/CGJ/2008
மாத்திரைத்தான் விற்பனைகாரர்
பொற்பந்தல்.
ரூபாய் 100/- , எ.எண். 2652
திகதி 14.05.2018

-2-

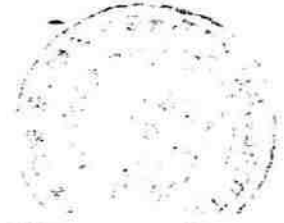
காஞ்சிபுரம் மாவட்டம், மானாம்பதி, விகுர், பாடசாலைத் தெரு, எண். 2/148, அஞ்சல் குறியீட்டு எண். 603403 விலாசத்தில் வசிக்கும் திரு. ராஜமாணிக்கம் அவர்களின் குமாரத்தியும், திரு. முருகன் அவர்களின் மனைவியுமான திருமதி. M. விஜயலட்சுமி -4,(ஆதார் அடையாள அட்டை எண். 582867100937) ஆகிய நாங்கள் சம்மதித்து எழுதிக் கொடுத்த புன்செய் நிலங்கள் சுத்த விக்கிரையப் பத்திரம்.

சின்னையப்பன்

- 1) R. Mathavar
- 2) R. Sankaran
- 3) R. Kannadeg
- 4) மனசுவலட்சுமி

1	மே 2018	540	ஆவணம்
25	தாள்களைக் கொண்டிருக்கிறது.		
2	வரு நாள்		

பதிவு அலுவலர்



சின்னையப்பன்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. சண்முகம்
சென்னை

BP 360421
S. Jayachitra
S. ஜெயசித்ரா
உ.எண். 06/CGL/2008
முத்திரைத்தாள் விநியோகம்
பெற்றதில்.
தூய்மை 100/- உடனடி 2653
தேதி 14-05-2018

-3-

என்னவென்றால், காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், 83-ம் எண். சிறுதாலூர் கிராமத்தில் இந்த சொத்து விவரத்தில் கண்ட புன்செய் சர்வே எண். 319/1 ஏக்கர் 0.67 செண்ட் பூரா. புன்செய் சர்வே எண். 319/2 ஏக்கர் 1.33 செண்ட் பூரா. புன்செய் சர்வே எண். 319/3 ஏக்கர் 0.99 செண்ட் பூரா. புன்செய் சர்வே எண். 319/4 ஏக்கர் 1.01 செண்ட் பூரா. நிலங்களானது சென்ற 05-04-2018 தேதியில் எங்களில் 1 முதல் 3 வரை இலக்கமிட்ட நபர்களின் பெயரில் எங்களின் தகப்பனார் ஒரு செட்டில்மெண்ட் பத்திரம் எழுதி கொடுத்து அந்த பத்திரமானது சாலவாக்கம் சார்பதிவகத்தில் தாக்கல் செய்யப்பட்டு 1 பத்தகம் 2018 ஆம் ஆண்டின் 327 ஆம் எண் ஆவணமாக பதிவு செய்யப்பட்டும்,

சண்முகம்

- 1) R. Mathas
- 2) R. Sankaran
- 3) R. Kumaresan
- 4) R. Sankaran

1 புது 2018
25 தாக்கல் செய்யப்பட்டது.
3 வது தாள்
பதிவு செய்யப்பட்டது 540 ம் ஆவணம்
பதிவு செய்யப்பட்டது 274

சண்முகம்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. சன்னியப்பன்
நிருகண்டம் கிராமம்

-BP 360422
S. ஜெயசித்ரா
S. ஜெயசித்ரா
உ.என். 08/CGJ/2008
முத்திரைத்தாள் விற்பனையாளர்
பொற்பந்தல்.
ரூபாய் 100/- .வ.எண் 2654
தேதி 14-05-2018

-4-

எங்களில் 1 முதல் 3 வரை இலக்கமிட்ட நபர்களின் பெயரில் பட்டா எண். 4163 ஆக தாக்கலாய் உள்ளதும், எங்களில் 4வது நபர் 1 முதல் 3 வரை இலக்கமிட்ட நபர்களின் சகோதரி என்ற முறையிலும், அவர் இராஜமாணிக்கம் அவர்களின் குமாரத்தி என்ற முறையிலும், ஆக நாங்கள் சர்வ சுதந்திரமாய் சகலவித அதிகாரங்களுடன் ஆண்டு அனுபவித்து வருகின்றதும், எங்களது சுவாதீனத்திலும் அனுபவித்திலும் இருந்து வருகின்ற சொத்துக்களாகும். இந்த சொத்து விவரத்தில் கண்ட சொத்துக்களை நாங்கள் இன்று தேதியில் தங்களுக்கு கிரையம் கொடுப்பதாக கிரையத் தொகை நிச்சயித்த ரொக்கம் ரூபாய். 40,51,000/- (எழுத்தால் ரூபாய். நூற்பது இலட்சத்து ஐம்பத்து ஓராயிரம்) மட்டும்.

- சன்னியப்பன்

- 1) R. Mathar
- 2) R. Sannasam
- 3) R. Kamalajay
- 4) Manoj walar

1 மார்ச்சு 2018ல் வரி தொகை 540 ம் ஆவணம்
25 நாட்களில் செலுத்தியது.
4 வது நாள்
பதிவு ஆளுவனர்



சன்னியப்பன்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. சண்முகம்
நெடுஞ்செழியன் கிராமம்

BP-360423

S. Jayachitra

S. ஜெயசித்ரா
உ.எண். 06/CGL/2008
முத்திரைத்தாள் விற்பனையாளர்
பொற்பந்தல்.
ரூபாய் 100/- வ.எண் 2655
முக்தி 14-05-2018

முக்தகம் 2018ம் ஆண்டு/அக்டோபர் 540ம் ஆவணம்
தாள்களைக் கொண்டு.
5 வது நாள்
பதிவு செய்யப்பட்டது

இதில் எங்களில் 1வது நபர் மாதவன் அவர்கள் உள்ளவார், கரூர் வைஸ்யா வங்கியின் RTGS UTR NO. KVBLR52018051500333369 மூலம் ரூபாய் 3,00,000/- (மூன்று இலட்சம்) மற்றும் உள்ளவார், கரூர் வைஸ்யா வங்கியின் கேட்பு வரைவோலை எண். 784211 மூலம் ரூபாய் 10,00,000/- (பத்து இலட்சம்) 2வது நபர் சங்குபாணி அவர்கள் உள்ளவார், கரூர் வைஸ்யா வங்கியின் RTGS UTR NO. KVBLR52018051500333488 மூலம் ரூபாய் 3,00,000/- (மூன்று இலட்சம்) மற்றும் உள்ளவார், கரூர் வைஸ்யா வங்கியின் கேட்பு வரைவோலை எண். 784212 மூலம் ரூபாய் 10,00,000/- (பத்து இலட்சம்) மற்றும் 3வது நபர் கண்ணதாசன் அவர்கள் உள்ளவார், கரூர் வைஸ்யா வங்கியின் RTGS UTR NO. KVBLR52018051500333507 மூலம் ரூபாய் 4,00,000/- (நான்கு இலட்சம்) மற்றும் உள்ளவார், கரூர் வைஸ்யா வங்கியின் கேட்பு வரைவோலை எண். 784210 மூலம் ரூபாய் 10,00,000/- (பத்து இலட்சம்) பெற்றுக் கொண்டனர். RTGS மற்றும் கேட்பு வரைவோலையாக ரூபாய் 40,00,000/- (நாற்பது இலட்சம்) மற்றும் ரொக்கமாக ரூபாய் 51,000/- (எழுத்தால் ரூபாய் ஐம்பத்து ஒன்றாயிரம்) 1 முதல் 3 நபர் பெற்றுக் கொண்டனர். இதில் 4வது நபர் விஜயலட்சுமி அவர்கள் அவருக்குண்டான கிரையத் தொகையை தனது சகோதரர்கள் அவர்கள் இடையே பெற்றுக் கொண்டனர்.

சண்முகம் R. M. Sivan

3) R. Srinivasan

2) R. Srinivasan

4) மலையாள ரூபாய்

சண்முகம்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. கண்ணியப்பன்
தேயங்குடி இராஜம்

BP 360424
S. ஜெயசித்ரா
உ.எண். 08/CGL/2008
முத்திரைத்தாள் விற்பனைகள்
பொற்பத்தல்.
ரூபாய் 100/- .வ.எண் 2656
தேதி 14.05.2018

-6-

ஆக மொத்தம் கிரையத் தொகை ரூபாய் 40,51,000/- (நூற்பது இலட்சத்து ஐம்பத்து ஓராயிரம்) நாங்கள் எங்களது குடும்ப செலவினங்களுக்காக மேற்படி விவரப்படி பெற்றுக் கொண்டோம். கிரையத் தொகை முழுவதும் எங்களுக்கு சேர்ந்துவிட்டபடியால் சொத்து விவரத்தில் கண்ட புன்செய் நிலங்களை இன்றே தங்களின் சுவாதீனம் செய்துவிட்டோம். இது முதற்கொண்டு தாங்களே கைப்பற்றி தங்களின் பெயரில் பட்டா மாற்றம் செய்து கொண்டு சர்வ சுதந்திரமாய் சகலவித அதிகாரங்களுடன் புத்திர பௌத்திர பாரம்பரியமாய் தானாதி வினிமிய விக்கிரையங்களுக்கு உரித்தாய் ஆண்டு அனுபவித்துக் கொள்ள வேண்டியது.

✓ கண்ணியப்பன்

1) R. Mathan

2) R. Saravanan

3) R. Kamalath

4) மனதுபலபு

11 மார்ச் 2018ம் தேதி 540ம் ஆவணம்
25 தாக்கவாங்காவப்பது.
6 வரு தாளர்
பதிவு அலுவலர்





தமிழ்நாடு தமில்நாடு TAMILNADU

N. கண்ணியப்பன்
பிடுஞ்சேறும் இராமன்

BP 360425
S. Jaya Jatra

S. ஜெயசித்ரா
உ.எண். 06/CGL/2008
மத்திரைத்தான் விற்பனையாளர்
பொற்பத்தல்.
ரூபாய் 100/- வ.எண் 2657
திகதி 14-05-2018

-7-

இந்த சொத்து விவரத்தில் கண்ட கிரையச்சொத்தின் மீது யாதொரு விதமான முன் கலன் அகீரு வில்லங்க தகாதாக்கள், வங்கி கடன்கள், பிறகடன்கள், டைட்டில் வாரிசு தகராறுகள், கோர்ட் அட்டாச்மெண்ட், நீதிமன்ற உறுத்துக்கட்டளைகள், ஜப்தி நடவடிக்கைகள், முன்கிரைய உடன்படிக்கைகள், மூல ஆவண வைப்பு, உடன்படிக்கைகள், போன்ற எந்தவிதமான வில்லங்க தகாதாக்களும் இல்லை எனவும் அப்படி யாதாகிலும், இருப்பதாக பின்னிட்டு தெரிந்திடும் அவைகளை நாங்களே முன்னின்று எங்களது சொந்த செலவில் வில்லங்கத்தை தீர்த்து தருகிறோம். புன்செய் சர்வே எண்.319/3 -ல் உள்ள கிணர், 3.H.P மின் மோட்டார், 3.H.P மின் இணைப்பு இதன் எண். 178 இதன் வையுப்த் தொகை உள்படவும், கிரையம் செய்யப்பட்டது. மின் இணைப்பு எண். 178 இதன் வையுப்த் தொகை இவைகளை தங்களின் பெயர் மாற்றம் செய்து கொள்ள வேண்டியது.

சுண்ணயப்பன்

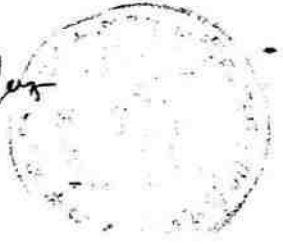
1) R. Mathan

2) R. Sankarmani

3) R. Kumalafaz

4) மல ஜயலிபு

புத்தம்ப 20180 பதிவுத்திய 540 ஆவணம்
25 தாள்களைப் பெறப்பட்டது.
பதிவு ஆலயவர்



சுண்ணயப்பன்



தமிழ்நாடு தமில்நாடு TAMILNADU

சு. ந. கண்ணியப்பன்.
 தந்திரமும் திருவள்ளூர்

BP 360426
 S. Jeyasithira
 S. ஜெயசித்ரா
 உ.எண். 08/CGL/2008
 முத்திரைத்தான் விற்பனைகளைப்
 பொறுத்தல்.
 ரூபாய் 100/-வ.எண் 2658
 தேதி 14-05-2018

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இந்த சொத்து விவரத்தில் கண்ட சொத்து சம்மந்தமாக நாங்கள் பிற்காலத்தில் ஆவணங்கள் ஏதாகிலும் எழுதிக் கொடுக்க வேண்டியிருந்தால் அவற்றையும் எவ்வித பிரதி பலனும் எதிர்பாராமல் எழுதிக் கொடுக்க சம்மதிக்கிறோம். இதுமுதற்கொண்டு இந்த சொத்து விவரத்தில் கண்ட சொத்தின் மீது எங்களுக்கோ, எங்களுடைய வாரிசுகளுக்கோ, எவ்வித உரிமையும், பாத்தியதையும், பின்தொடர்ச்சியும் கிடையாது என்று உறுதி கூறுகிறோம். இந்தப்படிக்கு நாங்கள் சம்மதித்து எழுதிக் கொடுத்த புன்செய் நிலங்கள் சுத்த விக்கிரையப் பத்திரம்.

✓ சு. ந. கண்ணியப்பன்

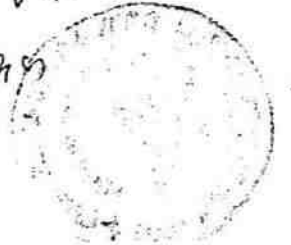
1) R. Mathur

2) R. Sankaran

3) R. Kumalaraj

4) Manoj Kumar

1 புத்தகம் 2018ல் ஒட்டுதலில் 540ல் ஆவணம்
 25 நாள் காலம் கொண்டு.
 8 வருட நாள் பதிவு அலுவலர்



சு. ந. கண்ணியப்பன்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. சன்னியப்பன்
நீதித்துறை இயக்குநர்

BP 360427
S. Jaya Jitra

S. ஜெயசித்ரா
உ.எண். 06/CGL/2008
முத்திரைத்தாள் விற்பனைப்பாளர்
பொற்பந்தல்.
ரூபாய் 100/- வ.எண் 2659
தேதி 14-05-2018

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சொத்து விவரம்

காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சாலவாக்கம் சார்பதிவகத்தைச் சேர்ந்த

83-ம் எண். சிறுதாலூர் கிராமம் பட்டா எண்.4163-ல் அடங்கிய

புன்செய் சர்வே எண். 319/1 - எக்டர் 0.27.0 ஏர்ஸ் அல்லது ஏக்கர் 0.67 செண்ட் பூரா,

புன்செய் சர்வே எண். 319/2 - எக்டர் 0.54.0 ஏர்ஸ் அல்லது ஏக்கர் 1.33 செண்ட் பூரா,

புன்செய் சர்வே எண். 319/3 - எக்டர் 0.40.0 ஏர்ஸ் அல்லது ஏக்கர் 0.99 செண்ட் பூரா,

புன்செய் சர்வே எண். 319/4 - எக்டர் 0.41.0 ஏர்ஸ் அல்லது ஏக்கர் 1.01 செண்ட் பூரா,

புன்செய் சர்வே எண்.319/3 -ல் உள்ள கிணர், 3.H.P மின் மோட்டார், 3.H.P மின் இணைப்பு இதன் எண்.

178 இதன் வைப்புத் தொகை உள்படவும்,

சன்னியப்பன்

1) R.Mohan

2) R.Sankaran

3) R.Kumalaraj

4) Manikavelu

1 முதல் 2018 டி 31 வரையில் 540 டி ஆவணம்
25 தாள்களைக் கொண்டது.
9 வருடம் பதிவு செய்யப்பட்டது.

சன்னியப்பன்



தமிழ்நாடு TAMILNADU

N. சண்முகம்
சுருதிநாடு இரண்டாம்

BP 360428

S. Jayachitra

S. ஜெயசித்ரா
உ.எண். 08/CGL/2008
முத்திரைத்தான் விநியோகியைப்
பொறுத்தல்.
ரூபாய் 100/- உடன் 2660
திகதி 14.05.2018

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ஆகக் கூடுதல் ஏக்கர் 4.00 செண்ட்(நான்கு ஏக்கர்) கிரையம் செய்யப்பட்டது. இந்த சொத்துக்களானது உத்திரமேரூர் ஊராட்சி ஒன்றியத்தைச் சேர்ந்த சிறுதாலூர் ஊராட்சி மன்ற எல்லைக்குட்பட்டது.

சண்முகம்

- 1) R. Mathias
- 2) R. Sankarmani
- 3) R. K. Subramanian
- 4) M. Anandavelu

1 பத்தம் 2018ம் ஆண்டு 540 ப் ஆவணம்
25 நாட்களில் கட்டப்படும்.
10 ரூபாய்
பதிவு அலுவலர்



சண்முகம்



தமிழ்நாடு தமில்நாடு TAMILNADU

N. கன்னியப்பன்
நீர்குன்றம் கிராமம்.

BP 360429

S. Jaya Jitra

S. ஜெயசித்ரா
உ.எண். 06/CGL/2008
முத்திரைத்தாள் விற்பனைப்பாளர்
பொற்பந்தல்.
ரூபாய் 100/- உ.எண் 2661
தேதி 14.05-2018

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இந்த சொத்துக்களின் தற்கால சந்தை மதிப்பு ரூபாய்.40,51,000/-தாளக்கூடியது.

கிரையம் பெறுபவர்

✓ கன்னியப்பன்

சாட்சிகள்

1) K. A. P. P.

த/பெ. கன்னியப்பன் நீர்குன்றம் கிராமம்

கிரையம் கொடுப்பவர்கள்

1) R. Mathan

2) R. Sankaran

3) R. Sankaran

4) M. Sankaran

2) R. Sankaran

த/பெ. ராஜேந்திரன் எண். 2/4

ஜோதிநகர் மெயின் ரோடு, ஈக்காட்டுத்தாங்கல், சென்னை, 32

இந்த ஆவணம் தயாரித்தவர்:-

Suresh

A.K. SURESH
Document Writer
L. No. A/1107 / cgl / 93
Anambakkam

14.05.2018ம் தேதி 540 ரூபாய்
25 நாள் காலத்திற்குள்ளாகும்.
பதிவு செய்தவர்

கன்னியப்பன்

-12-

இணைப்பு

இந்திய முத்திரைச் சட்டம் 3 (1)-ன் கீழ் பத்திரங்களின் மதிப்பை குறைப்பை தடுப்பதற்கான

விவரப்பட்டியல் 83-ம் எண். சிறுதாமூர் கிராமத்தில் அடங்கிய.

வரிசை எண்.	சர்வே எண் உட்பிரிவு	ஏக்கர்- செண்ட்	சொத்தின் தன்மை	மதிப்பு ரூபாய்
1	319/1	0.67	புன்செய்	6,70,000/-
2	319/2	1.33	புன்செய்	13,30,000/-
3	319/3	0.99	புன்செய்	9,90,000/-
4	319/4	1.01	புன்செய்	10,10,000/-
5	319/3	உள்ள	கிணர் மதிப்பு	20,000/-
6	319/3	3.H.P	மின் மோட்டார் மதிப்பு	30,000/-
7	319/3	3.H.P	மின் இணைப்பு எண்.178 வைப்புத் தொகை	1,000/-
ஆக	மொத்தம்	4.00	புன்செய்	40,51,000/-

கிரையம் பெறுபவர்

✓ ஈர்ணையப்பன்

கிரையம் கொடுப்பவர்கள்

1) R. Mathan

2) I. Sankaranarayanan

3) R. Kumalakshmi

4) Manojkumar

1	மார்ச் 2018 ம் வரையில் 540 ரூ ஆவணம்
25	தாமதமான கமிஷன்
12	வரு தாள்

பதிவு அலுவலர்



5/15/2018

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : காஞ்சிபுரம்

வட்டம் : உத்திரமேரூர்

வருவாய் கிராமம் : சிறுதாமூர்

பட்டா எண் : 4163

உரிமையாளர்கள் பெயர்

1.	ராஜமாணிக்கம் பிள்ளை	மகன்	மாதவன்
2.	ராஜமாணிக்கம் பிள்ளை	மகன்	சங்குபாணி
3.	ராஜமாணிக்கம் பிள்ளை	மகன்	கண்ணதாசன்

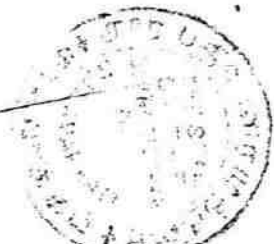
நன்செய்		புன்செய்		மற்றவை			
பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை		
புல எண்	உட்பிரிவு	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை
319	1	--	--	0 - 27.00	0.50	--	--
319	2	--	--	0 - 54.00	1.00	--	--
319	3	--	--	0 - 40.00	0.74	--	--
319	4	--	--	0 - 41.00	0.76	--	--
				1 - 62.00	3.00		

குறிப்பு 2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 03/03/083/04163/40364 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 15-05-2018 அன்று 11:08:08 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

1 பத்தகம் 2018 ல் வசூல்தீய 540 ல் ஆவணம்
25 நாள் காலம் கொடுக்கப்பட்டது.
13 வருட நாள்
பதிவு அலுவலர்





சாத்திரம்
சாத்திரம்
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சாத்திரம்



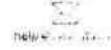
4778 6355 6599

சாத்திரம் மனிதனின் அதிகாரம்

சாத்திரம்
சாத்திரம்
சாத்திரம்
சாத்திரம்
சாத்திரம்

சாத்திரம்
சாத்திரம்
சாத்திரம்
சாத்திரம்
சாத்திரம்

4778 6355 6599



✓ சாத்திரம் மனிதனின் அதிகாரம்

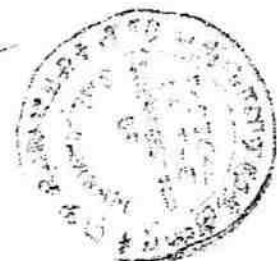
✓ R. Mathan

✓ R. Srinivasan

✓ R. Sundar

✓ R. Sundar

1 பத்திரம் 2018 டி 25 - 540 டி 25 வரை
25 தாள்களைக் கொண்டது.
14 வது தாள்
பதிவு எண்



TAX DEPARTMENT
NARAYANAN



भारत सरकार
GOVT. OF INDIA

06/10/1950
Permit/Account Number
DXSEK5378D

N. Narayanan
Signature

In case this card is lost / found, kindly inform / return to
Income Tax PAN Services Unit, UHITSU,
Plot No. 3, Sector 11, CBD Belapur,
Navi Mumbai - 400 612.

इस कार्ड के खोने/पाने पर कृपया सूचित करें/लौटायें :
आपका पैन सेवा यूनिट, UHITSU,
प्लॉट नं: 3, सेक्टर 11, सी.बी.डी. बेलपुर,
नवी मुंबई-400 612.

✓ ஜெனரல் மறுபார்வை

✓ R. Mathan

✓ R. Sankaran

✓ R. Sankaran

✓ மறுபார்வை

1 புதுப்பிப்பு 2018-ம் ஆண்டு 540-ல் ஆவணம்
25 தரக்கணக்கினைக் கட்டி.
15 நாள் தள்ளி
புதிൽ அட்டை



✓ ஜெனரல் மறுபார்வை


இந்திய அரசாங்கம்
 Government of India


 மதுவன் ராஜமணிக் கம்
 Mathavan Rajamanikkam
 பிறந்த நாள்/DOB: 06/04/1976
 ஆண் / MALE



2001 6564 2493
 VID: 9142 4642 1517 8992

எனது ஆதார். எனது அடையாளம்


இந்திய தனிமுகை அடையாளம் அமைப்பு
 Unique Identification Authority of India



முகவரி:
 S/O: ராஜமணிக் கம், 104, கே.எஸ்.பி நகர்,
 கஞ்சிபுரம், கஞ்சிபுரம், கஞ்சிபுரம்,
 தமிழ்நாடு 631501

Address:
 S/O: Rajamanikkam, 104, K.S.P NAGAR,
 KANCHIPURAM, Kancheepuram,
 Tamil Nadu - 631501


2001 6564 2493
 VID: 9142 4642 1517 8992

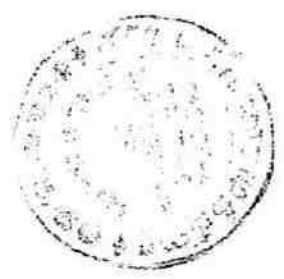


சுண்ணியப்பன்

- 1) R. Mathan
- 2) R. Sanganani
- 3) R. K. Subash
- 4) M. R. Subash

1 மத்திய 2018 டி 25 ஆம் திகதி 540 டி ஆவணம்
 25 தாக்கீதம்/பெயர்/பெயர்
 16 வரு தார்


 பதிவு ஆலோசகர்




28 சுண்ணியப்பன்


 भारत सरकार
 GOVERNMENT OF INDIA

 சங்குபாணி ராஜமணிக்கம்
 Sangupani Rajamanickam
 பிறந்த நாள் / DOB : 15/10/1981
 ஆண் / MALE

 2245 8318 4026

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

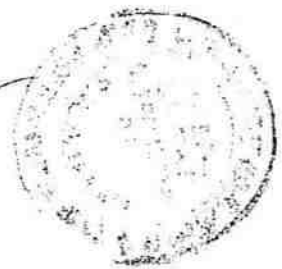

 भारत प्रविधिकरण प्राधिकरण
 UNIQUE IDENTIFICATION AUTHORITY OF INDIA
 முகவரி: S/O ராஜமணிக்கம், என் 121, பிள்ளையார் கோவில் தெரு, கிஞ்சிப்புரம், காஞ்சிபுரம், தமிழ் நாடு, 631606
 Address: S/O Rajamanickam, No 121, Pillayar Kovil Street, Sirudamur, Kancheepuram, Tamil Nadu, 631606


 1947 1800 300 1947 help@uidai.gov.in www.uidai.gov.in P.O. Box No.1947, Bengaluru-560 001

✓ கண்ணயப்பன்

- 1) R. Mathias
- 2) R. Sangupani
- 3) R. Kumudhary
- 4) Manaswali Devi

பத்திரம் 2018 இல் எட்டிவந்திய 540 இல் ஆவணம்
 05 நாள் காலமாக தொண்டிட்டு.
 17 வருடம் பதிவு செய்யலாம்



288 கண்ணயப்பன்


 இந்திய அரசாங்கம்
 Government of India

 கன்னடசன் ரா
 Kannadasan R
 பிறந்த நாள்/DOB: 09/05/1984
 ஆணர்/ MALE


 6213 9969 9900
 VID: 9104 0275 6192 1060
 எனது ஆதார். எனது அடையாளம்


 இந்திய அடையாளம் அமைப்பு
 Unique Identification Authority of India

 QR Code with Photograph
 முகவரி:
 S/O ராஜமணிக்கம், எண் 121, சிந்துமூர்
 கிராமம், பழையசேவரம் வட்டி உதிராமூர்
 வட்டம், சிந்துமூர், காஞ்சிபுரம்,
 தமிழ் நாடு - 631606
 Address:
 S/O Rajamanikkam, No 121, Sinthumar
 Village, Palayaseevaram Via Uthiramerur
 Taluk, Sirudamur, Kancheepuram,
 Tamil Nadu - 631606
 6213 9969 9900
 VID: 9104 0275 6192 1060

சின்ன யப்பன்

1) R. Mathias

2) R. Sandurani

3) R. Kumalesh

4) Manjula Devi

பந்தகம் 2018	540
25	சான்றிதழ்
18	வருடம்

பதின அறுவயல்



भारत सरकार
GOVERNMENT OF INDIA

भारतीय पहचान प्रमाणिका
INDIAN BIOMETRIC IDENTIFICATION AUTHORITY



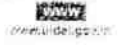
சான்று: சனி ராஜமணிகம்
Sankarini Rajamanickam
பிறந்த நாள் / DOB : 15/10/1981
பால: MALE
2245 8318 4026



Address:
S/O ராஜமணிகம், பண்
121, பிள்ளையார் கோவில்
பெரு, சிறு முல், கங்கேபுரம்,
தமிழ் நாடு, 631606

Address:
S/O Rajamanickam, No 121,
Pillayar Kovil Street, Sirudamur,
Kancheepuram, Tamil Nadu,
631606

சான்று: சனி ராஜமணிகம் அதிகாரம்

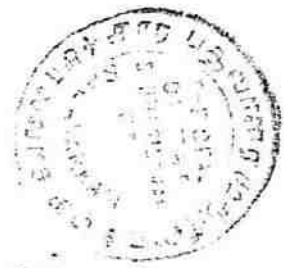


P.O. Box No. 1947
Bengaluru-560 201

சான்று: சனி ராஜமணிகம்

- 1) R. Mathan
- 2) R. Sankarmani
- 3) R. K. K. K.
- 4) M. S. S. S.

1 மார்ச் 2018 ம் தேதி 540 ம் ஆவணம்
25 நாட்களுக்குள்ளாகப் படி.
19 வருடம்
பதிவு செய்தவர்



சான்று: சனி ராஜமணிகம்

राजकर विभाग
INCOME TAX DEPARTMENT
KAL. DA. ANR



भारत
GOVT. OF INDIA

RAJAMANIKKAM

09/05/1984

Permanent Account Number

EOTPK5760Q

R. K. Mathias
Signature



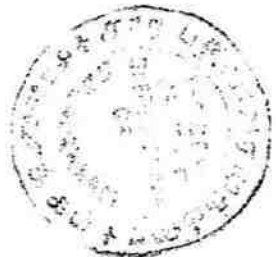
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Plot No. 3, Sector 11, CBD Belapur,
Navi Mumbai - 400 614.
इस कार्ड के खोने/पाने पर कृपया सूचित करें/सीटारें :
जायकार पैन सेवा यूनिट, UTIITSL,
प्लॉट नं: 3, सेक्टर 11, सी 11 डी बेलपुर,
नवी मुंबई-400 614

சென்னை ஸ்டாப்



- 1) R. Mathias
- 2) R. Samburam
- 3) R. K. Mathias
- 4) Manojwarathar

1	பெற்றல் 2018-ம் ஆண்டுக்கு 540-ல் ஆவணம்
25	தாள்களைக் கொடுக்கிறது.
20	வாறு தரல்



[Signature]
பதிவு அதிகாரி



சென்னை ஸ்டாப்

 Government of India





 Government of India


INFORMATION
 This is proof of identity, not of citizenship.
 To establish identity, authenticate online.

2. இலக்கம் உங்கள் சேவை எண்
5828 6710 0937
 உங்கள் சேவை எண்ணின் அகிலம்

உங்கள் சேவை எண்ணின் அகிலம்
 உங்கள் சேவை எண்ணின் அகிலம்
 உங்கள் சேவை எண்ணின் அகிலம்
 உங்கள் சேவை எண்ணின் அகிலம்
 உங்கள் சேவை எண்ணின் அகிலம்



 5828 6710 0937
 உங்கள் சேவை எண்ணின் அகிலம்



 5828 6710 0937

சேவையளிப்பவர்

A. Mathias
 P. Sankaran
 R. Sankaran
 ம. சேவையளிப்பவர்

30/06/2018

சென்னை கார்ப்பரேஷன்
சென்னை கார்ப்பரேஷன்



பெயர்
S/K
பால / DOB : 01/06/1986
பால
MALE



20 3152

மாண்புமிகு மனிதனின் அதிகாரம்

முகவரி
S/O கன்னியாப்பன் ந. 45,
மாரியம்மன் கோயில் தெரு,
நீர்க்குண்டம், கர்ச்சேபுரம்,
தமிழ் நாடு, 603107

Address
S/O Kanniyappan N, 45,
MARIYAMMAN KOIL STREET,
Neerkundram, Kanchcheepuram,
Tamil Nadu, 603107

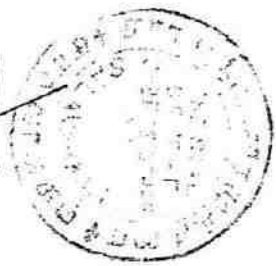


சென்னை கார்ப்பரேஷன்

- 1) R. Mathas
- 2) R. Sannathan
- 3) R. Sannathan
- 4) M. S. S. S. S.

K. A. P. P.

முதலில் 2018 ம் ஆண்டு 540 ப் ஆலயம்
25 நாள் கவனம் செலவு செய்து,
22 வரு தாள்
பதின ஆறுவரை



சென்னை கார்ப்பரேஷன்



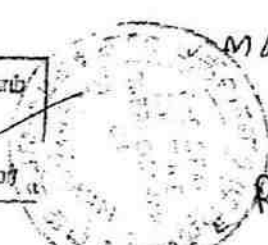
✓ ஸ்ரீ சண்முகம்

✓ R. Mathias

✓ R. Sankaranarayanan

✓ R. Kumaravel

1 மார்ச் 2018 லிருந்து 540 லுள்ள
 25 தாள்களில் உள்ளது.
 23 வரை தரவேண்டும்



மாண்புமிகு

R. Shanmugam

29A ஸ்ரீ சண்முகம்

R/சாலவாக்கம்/புத்தகம்-1/540/2018

1899ம் ஆண்டு இந்திய முத்திரைச் சட்டம் 42வது பிரிவின் கீழான சான்று

2018ம் ஆண்டு வரிசை எண் 318

எண்.55 மாரியம்மன் கோயில் தெரு, நீர்க்குன்றம், உத்திரமேரூர், காஞ்சிபுரம், தமிழ்நாடு, இந்தியா, 603107-ல் வசிக்கும் திரு கன்னியப்பன் என்பவரிடமிருந்து ₹ 2,81,570/- (ரூபாய் இரண்டு இலட்சத்து எண்பத்தொன்றாயிரத்து ஐநூற்று எழுபது மட்டும்) இந்த ஆவணத்திற்காக இந்திய முத்திரைச் சட்டம் 41வது பிரிவின் படி குறைவாயிருந்த முத்திரைக் கட்டணம் வசூலிக்கப்பட்டது என நான் இதன் மூலம் சான்றளிக்கிறேன்.

சார்பதிவாளர் : சாலவாக்கம்
நாள்: 17/05/2018

சார்பதிவாளர் மற்றும் இந்திய முத்திரைச் சட்டம் பிரிவு
41ன் படி ஆட்சியர்



2018 ஆம் ஆண்டு மே மாதம் 17ம் தேதி பி.ப. 02:09 மணியளவில் சாலவாக்கம் சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 1,62,385/- செலுத்தியவர்.

இடது பெருவிரல்



சுண்ணாம்புப்பன்

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



R. Mathan

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்





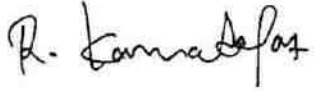
R. Sandurani

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி



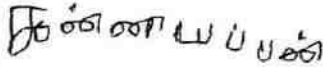
1 மார்ச் 2018 டி 02:09 இந்திய 540 ஆவணம்
25 நாள் காலக்காலம் வசூலித்து.
24 வது நாள் பதிவு செய்தவர்

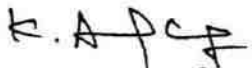
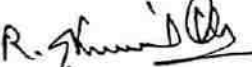
295
சுண்ணாம்புப்பன்


R/சாலவாக்கம்/புத்தகம்-1/540/2018


எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்  	 கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி.
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எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல்  	 கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி.
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எழுதி வாங்கியதாக ஒப்புக் கொண்டவர் இடது பெருவிரல்  	 கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி.
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இன்னாரென்று நிரூபித்தவர்கள்	
1. 	திரு அருள்குமார் தபெ கன்னியப்பன் எண். 55 மாரியம்மன் கோயில் தெரு, நிரக்குன்றம், உத்திரமேரூர், காஞ்சிபுரம், தமிழ்நாடு, இந்தியா, 603107
2. 	திரு செந்தில்குமார் தபெ ராஜேந்திரன் எண். 2/4 ஜோதிநகர் மெயின்ரோடு, ஈக்காட்டுத்தாங்கல், ஈக்காட்டுத்தாங்கல், கிண்டி, சென்னை, தமிழ்நாடு, இந்தியா, 600032

2018 ஆம் ஆண்டு மே மாதம் 17ம் நாள்	 பழனி செங்கல்வராயன் சார்பதிவாளர் சாலவாக்கம்
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R/சாலவாக்கம்/புத்தகம்-1/540/2018 எண்ணாகப் பதிவு செய்யப்பட்டது.	 பழனி செங்கல்வராயன் சார்பதிவாளர்
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புத்தகம் 2018ம் வருட ஆவணம் 540
 25 நாட்களின்கொண்டது
 25 வருட நாள்

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 சுன்னியப்பன்



பதிவுத்துறை
இரசீது
ஆவணப்பதிவு

இரசீது எண் : 993/2018

ஆவண எண் : R/ சாலவாக்கம்/ புத்தகம்-1/ 540 / 2018

திரு கன்னியப்பன் அவர்களிடமிருந்து ₹ 4,43,955 (ரூபாய் நான்கு இலட்சத்து நூற்பத்து முன்றாயிரத்து தொள்ளாயிரத்து ஐம்பத்தைந்து மட்டும்) (ரொக்கம்: ₹ 345,000) வரைவோலை: 784209 ₹ 281570, 784208 ₹ 162040) கீழ்க்கண்ட விவரப்படி பெற்றுக் கொள்ளப்பட்டது.

வ.எண்	விவரம்	தொகை (₹)
1	முத்திரைத்தீர்வை (முத்திரைச் சட்டம் பிரிவு 41ன் படி)	2,81,570
2	பதிவுக் கட்டணம்	1,62,040
3	கணினிக் கட்டணம்	295
4	குறுந்தகடுக் கட்டணம்	50
	செலுத்தப்பட்ட மொத்தத் தொகை	4,43,955

சாலவாக்கம் அலுவலகம்

நாள்: 17/05/2018

பதிவு அலுவலர் செயல்பாடு
சாப்திவாளர்
சாலவாக்கம்

கன்னியப்பன்



தமிழ்நாடு அரசு
பதிவுத்துறை

சொத்து பொறுத்து யாதொரு வில்லங்கமுமில்லை என்பதற்குரிய சான்று

சா.ப.அ. வாலாஜாபாத்	சான்று எண்: EC/Walajabad/2078/2018	மனு எண்: ECA/Walajabad/2078/2018	நாள்: 09-May-2018
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திரு/திருமதி/செல்வி. பிரபாகர் 2052/2018, Tamil Nadu, India கீழ்க்கண்ட சொத்து தொடர்பாக ஏதேனும் வில்லங்கம் இருப்பின் அதன் பொருட்டு வில்லங்கச் சான்று கோரி விண்ணப்பித்துள்ளார்.

கிராமம்	சர்வே விவரம்
சிறுதாமூர்	319/1,319/2,319/3,319/4

மனு சொத்து விவரம்: மொத்த விஸ்தீர்ணம்: 319/1-0.27.0,319/2-0.54.0,319/3-0.40.0,319/4-0.41.0

1 புத்தகம் மற்றும் அதன் தொடர்புடைய அட்டவணைகள் 9 ஆண்டுகளுக்கு 01-Jan-1975 முதல் 09-Aug-1983 நாள் வரை இச்சொத்தைப் பொறுத்து பதிவு செய்திட்ட நடவடிக்கைகள் மற்றும் வில்லங்கங்கள் குறித்து தேடுதல் மேற்கொள்ளப்பட்டது. அத்தேடுதலின் விளைவாக மனுவில் விவரித்த சொத்தை பொறுத்து எவ்வித விவரங்களும் /வில்லங்கங்களும் காணப்படவில்லை எனச் சான்றளிக்கிறேன்.

தேடுதல் மேற்கொண்டு சான்று தயாரித்தவர்

தேடுதலை சரிபார்த்து சான்றினை ஆய்வு செய்தவர்

அலுவலக முத்திரை & நாள்
09-May-2018

பதிவு அலுவலரின் கையொப்பம்
வாலாஜாபாத்

சா.பதிவாளர்,
வாலாஜாபாத்



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சுன்னையப்பன்

எல்லை வியாபகர்கள்: சூ. நிக் கு (மே), என் நிக் கு (வா), ராஜமாணிக்கம்பிள்ளை மநிளக் கு (கி), சி: நிக் கு (செ)	சொத்து தொடர்பான குறிப்புரை: இதன் மத்தியில் மேற்கண்ட 0.16 செண்ட் புஞ்சை சர்வே எண் 3192 1.336ல் 0.16 செண்ட் 3193 0.995ல் 0.16 செண்ட் ஆக மொத்தம் 0.32 செண்ட்.
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பதிவுகளின் எண்ணிக்கை : 1

இந்த உறுதிமொழிச் சான்றிதழில் குறிப்பிடப்பட்டுள்ள விவரங்களும், வில்லங்கங்களும், மறுதலாரால் தெரிவிக்கப்பட்ட சொத்துக்களின் விவரத்தின் அடிப்படையில் கண்டறிப்பட்டவைகளும் மறுதலாரர் குறிப்பிட்டுள்ள விவரங்கள் அல்லாமல் பதிவு செய்யப்பட்ட ஆவணங்களில் அந்த சொத்துக்கள் வேறு மாதிரியான விவரங்களைக் கொள்வனவுக்குரிய அம்சங்களைப் புகட்டுதப்பட்ட விவரங்கள் இச்சான்றிதழில் சேர்க்கப்படாட்டாது.

பதிவுச் சட்டத்தின் 57 ஆம் பிரிவின்கீழ்ப்படி, 1977(1) ஆம் விதிக்கீழ்ப்படி, பதிவேடுகளிலும், அட்டவணைகளிலும் உள்ள பதிவுகளைப் பார்வையிட விரும்பினோரும், அவற்றில் புகளை அல்லது குறிப்பிட்ட சொத்துக்களுக்குரிய வில்லங்கச் சான்றிதழ்களைப் பெற்றுக் கொள்ள விரும்பினோரும், பதிவேடுகளையும், அட்டவணைகளையும் தாங்களே சரிபார்த்துக் கொள்ள வேண்டும். அப்போது அறியப்பட்ட எட்டணங்களைப் பெறுகையின்னர் பதிவேடுகளும் அட்டவணைகளும் அவர்கள் பார்வைக்கு வைக்கப்படும்.

ஆனால் குறிப்பிடப்பட்ட நேரவில் மறுதலர் தாமே சரிபார்க்கவில்லை என்பதால், இந்த அலுவலகத்தில் பொது கவனத்தின் பொது கவனத்தின் மூலம் சரிபார்க்கப்பட்டது ஆனால் இந்தச் சான்றிதழில் உள்ள முடிவுகளில் பிழைகள் ஏதேனும் இருப்பின் அவற்றுக்கு இத்துறை பொறுப்பேற்காது.



தேடுதல் மேற்கொண்டு சான்று தயாரித்தவர்
 தேடுதலை சரிபார்த்து சான்றினை ஆய்வு செய்தவர்

அலுவலக முத்திரை & நாள்
 08-May-2018



பதிவு அலுவலரின் ஹைஸ்டிராபிம்
 சார்புபதிவுள்ள
 சாலவாகங்கள்



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 சான்றிதழ்

சொத்து பொறுத்த யாதொரு வில்லங்கமுமில்லை என்பதற்குரிய சான்று

Nil Certificate of Encumbrance on Property

S.R.O/சா.ப.அ: Walajabad E.C. No./சான்று எண்: 2051 Appln No./மனு எண்: 2051 Date/நாள் : 09/05/2018

Thiru/Tmt பிரபாகரன் நீற்குன்றம் having applied to me for a certificate giving particulars of registered acts and encumbrances if any, in respect of undermentioned property.

திரு/திருமதி பிரபாகரன் நீற்குன்றம் கீழ்க்கண்ட சொத்து தொடர்பாக ஏதேனும் வில்லங்கம் இருப்பின் அதன் பொருட்டு வில்லங்கச் சான்று கோரி விண்ணப்பித்துள்ளார்.

Village/கிராமம்	Survey Details (சர்வே விவரம்)
Siruthamur (SNo:319/4)	(SNo:319/1), (SNo:319/2), (SNo:319/3), (SNo:319/4)

Property Description/மனு சொத்து விவரம்: சிறுதாமூர் கிராமம், சர்வே எண் 319/1-0.27.0, 319/2-0.54.0, 319/3-0.40.0, 319/4-0.41.0

I hereby certify that a search has been made in Book 1 and in the indexes relating thereto for 5 years from 01/06/2003 to 26/10/2007 for acts and encumbrances affecting the said property and that on such search the following acts and no encumbrance appears.

1 புத்தகம் மற்றும் அதன் தொடர்புடைய அட்டவணைகள் 5 ஆண்டுகளுக்கு 01/06/2003 முதல் 26/10/2007 நாள் வரை இச்சொத்தைப் பொறுத்து பதிவு செய்திட்ட நடவடிக்கைகள் மற்றும் வில்லங்கங்கள் குறித்து தேடுதல் மேற்கொள்ளப்பட்டது. அத்தேடுதல்களின் விளைவாக மனுவில் விவரித்த சொத்தைப் பொறுத்து ஏவ்வித விவரங்களும்/வில்லங்கங்களும் காணப்படவில்லை எனச் சான்றளிக்கிறேன்.

Search Made and Certificate prepared by / தேடுதல் மேற்கொண்டு சான்று தயாரித்தவர்

Search verified and certificate examined by / தேடுதலைச் சரிபார்த்து சான்றினை ஆய்வு செய்தவர்

Office Seal & Date / அலுவலக முத்திரை & நாள்

Signature of Registering Officer
பதிவு அலுவலரின் கையொப்பம்





தமிழ்நாடு அரசு
பதிவுத்துறை

சொத்து தொடர்பான வில்லங்கச் சான்று

சா.ப.அ: சாலவாக்கம்	சான்று எண்: ECAசாலவாக்கம்4062018	மனு எண்: ECAசாலவாக்கம்4062018	நாள்: 08-May-2018
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திருதிருமதிசெல்வி. அருள் அவர்களுக்காக எஸ்வி ரகு சாலவாக்கம் கீழ்க்கண்ட சொத்து தொடர்பாக ஏதேனும் வில்லங்கம் இருப்பின் அதன் பொருட்டு வில்லங்கச் சான்று கோரி விண்ணப்பித்துள்ளார்.

கிராமம்	சர்வே விவரம்
சிறுதாமரர்	319/4, 319/3, 319/2, 319/1

மனு சொத்து விவரம் சொத்து விவரம் தொடர்பான குறிப்புரை சர்வேஎண்.319/1-0.27.0.319/2-0.54.0.319/3-0.40.0.319/4-0.41.0

1 புத்தகம் மற்றும் அதன் தொடர்புடைய அட்டவணைகள் 12 ஆண்டுகளுக்கு 27-Oct-2007 முதல் 07-May-2018 வரை இச்சொத்தைப் பொறுத்து பதிவு செய்திட்ட நடவடிக்கைகள் மற்றும் வில்லங்கங்கள் குறித்து தேடுதல் மேற்கொள்ளப்பட்டது.

வ. எண்	ஆவண எண் மற்றும் ஆண்டு	எழுதிக் கொடுத்த நாள் & தாக்கல் நாள் & பதிவு நாள்	தன்மை	எழுதிக் கொடுத்தவர்கள்	எழுதி வாங்கியவர்கள்	தொகுதி எண் மற்றும் பக்க எண்
1	327/2018	05-Apr-2018 05-Apr-2018	ஏற்பாடு/ சொட்டில்மெண்டு.1. ராஜமாணிக்கம் பிள்ளை ஆவணம்	1. மாதவன் 2. சங்குபாணி 3. கண்ணதாசன்		
	கைமாற்றத் தொகை:	சந்தை மதிப்பு: ரூ. 14,51,000/-		முந்தைய ஆவண எண்: 277/1987		
	Schedule A Details:					
	சொத்தின் வகைப்பாடு: விவசாய நிலம்					சொத்தின் விஸ்தீர்ணம்: 1 ஏக்கர், 1.0 சென்ட், 1 ஏக்கர், 330 சென்ட், 67.0 சென்ட். 99.0 சென்ட்.
	கிராமம் மற்றும் தெரு: சிறுதாமரர்					புல எண் : 319/1, 319/2, 319/3, 319/4
						சொத்து தொடர்பான குறிப்புரை: the service number is 178 and the motor is 3 hp

301: சிவசுப்பன்



தமிழ்நாடு அரசு
பதிவுத்துறை

சொத்து தொடர்பான வில்லங்கச் சான்று

சா.ப.அ. சாலவாக்கம்	சான்று எண்: EC/சாலவாக்கம்/407/2018	மனு எண்: ECA/சாலவாக்கம்/407/2018	நாள்: 08-May-2018
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திருதிருமதிசெல்வி. அருள் அவர்களுக்காக எஸ்.வி ரகு சாலவாக்கம் கீழ்க்கண்ட சொத்து தொடர்பாக ஏதேனும் வில்லங்கம் இருப்பின் அதன் பொருட்டு வில்லங்கச் சான்று கோரி விண்ணப்பித்துள்ளார்.

கிராமம்	சர்வே விரமம்
சிறுதாமூர்	319/4, 319/3, 319/2, 319/1

மனு சொத்து விரமம் சொத்து விரமம் தொடர்பான குறிப்புரை சர்வேஎண் 319/1-0.27, 0.319/2-0.54, 0.319/3-0.40, 0.319/4-0.41, 0

1 புத்தகம் மற்றும் அதன் தொடர்புடைய அட்டவணைகள் 21 ஆண்டுகளுக்கு 10-Oct-1983 முதல் 31-May-2003 வரை இச்சொத்தைப் பொறுத்து பதிவு செய்திட்ட நடவடிக்கைகள் மற்றும் வில்லங்கங்கள் குறித்து தேடுதல் மேற்கொள்ளப்பட்டது.

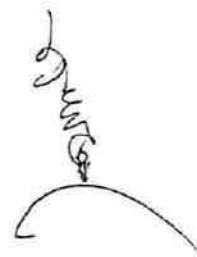
வ. எண்	ஆவண எண் மற்றும் ஆண்டு	எழுதிக் கொடுத்த நாள் & தாக்கல் நாள் & பதிவு நாள்	தன்மை	எழுதிக் கொடுத்தவர்கள்	எழுதி வாங்கியவர்கள்	தொகுதி எண் மற்றும் பக்க எண்
1	277/1987	22-Apr-1987 23-Apr-1987 27-Apr-1987	விற்பனை ஆவணம்/ கிரைய ஆவணம்	1. விராசாமிப்பிள்ளை	1. ராஜமாணிக்கமபிள்ளை	27, 487
கைமாற்றுத் தொகை: ரூ. 2,176/-						
சந்தை மதிப்பு ரூ. 4,352/-						
Schedule A Details:						
சொத்தின் வகைப்பாடு: விவசாய நிலம்						
கிராமம் மற்றும் தெரு: சிறுதாமூர், Land						
எல்லை விபரங்கள்: சூ. நிக்ரு (கி),ex நிக்ரு (தொ),ஏரிபுறம் பொக்குக்கு (மெ),er நிக்ரு (வ)						
Schedule B Details:						
சொத்தின் வகைப்பாடு: விவசாய நிலம்						
கிராமம் மற்றும் தெரு: சிறுதாமூர், Land						
சொத்தின் விஸ்தீர்ணம்: 0.32 செண்ட						
புல எண் : 319/2, 319/3						
சொத்து தொடர்பான குறிப்புரை: இதன் மத்தியில் மேற்கண்ட 0.16 செண்ட						
சொத்தின் விஸ்தீர்ணம்: 0.36 செண்ட						
புல எண் : 319/2, 319/3						

சுன்னியப்பன்

பதிவுகளின் எண்ணிக்கை : 1

இந்த உறுதிமொழிச் சான்றிதழில் குறிப்பிடப்படாதவற்றை விவரங்களும், விலைக்கட்டும், மனுதாரரால் தெரிவிக்கப்பட்ட சொத்துக்களின் விவரத்தின் அடிப்படையில் கண்டறியப்பட்டவையாகும். மனுதாரர் குறிப்பிடாதவற்றை விவரங்கள் அல்லாமல் பதிவு செய்யப்பட்ட ஆவணங்களில் அதே சொத்துக்கள் வேறு மாதிரியான விவரங்களாகக் கொண்டு வருவதற்கான அடிப்படையிலான ஆவணங்கள் முடையபடுத்தப்பட்ட விவரங்கள் இச்சான்றிதழில் சேர்க்கப்படமாட்டாது.

பதிவுச் சட்டத்தின் 57 ஆம் பிரிவின்கீழ்ப்படி, 137(1) ஆம் விதிக்கீழ்ப்படி, பதிவேடுகளிலும், அட்டவணைகளிலும் உள்ள பதிவுகளைப் பார்வையிட விரும்புவோரும், அவற்றின் படிவளை அல்லது குறிப்பிட்ட சொத்துக்களுக்குரிய விலைக்கட்ட வேண்டுகோளைப் பெற்றுக் கொள்ள விரும்புவோரும், பதிவேடுகளையும், அட்டவணைகளையும் தாங்களே சரிபார்த்துக் கொள்ள வேண்டும். அத்தகைய ஆணை குறிப்பிடப்பட்ட, நேர்வில் மனுதாரர் தாமே சரிபார்க்கவில்லை என்பதால், இந்த அலுவலகத்தில் கோரிய கவனத்துடன் தேவையான அளவில் சரிபார்க்கப்பட்டது. ஆனால் இந்தச் சான்றிதழில் உள்ள முடிவுகளில் பிழைகள் ஏதேனும் இருப்பின் அவற்றுக்கு இத்துறை பொறுப்பேற்காது.



தேடுதல் மேற்கொண்டு சான்று தயாரித்தவர்
தேடுதலை சரிபார்த்து சான்றினை ஆய்வு செய்தவர்



பதிவு அலுவலரின் கையெழுப்பம்
சார்பதிவுகளை
சாலவாகக்கம்



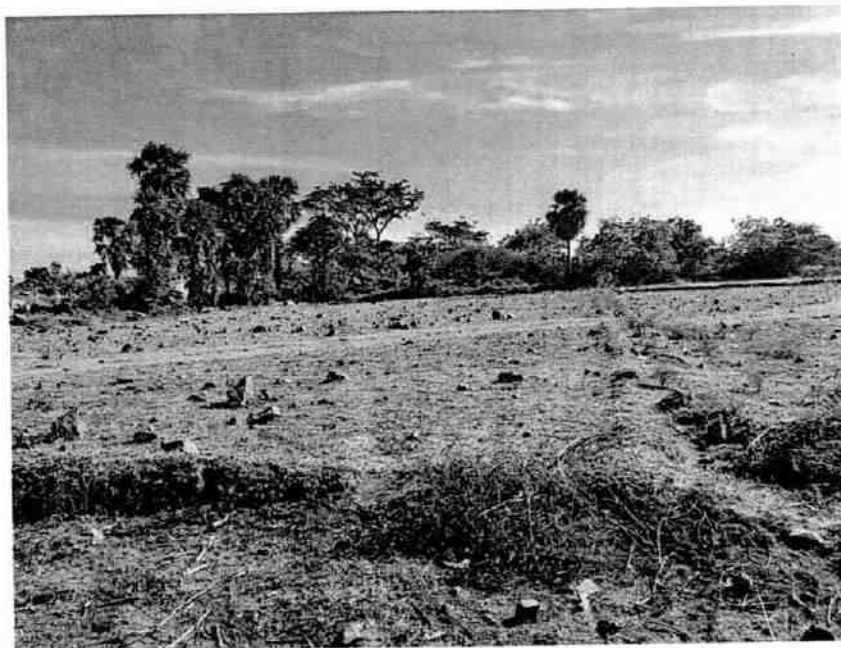
அலுவலக முத்திரை & நாள்
08-May-2018

303 சான்றியப்பன்



PHOTOCOPY OF THE PROPOSED LEASE AREA

Field photos in respect of rough stone and gravel for patta land lease quarry, over an extent of 1.62.0Hectares in S.F.No:319/1,319/2,319/3 & 319/4, Sirudamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu belongs to Mr.N.Kanniyappan, Kancheepuram-603107.



PHOTOGRAPHS SHOWING GENERAL VIEW OF THE PROPOSED LEASE AREA

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A

304.
சென்னை மாவட்டம்



தமிழ்நாடு தமில்நாடு TAMIL NADU 30 SEP 2020 78AB 886726
 காளிக்கய்யாணி காளிக்கய்யாணி
 ரெக்கார்ட் - 63

O-Swathi
 O.SWATHI (S.V.)
 3, LOGANATHAN STREET
 W. TAMBARAM, CHENNAI-45
 No. 9591/B1/2000 DT. 7.9.2000
 Tel: 90945 20807.

BLASTING WORK CONTRACT AGREEMENT

M/s.KUBERAN EXPLOSIVES & CO, No: 592/2B1A, Arugunam Village, Madurantakam Taluk, Kanchipuram District, having explosives license No: E/HQ/TN/22/298 (E56920) and magazine situated at Arugunam - Village here in after referred as Party 1 entered in to a blasting contract agreement with

N.KANNIAPPAN, S/o Narayanapillai, Neerkundram village, Uthiramerur T.K, Kanchipuram dist Having his Blue Metal Quarry at, SF.No.319/1(0.27.00), 319/2(0.54.00), 319/3(0.40.00), 319/4(0.41.00), Total area surface 1.62.00 Hector, Neerkuundram & Sirudhamur Village Kanchipuram with District Collector, Kancheepuram's proceedings RC.No 740/Q3/2018, Dt. 19.10.2020 Valid up to Five Years here in after referred as Party 2, on both the parties agreed for the followings.

M/s. KUBERAN EXPLOSIVES & CO.

காளிக்கய்யாணி

- a) Party 2 has to place his order by oral or written for requirement of explosives to Party 1, and Party 1 has to transport the Explosives as per the order, from his Explosives magazine to work site of the Party 2.
- b) Party 1 has to use his explosives and he has to do Blasting work in the Blue Metal Quarry with an authorized mines mates, which is issued by the Govt. of India, Department of Explosives, or authorized permit holder to carry out the blasting work in mines issued under the mines Act.
- c) Party 2 has to pay the Blasting Charges (Including the cost of the Explosives. and other expenses incidental to Blasting) to Party 1 as agreed by the both Parties 1&2.
- d) Party 2 has to make his own arrangement to remove all the broken materials in the work site at his own cost & risk.
- e) This agreement is valid from the date of signing by both the parties till the completion of blasting contract work from Party 2 by giving in writing for clearing the agreement with the acknowledgement by the Party 1.

Party 1

M/s Kuberan Explosives & Co
 # : 592/2B1A, Arugunam Village,
 Madurantakam Taluk,
 Kanchipuram District

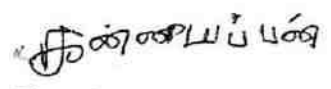


Proprietor

Signature



Party 2

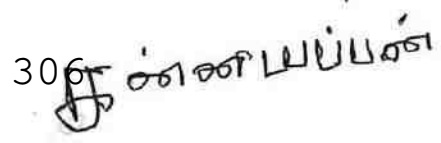
N.KANNIAPPAN,
 S/o. Narayanapillai,
 Neerkundram village,
 Uthiramerur T.K,
 Kanchipuram dist



Signature

Witness:

- 1. 
- 2. 

30 



Neel

सरकार भारत | Government of India
 वाणिज्य और उद्योग विभाग | Ministry of Commerce & Industry
 पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पीएसओ) | Petroleum & Explosives Safety Organisation (PESO)
 पूर्व वायु-विस्फोटक विभाग | Formerly - Department of Explosives
 A और D - फ्लोर, शस्त्र भवन, शस्त्र भवन | A & D - Wing, Block 1-8, 1st Floor, Shastri Bhavan
 26 मद्रास रोड, नंगम्बक्कम चेन्नई 600006
 फोन (Phone) - 28281023 | फैक्स (Fax) - 28284848
 ई-मेल Email: jtc@chennai.peso.gov.in

संख्या (No.): E/HQ/TN/22/298(E56920)

दिनांक (Date): 17/02/2017

किस नाम पर | To,

M/s. Kuberan Explosives & Co.,
 D. No. 164, Varanavasi Village, Banriati (Post), Thameri (Via), Town/Village - Kanchipuram
 District-KANCHIPURAM, State-Tamil Nadu, Pincode -

संबंधित: Survey No(s).592/2B 1A, ग्राम 164, Arugunam village, Madurantakam Taluk, जिला KANCHIPURAM, राज्य Tamil Nadu में विस्फोटक के भंडारण के लिए
 जारी की गई लाइसेंस, 2008 के अधिनियम LE-3 में जारी अनुमति E/HQ/TN/22/298(E56920) के नवीनीकरण संबंधित

Subject: Possession for Use of of Explosives from magazine situated at Survey No(s).592/2B 1A, 164 Arugunam village, Madurantakam Taluk, Dist. KANCHIPURAM, Tamil Nadu -Licence No.: E/HQ/TN/22/298(E56920) granted in Form LE-3 of Explosives Rules, 2008 - Renewal regarding

प्रति | Sir,

आपका संदर्भ संख्या में वायु N.L. संख्या 14/02/2017 का मूल प्रेषण को विचारित किया, 2008 के अधिनियम LE-3 में जारी अनुमति दिनांक 31/3/2021 तक नवीनीकरण कर दिए गए हैं। आप नीचे दी गई है।
 Reference to your letter No - NIL dated - 14/02/2017, the subject licence duly renewed upto 31/3/2021 and issued in Form LE-3 of Explosives Rules, 2008 is forwarded herewith.

अनुमति के अगली दस्तावेज हेतु कृपया निम्नलिखित दस्तावेज दिनांक 31/03/2021 से पहले इस कार्यालय को भेजे जाएं।
 For further renewal of licence, please submit the following documents so as to reach this office on or before 31/3/2021.

- आवेदन-1 में निम्नलिखित पूर्ण रूप से हस्ताक्षरित और साइन।
Application in Form RE-1 duly filled in and signed.
- एक से अधिक वर्षों के अनुमति काल का वारंट प्राप्त किए गए हुए दिनांक को दर्शाते हुए बैंक के साथ अनुमति, संयुक्त रूप से वाणिज्यिक विभाग, चेन्नई के पक्ष में चेकबुक में दिए गए।
Licence fees for one to five years in the form of demand draft drawn on any Nationalized Bank in favour of Jt. Chief Controller of Explosives, Chennai payable at Chennai.
- अनुमति प्राप्त की गई मूल अनुमति।
Original licence with approved plan.
- कृपया इस संबंध में विचारित किया, 2008 के नियम 112 का भी ध्यान देना।
In this connection, please also refer to Rule 112 of Explosives Rules, 2008
- विस्फोटक के खरीद अनुमति-11 में वायु (ईईई) अनुमति को दिया जाए और उसी की एक प्रति इस कार्यालय को भेजी जाए (अतिरिक्त पोस्ट के लिए लागू नहीं)।
Indent for purchase of explosives shall be placed in RE-11 with the supplier and copy of the same shall be sent to this office. (Not applicable for fireworks store house)
- कृपया विस्फोटक की तिमाही रिटर्न (RE-7) के अंत में अर्द्ध-7 में प्रेषण की जाए (विस्फोटक के कार्यालय में आगामी तिमाही के 10 दिनों से पहले भेजे जाने चाहिए (अतिरिक्त पोस्ट के लिए लागू नहीं)।
Please submit quarterly returns of explosives in RE-7 at the end of every quarter so as to reach this office by 10th of the succeeding quarter. (Not applicable for fireworks store house)
- सभी विस्फोटक कार्यों को एक कम्पेंट पर्सन द्वारा ही कराया जा सकता है जो कि एक वैध शॉट फायरिंग परमिट प्राप्त करता है जो कि 1952 के अधिनियम के अधिनियम में वर्णित है।
All blasting operations shall be carried out by a competent person holding a valid shot firer's permit granted under above rules. However, blasting operations in mines coming under the purview of the Mines Act 1952, the blaster shall have qualifications prescribed in the regulations framed under the said Act

आपके खाते में रु. 9800/- की राशि है जो कि आप अपने भविष्य के लेनदेन में उपयोग कर सकते हैं।
 An amount of Rs. 9800/- balance is in your credit, which may be utilized for future transaction by quoting this reference.

आपका | Yours faithfully

(Dr. Anuj Kumar)

विस्फोटक विभाग | Controller of Explosives

संयुक्त वायु विस्फोटक विभाग | For Joint Chief Controller of Explosives

चेन्नई, चेन्नई | South Circle, Chennai

प्रतिलिपि भेजें | Copy Forwarded to

1. जिला अधिकारी (District Magistrate), KANCHIPURAM (Tamil Nadu)- सूचना के लिए (for information)

संयुक्त वायु विस्फोटक विभाग | For Joint Chief Controller of Explosives
 चेन्नई, चेन्नई | South Circle, Chennai

(अधिक जानकारी के लिए विवरण, शुल्क और अन्य विवरणों के लिए हमारी वेबसाइट <http://peso.gov.in> देखें।)
 (For more information regarding status, fees and other details please visit our website <http://peso.gov.in>)

307
 श्री कृष्ण

अनुमति प्रारूप एल. ई.-3 | LICENCE FORM LE-3
 (विस्फोटक विनियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (ग) के तहत)
 (See article 3(a) to (g) of Part I of Schedule IV of Explosives Rules, 2008)
 (ए) उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक या किसी के संयोजन में वर्ग 6 के विस्फोटक रखने के लिए अनुमति
 Licence to possess : (e) for use, explosives of class 1, 2, 3, 4, 5, 6 or 7 in a magazine



अनुमति नं. (Licence No.) : E/HQ/TN/22/298(E56920)
 वार्षिक वसूल मूल्य (Annual Fee Rs): 12400/-

1. Licence is hereby granted to

M/s Naheem Explosives & Co. (अनुमति / Occupier : K. DhanaKoteswaram), D. No. 164, Vadamurai Village, Bannau (Patt), Thennar
 Town/Village - Kanchipuram, District-KANCHIPURAM, State-Tamil Nadu, Pincode -

ये अनुमति अनुच्छेद की शर्तों के

2. अनुमति प्राप्त की शर्तें (Status of licensee) **Individual**

3. अनुमति विस्फोटक प्रयोग के लिए वैध है।

Licence is valid only for the following purpose.

possess for use of Nitrate Mixture, Detonating Fuse, Detonators, - के प्रयोग के लिए

4. अनुमति विस्फोटक के निम्नलिखित प्रकारों, प्रकार और मात्रा के लिए वैध है।

Licence is valid for the following kinds and quantity of explosives: -- (ग) (a)

क्र. सं. / Sr. No.	नाम और विवरण / Name and Description	वर्ग और विभाग / Class & Division	उप-विभाग / Sub-division	किसी भी एक समय में की मात्रा / Quantity at any one time
1	Nitrate Mixture	2, D	0	6400 Kg.
2	Detonating Fuse	6, 2	0	50000 Mtrs
3	Detonators	6, 5	0	44000 Nos.

(क) किसी भी एक मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अन्तर्गत अनुमति के तहत]

20 times as above.

(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3(b) and (c)] :

5. अनुमति प्राप्त स्थान (आरेख) के अनुसार शर्तों की शर्तें हैं।

आरेख नं. (Drawing No.) : E/HQ/TN/22/298(E56920)
 दिनांक (Dated) 10/01/2012

6. अनुमति प्राप्त स्थानों का पता निम्न है। The licensed premises are situated at following address:

Survey No(s), 592/ZB 1A, (Town/Village) : 164, Arugunam village, Madurantakam Taluk
 जिला (District) : KANCHIPURAM राज्य (State) : Tamil Nadu पुलिस स्टेशन (Police Station) : Madurantakam
 दूरभाष (Phone) : 9444814614 ई-मेल (E-Mail) : Pincode : Post Office (Post Office)
 फोन (Fax) :

7. अनुमति प्राप्त स्थानों में निम्नलिखित सुविधाएँ उपलब्ध हैं।

a main magazine room, a lobby and a detonators store room.

8. अनुमति प्राप्त - इस पर विस्फोटक विनियम, 1884 और उसके अंतर्गत विनियम, 2008 के अन्तर्गत, शर्तों और शर्तों के तहत और विनियमित शर्तों के अन्तर्गत ही अनुमति की जाती है।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

1. आरेख नं. 5 के अनुसार आरेख (स्थान, संरचनात्मक तपस्वी और अन्य विवरण) में दर्शाए गए हैं।
Drawings (showing site, constructional and other details) as stated in serial No. 5 above.
2. अनुमति प्राप्त स्थानों पर लागू होने वाले अनुमति की शर्तों और अतिरिक्त शर्तों।
Conditions and Additional Conditions of this licence signed by the Licensing authority
3. दूरी नियम DE-2 | Distance Form DE-2.

9. यह अनुमति 31 मार्च 2012 तक वैध रहेगी। This licence shall remain valid till 31st day of March 2012.

यह अनुमति, अनुमति प्राप्त करने वाले अनुमति प्राप्त स्थानों पर अनुसूची V के भाग 4 के तहत विनियम DE-VII के अन्तर्गत तथा अनुमति की शर्तों और अतिरिक्त शर्तों के तहत अनुमति प्राप्त स्थानों का उपयोग के लिए वैध है।
 This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

दिनांक | The Date - 10/01/2012

Sd/-
मुख्य विस्फोटक नियंत्रक
Chief Controller of Explosives

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 01/08/2012
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 08/03/2013
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 18/07/2014

अनुमति प्राप्त करने के लिए स्थान
Space for Endorsement of Renewal

अनुमति की तिथि / Date of Renewal	अवधि की तिथि / Date of Expiry	अनुमति प्राप्त करने वाले अधिकारी की हस्ताक्षर और मुद्रा / Signature of licensing authority and stamp
17/02/2017	31/03/2021	It. Chief Controller of Explosives, South Circle, Chennai

Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

#



य परीक्षा बोर्ड
Cross
No
2.12.87

सी.एम.ए.एम. 1124
C.M.A.M. 1224



ब्लॉक अधिनियम, 1952
THE MINES ACT, 1952

विस्फोटकता प्रमाणपत्र
BLASTER'S CERTIFICATE OF COMPETENCY

(यहां उत्साहक ब्लॉक विनियमों, 1961 के अधीन)
(Under Metalliferous Mines Regulations, 1961)

(Restricted to metalliferous Mines having open-cast workings only)

नाम
पता
को जिनकी जन्मतिथि है अपनी आय, नारोग्यता, अच्छे आचरण, साक्षरता और अनुभव के संबंध में संतोषजनक प्रमाण दे देने और में तात्पर्य को हुई परीक्षा पास कर लेने पर यहाँ उत्साहक ब्लॉक विनियमों, 1961 के अधीन विस्फोटकता प्रमाणपत्र दिया जाता है।

Shri. **KRISHNAMOORTHY** (Name)
of Village. **MANGALAVINAYAGAR KOIL STREET**, Thana. **MANAGALA VINAYAGAR KOIL ST.**
District. **CHENGALPET, THIRUSULAM MS-100**, State. **TAMILNADU**
born on **12.2.1961** son of **M. MADASAMY**
having given satisfactory evidence of his age, medical fitness, good conduct, literacy and experience and having passed an examination held at **SALEM** on **27.12.1988**,
hereby granted a BLASTER'S CERTIFICATE under the Metalliferous Mines Regulations, 1961.

ब्लॉक परीक्षा बोर्ड
Secretary,
Board of Mining Examinations.
दिनांक/Dated **22.12.1989**

RESTRICTED TO MINES HAVING
(OPEN CAST WORKINGS ONLY)

ब्लॉक परीक्षा बोर्ड
Chairman,
Board of Mining Examinations

बायें हाथ के अंगूठे का निशान
Left hand thumb impression



प्रमाणित किया जाता है कि उक्त व्यक्ति विनियमों के अधीन परीक्षा में सफल होकर विस्फोटकता प्रमाणपत्र प्राप्त करने के योग्य है।

Certified that he was examined and found free from deaf, defective vision or any other infirmity, mental physical, likely to interfere with the efficient discharge of his duties.

1. On **24.05/94** को
2. On **13/4/99** को
3. On को
4. On को
5. On **18.02.04** को
6. On **07/02/2009** को

श्री. कृष्णमूर्ति

இந்திய அரசாங்கம்
Government of India




கன்னியப்பன் நா
Kanniyappan N
தந்தை : நாராயணன்
Father : NARAYANAN
பிறந்தவருடம் / Year of Birth : 1945
ஆண்பால் / Male



4778 6355 6599


ஆதார் - சாதாரண மனிதனின் அதிகாரம்


இந்திய அடையாள அமைப்பு ஆணையர் அமைப்பு
Unique Identification Authority of India


முகவரி:
S/O நாராயணன், 55,
மாரியம்மன் கோவில்,
ஆனம்பாக்கம் அஞ்சல்,
நூர்க்குன்றம், காஞ்சிபுரம்,
ஆனம்பாக்கம், தமிழ் நாடு.
603107

Address:
S/O: Narayanan, 55,
MARIYAMMAM KOVIL,
AANAMPAKKAM POST,
Neerkundram, Kancheepuram,
Anambakkam, Tamil Nadu,
603107

4778 6355 6599


1947
1800 300 1947


help@uidai.gov.in


www.uidai.gov.in


Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A.

खान मंत्रालय / MINISTRY OF MINES
भारतीय खान ब्यूरो / INDIAN BUREAU OF MINES



Signature

अर्हता प्राप्त व्यक्ति के रूप में मान्यता प्रमाण पत्र
(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)
CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON
(Under Rule 22C of Mineral Concession Rules, 1960)

श्री एस. करुपण्णन, मॉगनीकाडू, मुत्तमंपट्टी पोस्ट, बोम्मीडी वर्यो, ओमलूर तालुक, सेलम डीस्ट्रीक्ट, तमिलनाडू - 635 301, जिनका फोटो और हस्ताक्षर ऊपर दिया हुआ है, तथा जिनहोंने अपनी अर्हता और अनुभव का संतोष जनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम 22सी के तहत अर्हता प्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है।

Shri S. Karuppannan, Manganikadu, Muthampatty (Post), Bommidi (Via), Omalur Taluk, Salem District, Tamilnadu - 635 301, whose **Photograph and signature** is affixed herein above, having given satisfactory evidence of his qualifications & experience hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

उनकीपंजीयन संख्या है
His registration number is

RQP /MAS/263/2014/A

यह मान्यता 10 वर्षों की अवधि के लिए मान्यता है जो दिनांक 15.12.2024 को समाप्त होगी।
This recognition is valid for a period of 10 years ending on 15.12.2024.

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।

This certificate will liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

स्थान/ Place : Chennai
दिनांक/ Date : 16.12.2014.

Signature







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

Signature
क्षेत्रीय खाननियंत्रक / Regional Controller of Mines
भारतीय खानब्यूरो / Indian Bureau of Mines
चेन्नई क्षेत्र / Chennai Region

PLATE NO-I
APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.


LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect.
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

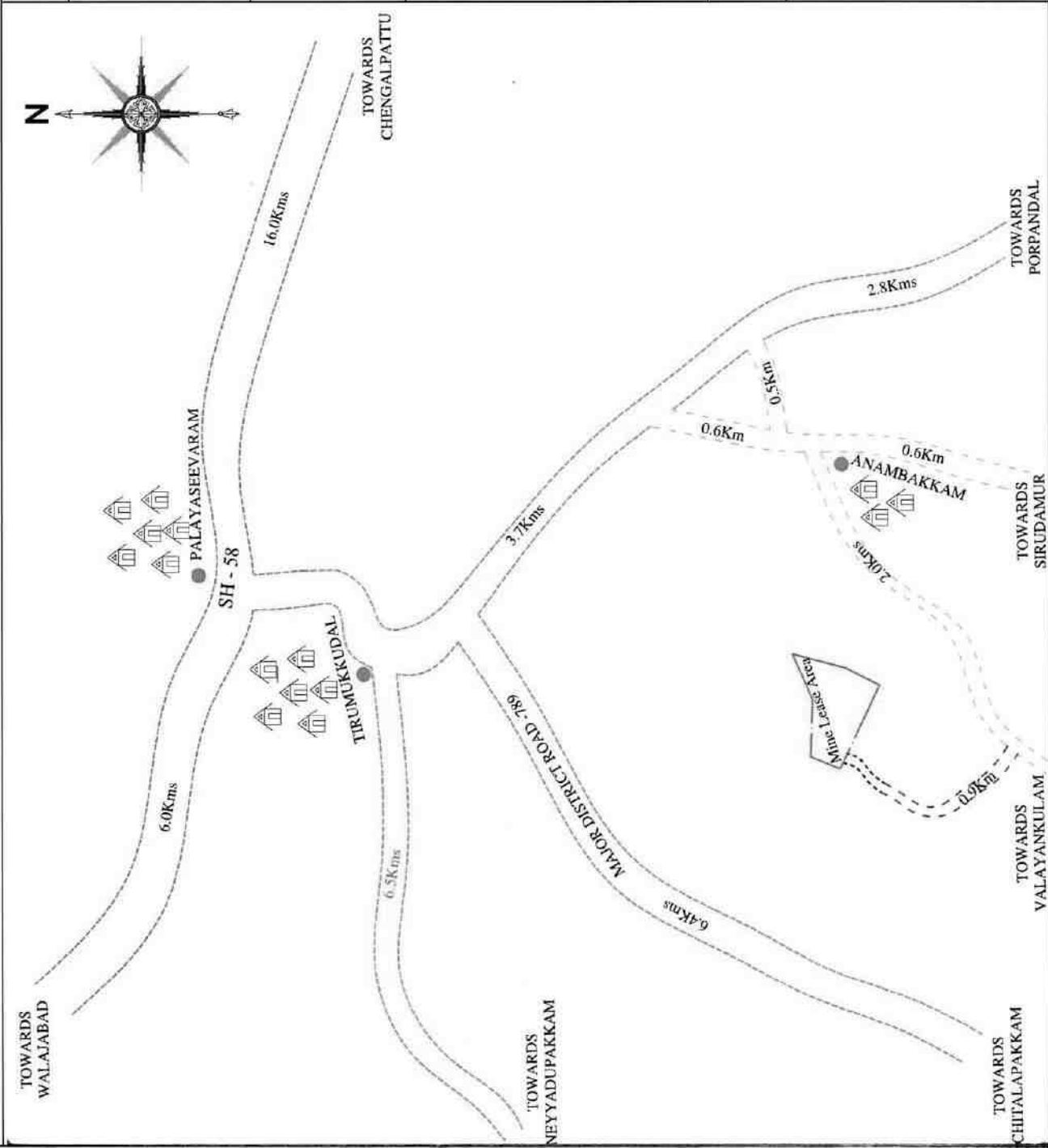
INDEX

MINE LEASE AREA	
APPROACH ROAD	
SH - 58 ROAD	
DISTRICT ROAD -789	
VILLAGE ROAD	
CART TRACK	

KEY MAP
 Not to Scale

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

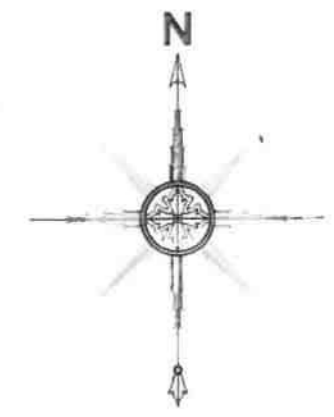

 Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



312
 சிந்தனையுடன்

12°43'9.69"N

TAMIL NADU



79°51'0.49"E

PLATE NO-IA

APPLICANT:
Mr.N.KANNIYAPPAN,
S/O Mr.NARAYANAPILLAI,
No.55,MARIYAMMAN KOVIL,
AANAMPAKKAM POST,
NEERKUNDRAM VILLAGE,
UTHIRAMERUR TALUK,
KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
S.F.NO : 319/1, 319/2, 319/3 & 319/4
EXTENT : 1.620Hect,
VILLAGE : SIRUDAMUR,
TALUK : UTHIRAMERUR,
DISTRICT : KANCHEEPURAM

INDEX

MINE LEASE AREA: ●
TOPO SHEET NO : 57-P/14
LATITUDE : 12°43'4.71"N to 12°43'9.69"N
LONGITUDE : 79°51'0.49"E to 79°51'7.15"E

LOCATION PLAN

NOT TO SCALE

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
RECOGNISED QUALIFIED PERSON
ROP/MAS/263/2014/A

சென்னை மாவட்டம்

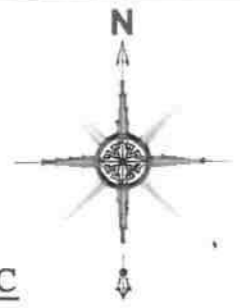


PLATE NO-IC

APPLICANT:
Mr.N.KANNIYAPPAN,
S/O Mr.NARAYANAPILLAI,
No.55,MARIYAMMAN KOVIL,
AANAMPAKKAM POST,
NEERKUNDRAM VILLAGE,
UTHIRAMERUR TALUK,
KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
S.F.NO : 319/1, 319/2, 319/3 & 319/4
EXTENT : 1.62.0Hect,
VILLAGE : SIRUDAMUR,
TALUK : UTHIRAMERUR,
DISTRICT : KANCHEEPURAM

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MINE LEASE AREA	
APPROACH ROAD	
CART TRACK	
300m RADIUS	
500m RADIUS	
PERIYA ERI	
EXISTING QUARRY PIT	

TOPO SHEET NO : 57-P/14
LATITUDE : 12°43'4.71"N to 12°43'9.69"N
LONGITUDE: 79°51'0.49"E to 79°51'7.15"E

SATELLITE IMAGERY MAP

SCALE- 1:5000

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
RECOGNISED QUALIFIED PERSON
RQP/MAS/263/2014/A



79°51'0.49"E

12°43'9.69"N

Periya Eri

சீர்தரப்பட்டது

OCTOBER TO DECEMBER

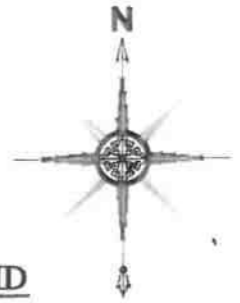


PLATE NO-ID

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

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MINE LEASE AREA	
SAFETY DISTANCE	
APPROACH ROAD	
CART TRACK	
300m RADIUS	
500m RADIUS	
PERIYA ERI	
EXISTING QUARRY PIT	

TOPO SHEET NO : 57-P/14
 LATITUDE : 12°43'4.71"N to 12°43'9.69"N
 LONGITUDE: 79°51'0.49"E to 79°51'7.15"E

ENVIRONMENTAL PLAN

SCALE- 1:5000

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



316

JULY TO SEPTEMBER

சீர்தரம் உடனடி



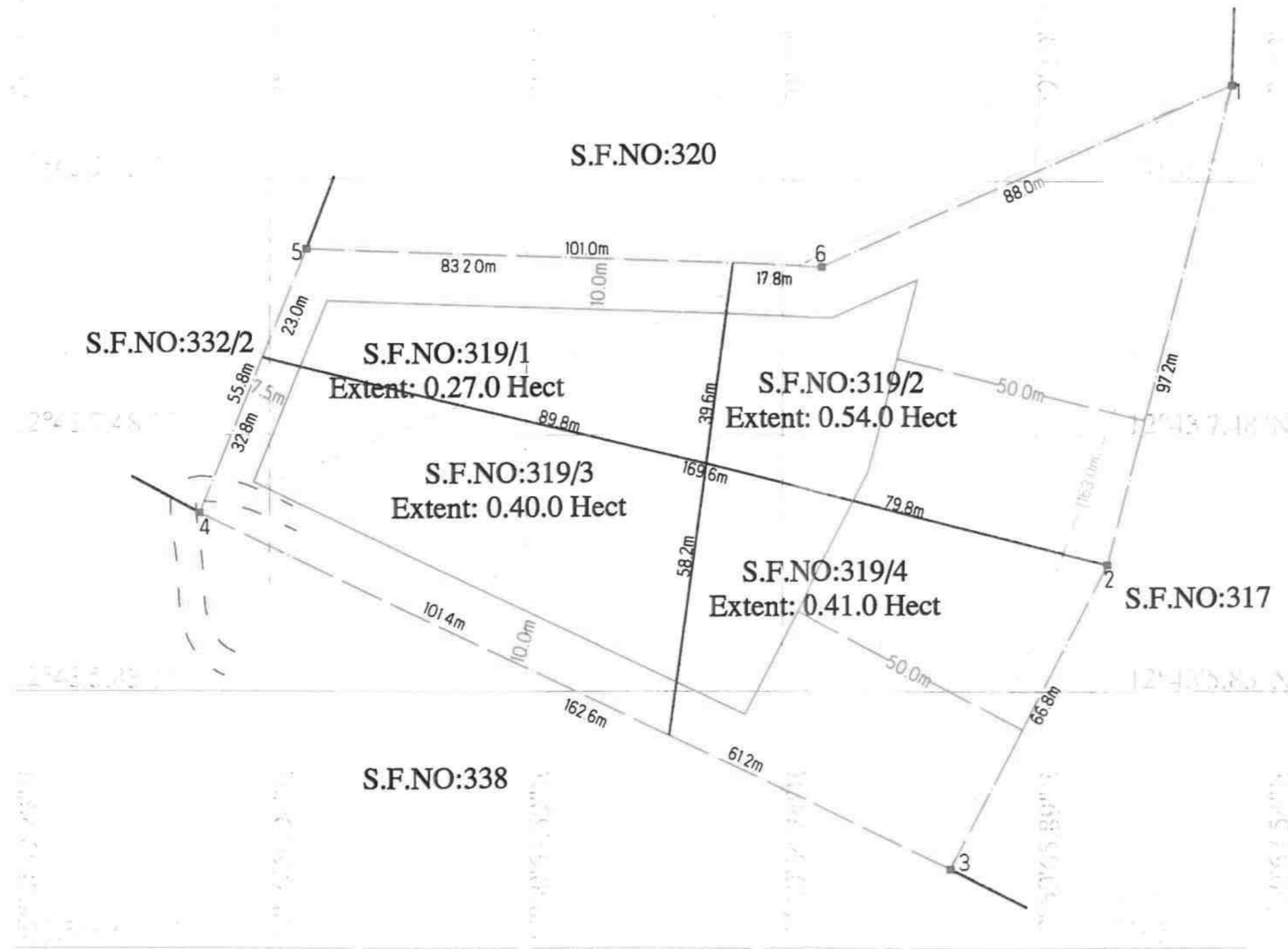
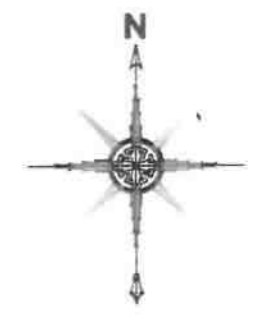


PLATE NO-II

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.620Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

INDEX

- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH ROAD
- PILLAR

MINE LEASE PLAN

SCALE 1 : 1000

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

Pillar ID	Latitude	Longitude
1	12°43'9.69"N	79°51'7.15"E
2	12°43'6.62"N	79°51'6.38"E
3	12°43'4.71"N	79°51'5.37"E
4	12°43'6.95"N	79°51'0.49"E
5	12°43'8.61"N	79°51'1.16"E
6	12°43'8.53"N	79°51'43.1"E

சென்னை மின்வாரியம்

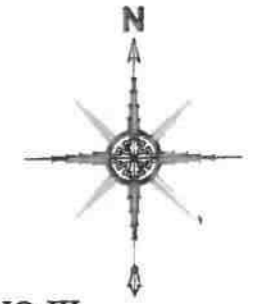
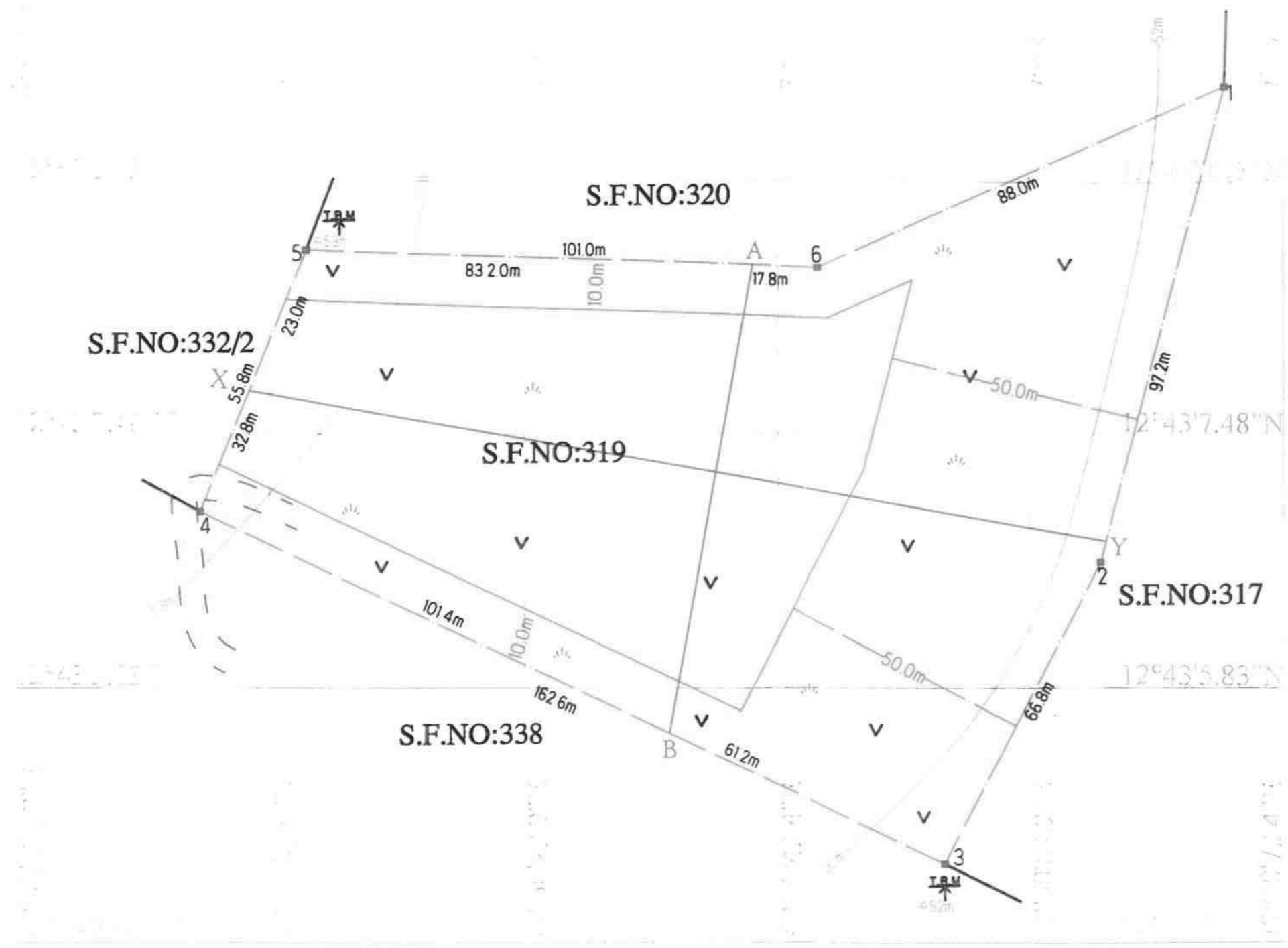


PLATE NO-III

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM



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APPROACH ROAD	
TEMPORARY BENCH MARK	
CONTOUR LINE	
SHRUBS	
GRAVEL	
PILLAR	

SURFACE AND GEOLOGICAL PLAN

SCALE 1 : 1000

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

சென்னை மதுகூலர்

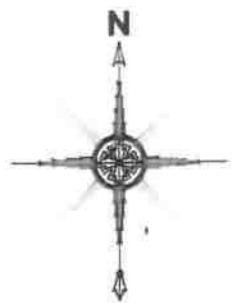
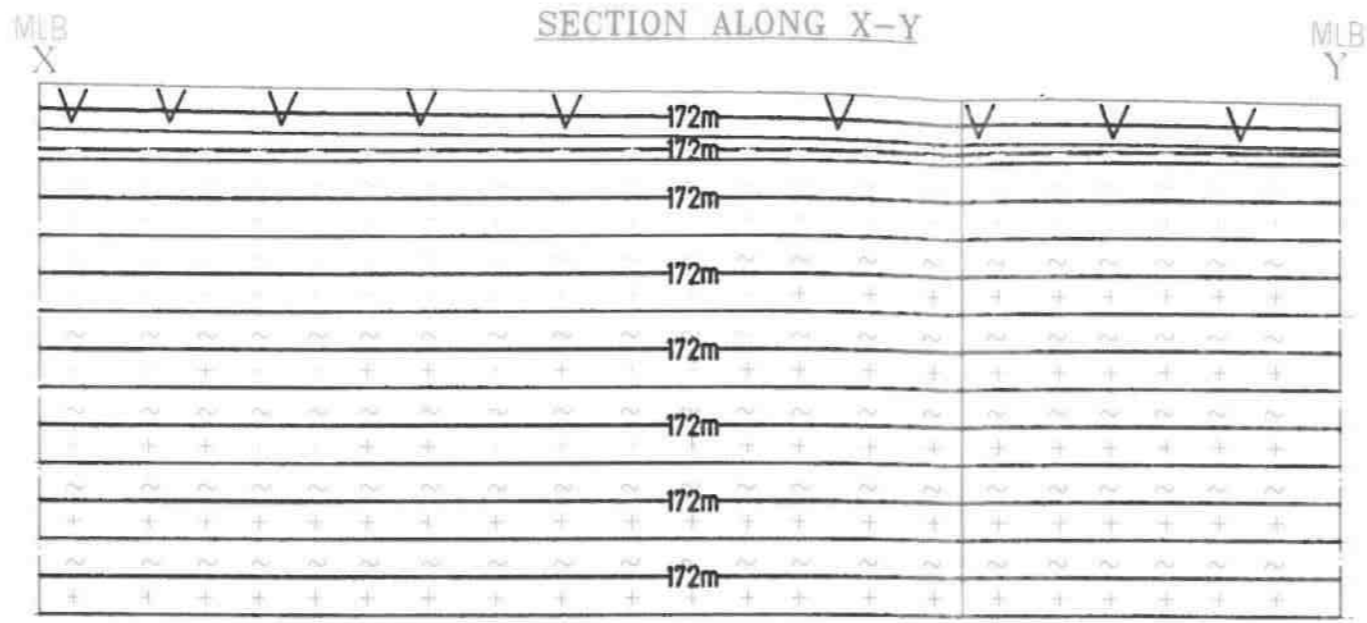


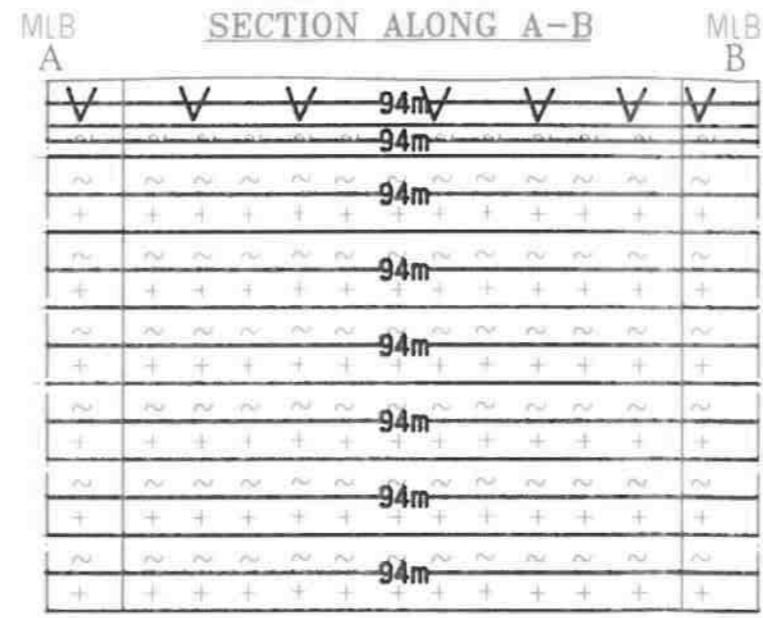
PLATE NO-III A

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- GRAVEL V V V
- ROUGH STONE



GEOLOGICAL RESOURCES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Geological Resources in CBM	Gravel in CBM
XY-AB	I	172	94	3	48504	.....	48504
	I	172	94	2	32336	32336	.....
	II	172	94	5	80840	80840	.....
	III	172	94	5	80840	80840	.....
	IV	172	94	5	80840	80840	.....
	V	172	94	5	80840	80840	.....
	VI	172	94	5	80840	80840	.....
VII	172	94	5	80840	80840	.....
TOTAL					565880	517376	48504

GEOLOGICAL SECTIONS

SECTION HOR 1 : 1000 & VER 1 : 500

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

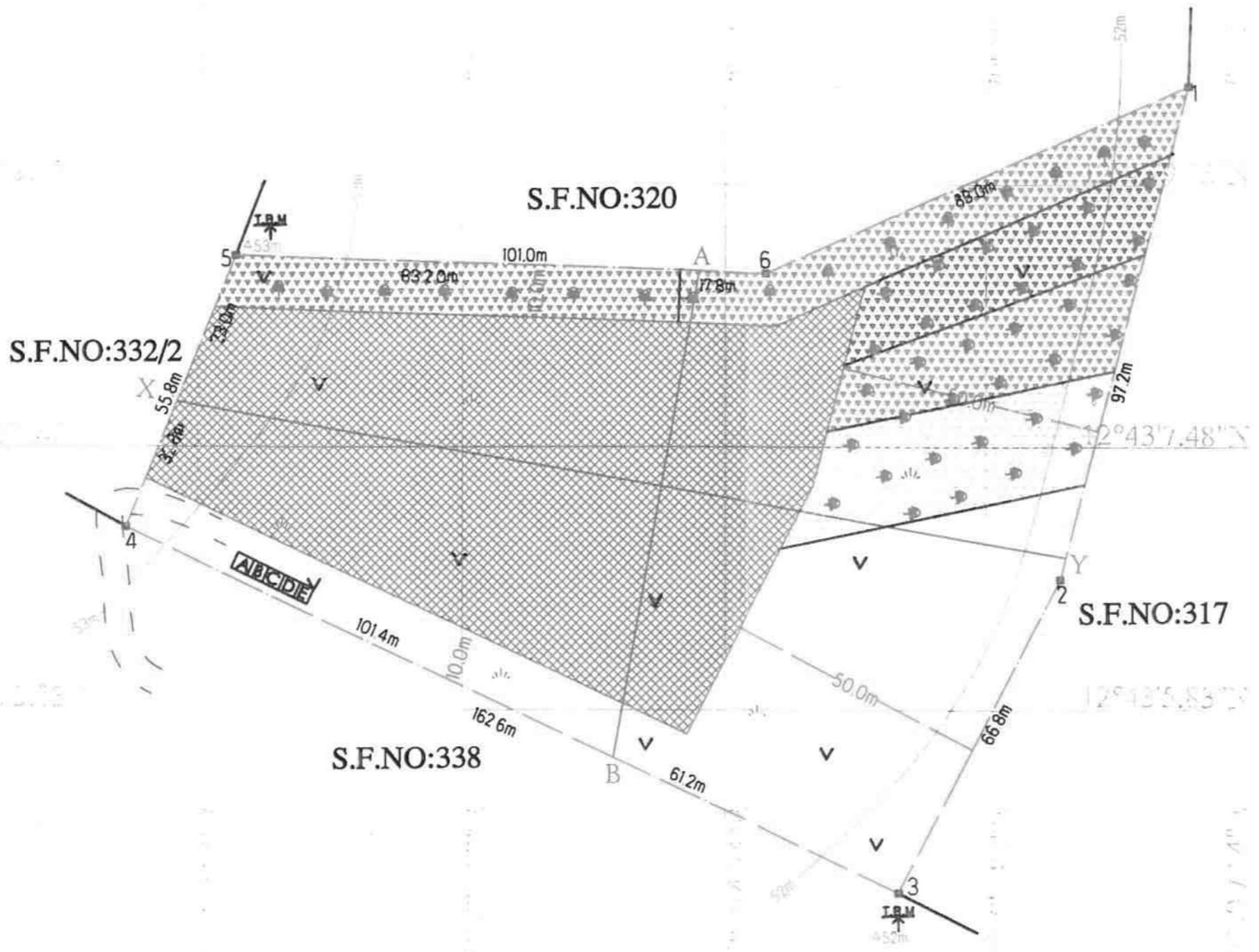
கண்ணாயப்பன்



PLATE NO-IV

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM



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APPROACH ROAD	
TEMPORARY BENCH MARK	
CONTOUR LINE	
GRAVEL	
SHRUBS	
PILLAR	

YEARWISE DEVELOPMENT & PRODUCTION PLAN
 SCALE 1 : 1000

Prepared By:

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

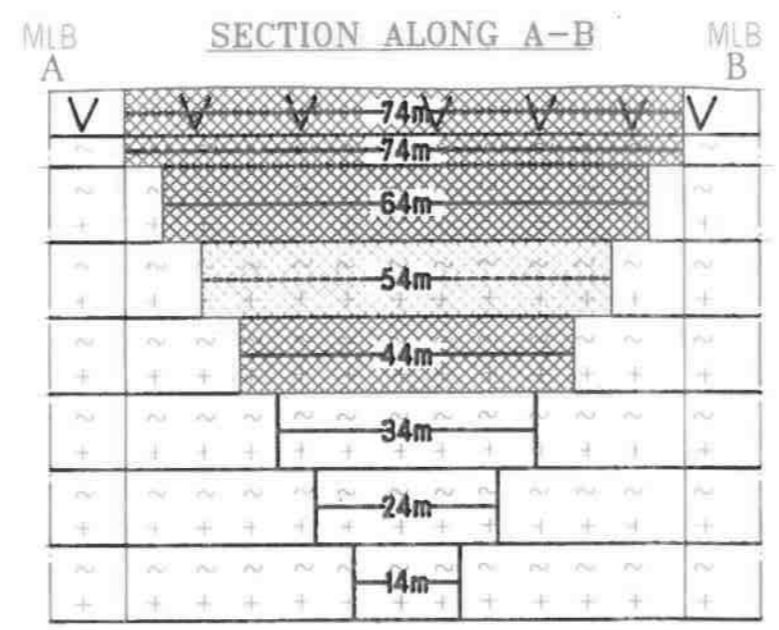
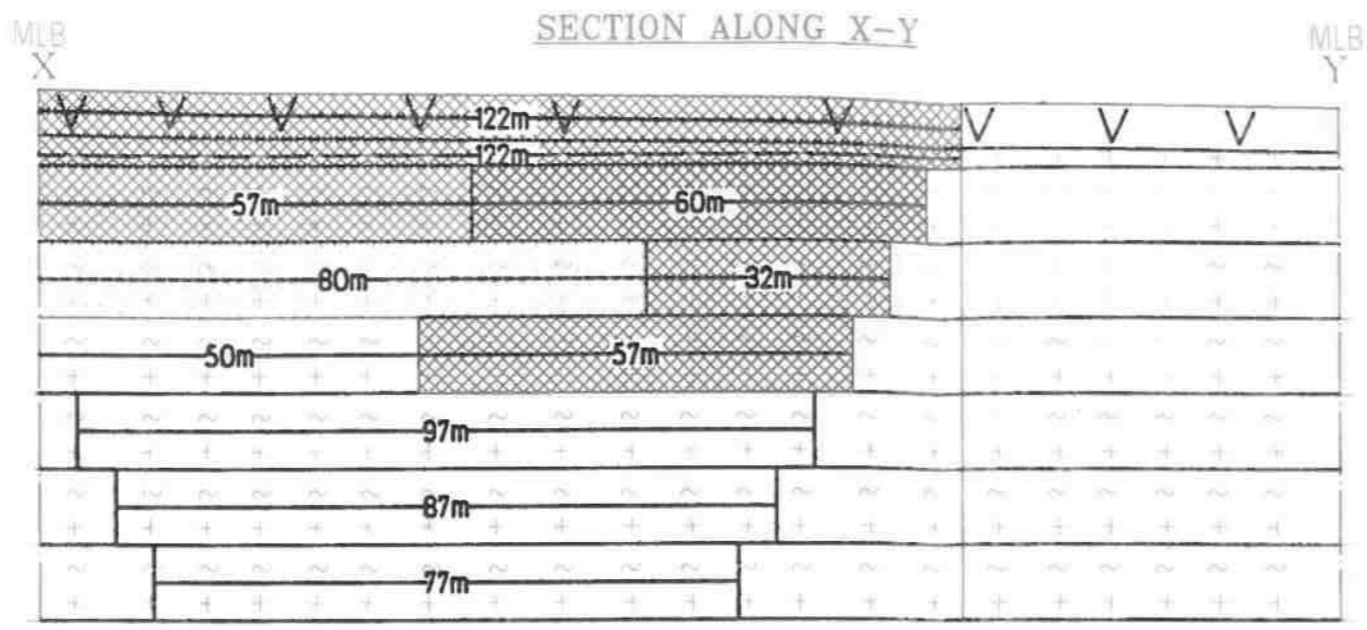
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

I - Year Proposed area to be Planted	
II - Year Proposed area to be Planted	
III - Year Proposed area to be Planted	
IV - Year Proposed area to be Planted	
V - Year Proposed area to be Planted	

I - Year Proposed area to be Quarried	
II - Year Proposed area to be Quarried	
III - Year Proposed area to be Quarried	
IV - Year Proposed area to be Quarried	
V - Year Proposed area to be Quarried	

A - OFFICE
 B - STORE
 C - FIRST AID
 D - REST ROOM
 E - TOILET

சுண்ணாம்பு



- I - Year Proposed area to be Quarried
- II - Year Proposed area to be Quarried
- III - Year Proposed area to be Quarried
- IV - Year Proposed area to be Quarried
- V - Year Proposed area to be Quarried

YEARWISE PRODUCTIONS								
Section	Year	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production in CBM	Gravel in CBM
XY-AB	I-YEAR	I	122	74	3	27084	.....	27084
			122	74	2	18056	18056	.....
	II - YEAR	I	60	64	5	19200	19200	.....
	III - YEAR	II	57	64	5	18240	18240	.....
	IV-YEAR	II	80	54	5	21600	21600	.....
V-YEAR	III	32	54	5	8640	8640	.....
	IV	57	44	5	12540	12540	.....
TOTAL						125360	98276	27084

PLATE NO-IVA

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- GRAVEL
- ULTIMATE BENCH
- ROUGH STONE
- PROPOSED BENCH

YEARWISE DEVELOPMENT & PRODUCTION SECTIONS

SECTION HOR 1 : 1000 & VER 1: 500

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

 Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 ROP/MAS/263/2014/A

சென்னை மாநகராட்சி

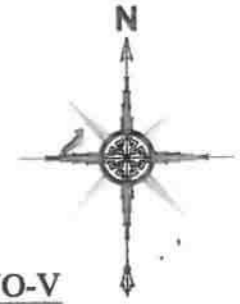
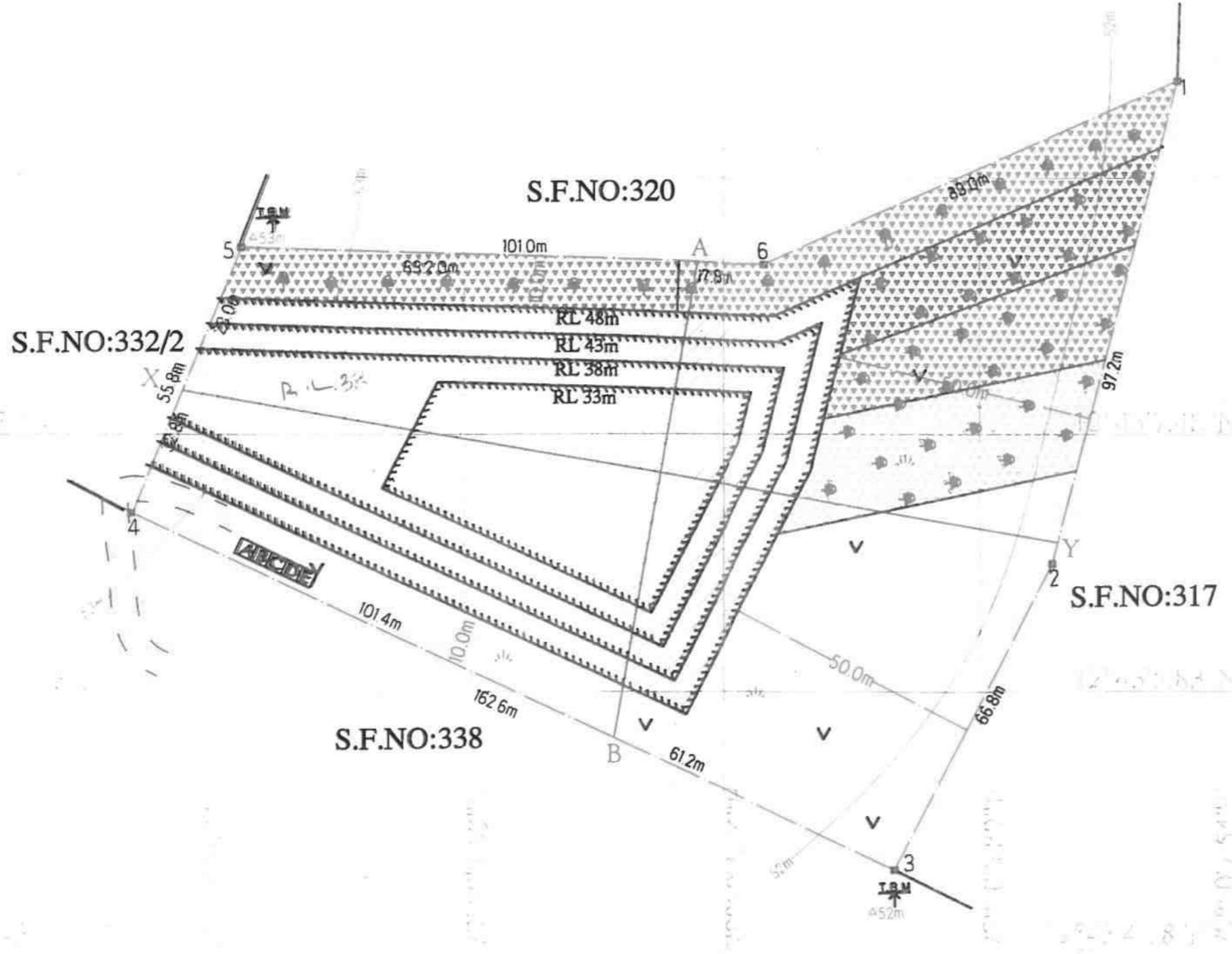


PLATE NO-V

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM



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- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- TEMPORARY BENCH MARK
- CONTOUR LINE
- GRAVEL
- SHRUBS
- BENCH
- PILLAR

MINE LAYOUT PLAN AND LAND USE PATTERN
 SCALE 1 : 2000

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

(Signature)

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

MINE LAYOUT LAND USE PATTERN

- I - Year Proposed area to be Planted
- II - Year Proposed area to be Planted
- III - Year Proposed area to be Planted
- IV - Year Proposed area to be Planted
- V - Year Proposed area to be Planted

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	0.69.8	
INFRASTRUCTURE ROADS	NIL	0.01.0	
UN-UTILIZED AREA	1.62.0	0.41.97	
GREEN BELT	NILL	0.48.23	
GRAND TOTAL	1.62.0Hect	322.62.0Hect	

- A - OFFICE
- B - STORE
- C - FIRST AID
- D - REST ROOM
- E - TOILET

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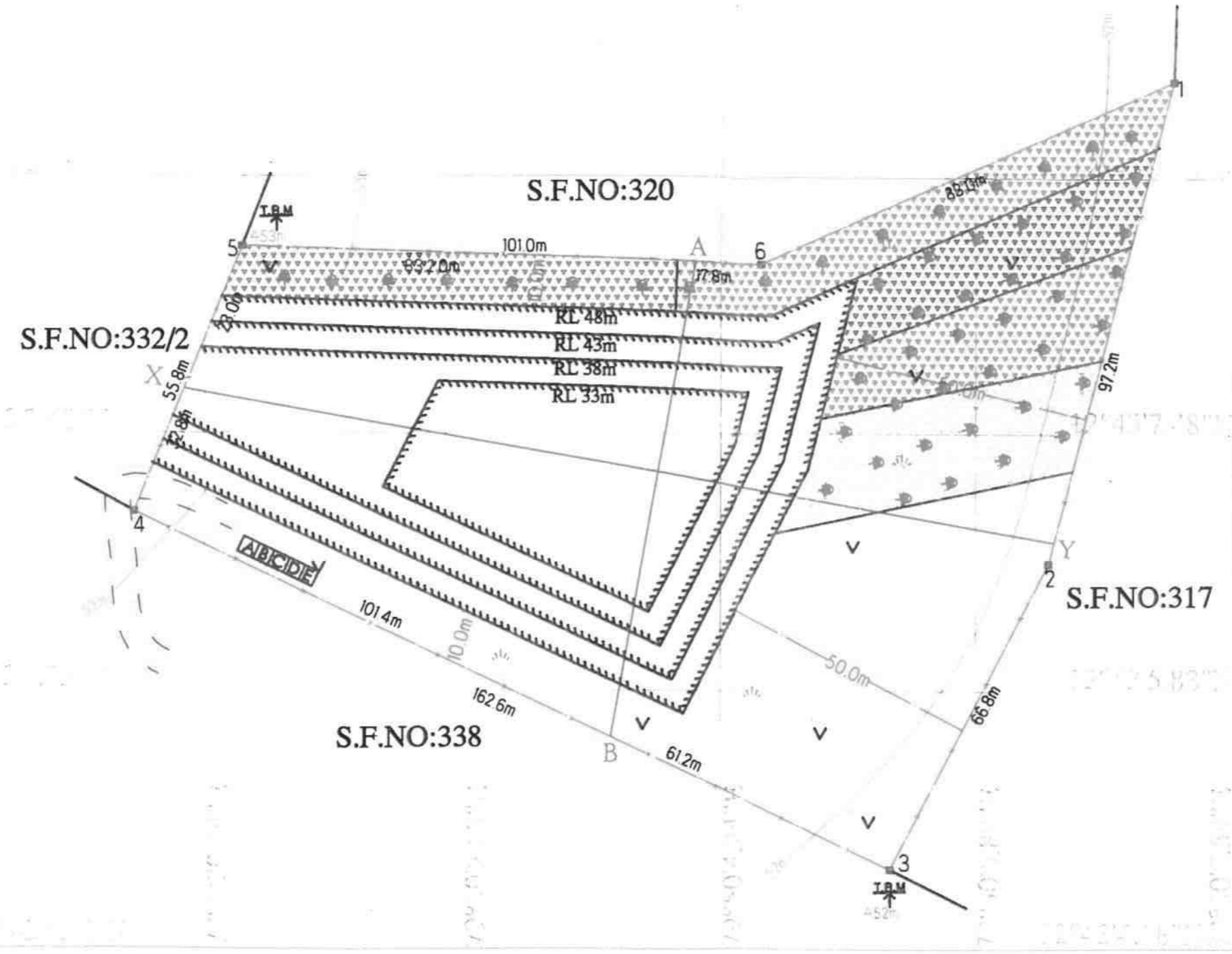
PLATE NO-VI

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

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SAFETY BOUNDARY	
APPROACH ROAD	
TEMPORARY BENCH MARK	
CONTOUR LINE	
GRAVEL	
SHRUBS	
BENCH	
FENCING	

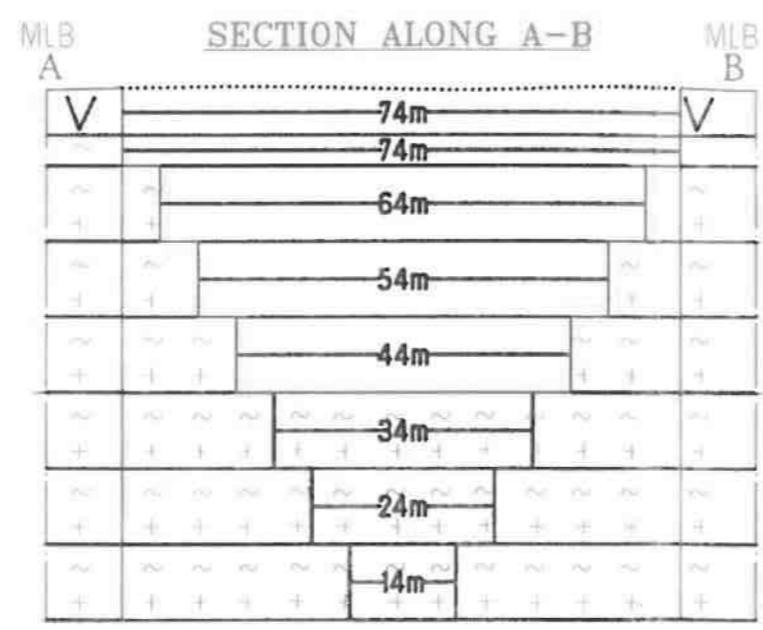
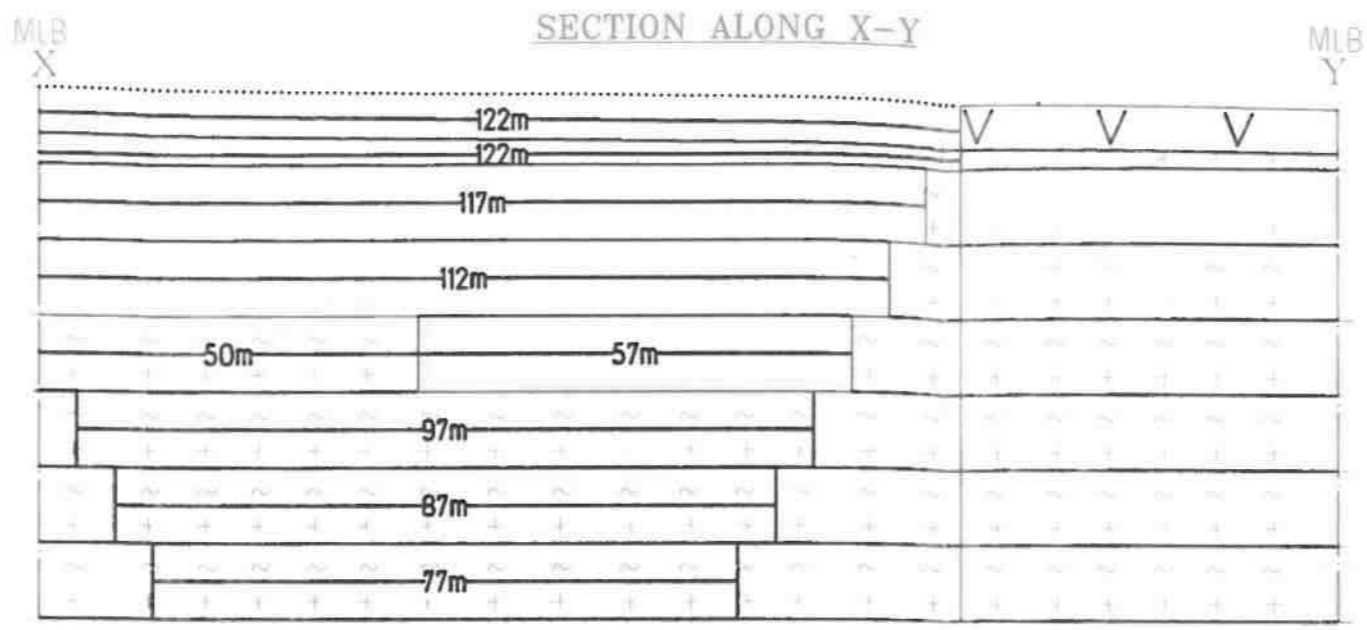


I - Year Proposed area to be Planted		A - OFFICE B - STORE C - FIRST AID D - REST ROOM E - TOILET
II - Year Proposed area to be Planted		
III - Year Proposed area to be Planted		
IV - Year Proposed area to be Planted		
V - Year Proposed area to be Planted		

**PROGRESSIVE MINE
 CLOSURE PLAN
 SCALE PLAN 1 : 1000**

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A



PRODUCTIONS							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production in CBM	Gravel in CBM
XY-AB	I	122	74	3	27084	.....	27084
	I	122	74	2	18056	18056	.....
	II	117	64	5	37440	37440	.....
	III	112	54	5	30240	30240	.....
	IV	57	44	5	12540	12540	.....
TOTAL					125360	98276	27084

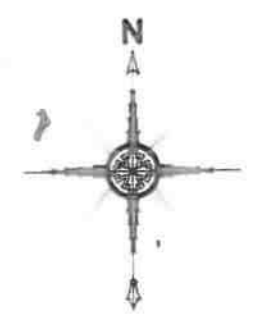


PLATE NO-VIA

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

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- MINE LEASE AREA
- SAFETY BOUNDARY
- GRAVEL
- ULTIMATE BENCH
- ROUGH STONE
- PROPOSED BENCH

PROGRESSIVE MINE CLOSURE SECTIONS

HOR 1 : 1000 & VER 1 : 500

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

கனம் ஸர்யபுரம்

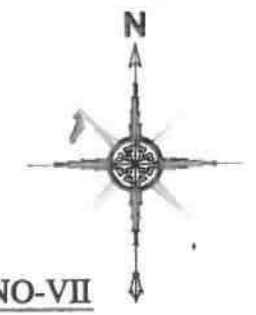
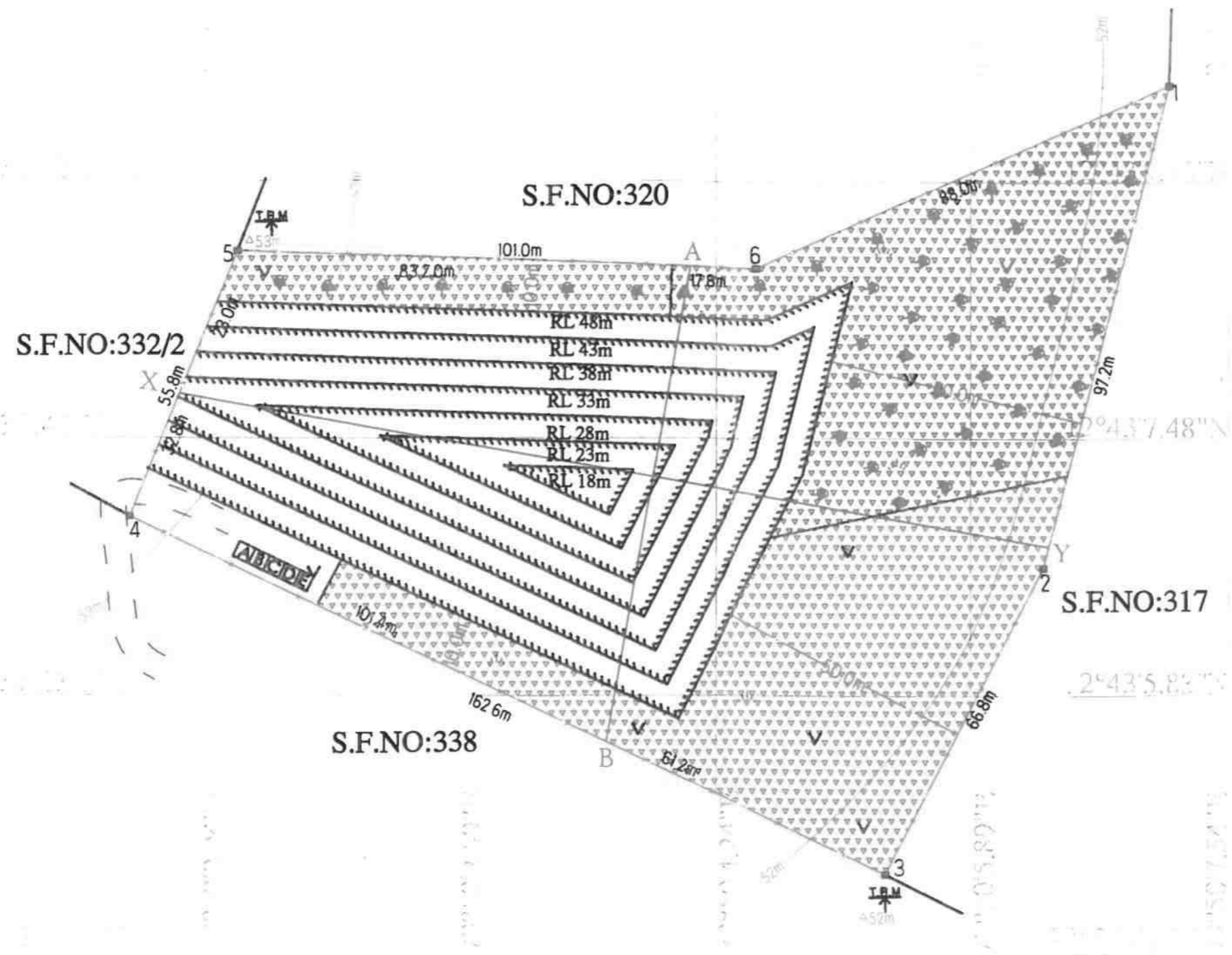


PLATE NO-VII

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM



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SAFETY BOUNDARY	
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CONTOUR LINE	
GRAVEL	
SHRUBS	
BENCH	
FENCING	

**CONCEPTUAL / FINAL
 MINE CLOSURE PLAN**
 SCALE 1 : 1000

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

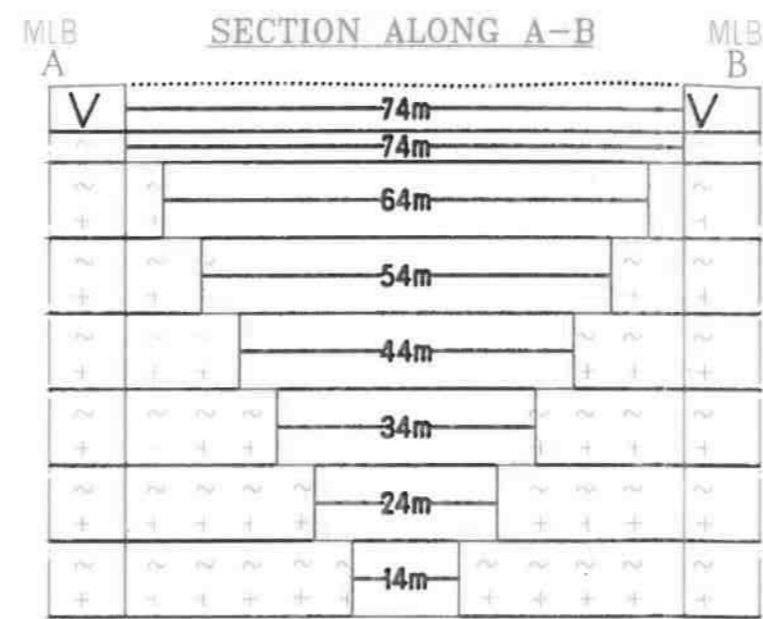
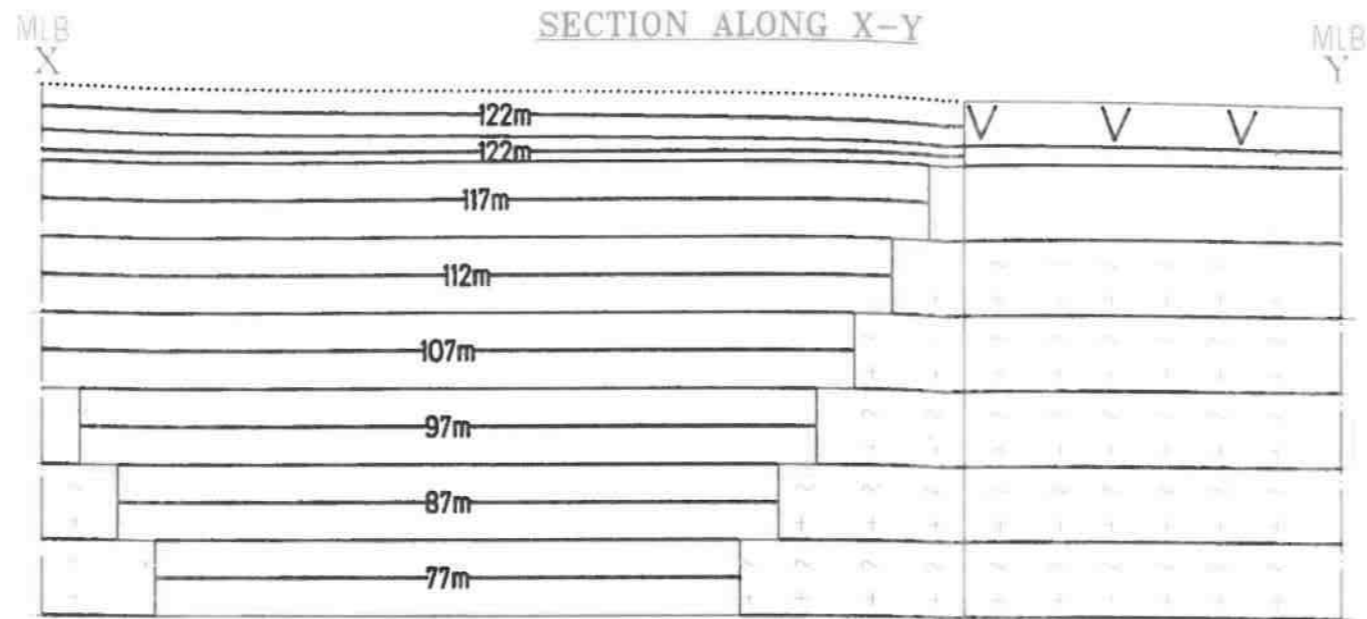
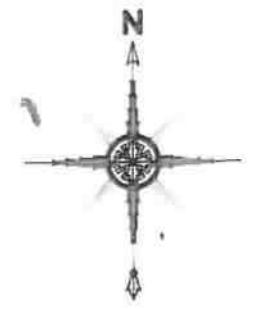
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 RQP/MAS/263/2014/A

I - Year Proposed area to be Planted	
II - Year Proposed area to be Planted	
III - Year Proposed area to be Planted	
IV - Year Proposed area to be Planted	
V - Year Proposed area to be Planted	

A - OFFICE
B - STORE
C - FIRST AID
D - REST ROOM
E - TOILET

I - Five Year Proposed area to be Planted	
II - Five Year Proposed area to be Planted	

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MINEABLE RESERVES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Mineable Reserves in CBM	Gravel in CBM
XY-AB	I	122	74	3	27084	.....	27084
	I	122	74	2	18056	18056	.....
	II	117	64	5	37440	37440	.....
	III	112	54	5	30240	30240	.....
	IV	107	44	5	23540	23540	.....
	V	97	34	5	16490	16490	.....
	VI	87	24	5	10440	10440	.....
VII	77	14	5	5390	5390	.....
TOTAL					168680	141596	27084

PLATE NO-VIIA

APPLICANT:
 Mr.N.KANNIYAPPAN,
 S/O Mr.NARAYANAPILLAI,
 No.55,MARIYAMMAN KOVIL,
 AANAMPAKKAM POST,
 NEERKUNDRAM VILLAGE,
 UTHIRAMERUR TALUK,
 KANCHEEPURAM DISTRICT.

LEASE APPLIED AREA:
 S.F.NO : 319/1, 319/2, 319/3 & 319/4
 EXTENT : 1.62.0Hect,
 VILLAGE : SIRUDAMUR,
 TALUK : UTHIRAMERUR,
 DISTRICT : KANCHEEPURAM

INDEX

- MINE LEASE AREA ▭
- SAFETY BOUNDARY ▭
- GRAVEL VVV
- ROUGH STONE ▭
- PROPOSED BENCH ▭

**CONCEPTUAL / FINAL
 MINE CLOSURE SECTIONS
 HOR 1 : 1000 & VER 1: 500**

Prepared By:

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

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
 RECOGNISED QUALIFIED PERSON
 ROP/MAS/263/2014/A

கண்ணியப்பன்

From
R. Perumal Raja, M.Sc.,
Assistant Director,
Geology and Mining,
Kancheepuram.

To
Thiru. N. Kanniyappan,
S/o. Narayanapillai,
Neerkundram Village,
Uthiramerur Taluk,
Kancheepuram District.

Rc. No.740/Q3/2018, dated:10.12.2020

Sir,

Sub: Mines and Minerals – Kancheepuram District - Minor Mineral – Rough Stone & Gravel Quarry in Patta lands - S.F.Nos. 319/1, 319/2, 319/3, 319/4 - Over an Extent of 1.62.00 Hectares in Siruthamur Village - Uthiramerur Taluk – Thiru. N. Kanniyappan, S/o. Narayanapillai Submission of Mining Plan for approval - Approved - Regarding.

- Ref: 1. Application for Rough Stone / Gravel quarry permission preferred by Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District dated 14.12.2018.
2. G.O. Ms. No. 79 / Industries (MMC 1) Department dated 06.04.2015.
3. G.O. Ms. No. 169 / Industries (MMC 1) Department, dated.04.08.2020.
4. G.O. Ms. No. 208 / Industries (MMC 1) Department, dated.21.09.2020.
5. The Assistant Director, Kancheepuram, Precise Area Communication letter No.740/Q3/2018, dated.19.10.2020.
6. Mining Plan submitted by Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram District in letter dated.29.10.2020.

In the reference 5th cited, Precise Area has been Communicated to by Thiru. N. Kanniyappan, S/o. Narayanapillai and was directed to submit mining plan for approval so as obtain Environmental Clearance from competent authority for the Rough Stone & Gravel Quarry in S.F.Nos. 319/1(0.27.00), 319/2(0.54.00), 319/3(0.40.00), 319/4(0.41.00) Over an Extent of 1.62.00 Hectares in Sirudhamur

31/10/2020

Village, Uthiramerur Taluk, Kancheepuram District for a period of Ten years.

In response, Thiru. N. Kanniyappan, S/o. Narayanapillai, Neerkundram Village, Uthiramerur Taluk, Kancheepuram vide the reference 6th cited has submitted three copies of Mining Plan prepared by the RQP, for the proposed Rough Stone & Gravel quarry in S.F.Nos. 319/1(0.27.00), 319/2(0.54.00), 319/3(0.40.00), 319/4(0.41.00) Over an Extent of 1.62.00 Hectares in Sirudhamur Village, Uthiramerur Taluk, Kancheepuram District with a requested to approve the same.

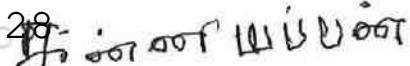
The Mining Plan has been prepared for the production of 98,276 M³ of Roughstone and 27,084 M³ of Gravel over a period of Five years.

The Mining Plan has been verified in detail and found that it has been prepared in accordance with the guidelines / instructions issued by the Commissioner of Geology and Mining vide letter in Rc.No.3868/LC/2012 dated 19.11.2012.

Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, read with G.O. (Ms). No.79 / Industries (MMC 1) Department dated 06.04.2015, the Mining Plan is hereby approved subject to the following conditions.

Part-I

- (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 convey 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.

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- (iii) The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (iv) The validity of the mining plan is co-terminus with the lease period.
- (v) Quarrying shall be done in accordance with 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.
- (vi) 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.
- (vii) If any black granite deposit found in the applied area during quarry work the lease granted will be cancelled as per Rules.
- (viii) விண்ணப்பப் புலங்களுக்கு அருகிலுள்ள அரசு புறம்போக்கு மற்றும் பட்டா நிலங்களுக்கு (விண்ணப்பதாரருக்கு சொந்தமான பட்டா குவாரிப் புல எண். 332/2 தவிர்த்து) முறையே 10 மீட்டர் மற்றும் 7.5 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு குவாரிப்பணி செய்யப்பட வேண்டும்.
- (ix) விண்ணப்ப புலத்திரன ஒட்டினார் போல் சிறுதாமூர் பெரிய ஏரி புறம்போக்கு புலஎண்.317/-என எவ்வித ஆக்ரமணமும் செய்யாமல் பாதுகாப்பு இடைவெளி 50 மீட்டர் விடப்பட்டு குவாரிப்பணி செய்ய வேண்டும்.

Part-II

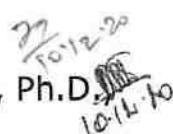
- (a) There are no minor mineral quarries exceeding an extent of 25.00.0 hectares in total within a radial distance of 500 meters from the periphery of the applied fields.

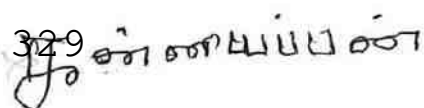
Encl:

Two copy of Approved Mining Plan


Assistant Director,
Geology and Mining,
Kancheepuram.

Copy to:

- 1. Thiru. S. Karuppannan, M.Sc., Ph.D. 
Recognised Qualified person,
No.1/213-B, Ground Floor, Natesan Complex, Oddapatti,
Collectorate Post Office,
Dharmapuri - 636705.
- 2. The Director of Geology and Mining,
Chennai-32. (with AMP).





Quality Council of India
National Accreditation Board for
Education & Training

Certificate of Accreditation

Geo Technical Mining Solutions

No-1/213-B, Ground Floor, Natesan Complex, Oddapatti,
 Collectorate Post office, Dharmapuri, Tamil Nadu-636705

Accredited as Category – ‘B’ organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IA AC Minutes dated January 29, 2021 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/21/1674 dated March 30, 2021. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.



Sr. Director, NABET
 Dated: March 30, 2021

Certificate No.
 NABET/EIA/2023/IA0067

Valid till
 December 29, 2023

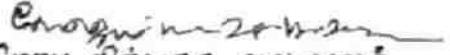
For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.



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சான்று

காஞ்சிபுரம் மாவட்டம். உத்திரமேரூர் வட்டம். சிறுதாமூர் கிராமம். புல எண்கள்; 319/1, 319/2, 319/3 & 319/4-ல் மொத்தபரப்பு 1.62.0ஹெக்டேர் புன்செய் பட்டா நிலத்தில் சாதாரண கற்கள் மற்றும் கிராவல்மண் வெட்டியெடுக்க திரு.நா.கன்னியப்பன் த/பெ. நாராயணப்பிள்ளை என்பவர் குவாரி செய்ய மனு செய்துள்ளார். புலதணிக்கையில் செய்ததில் சுமார் 300மீட்டர் சுற்றளவில் கிராம நத்தம், கோவில்கள், அங்கிகரிக்கப்பட்ட குடியிருப்பு பகுதிகள், சுடுகாடு, புதை குழிகள். உயர்மின்னழுத்த கம்பிகள் மற்றும் கம்பங்கள் ஏதும் இல்லை என சான்றளிக்கப்படுகிறது.


கிராம நிர்வாக அலுவலர்
நெ.83, சிறுதாமூர்
உத்திரமேரூர் வட்டம்
காஞ்சிபுரம் மாவட்டம்

α கன்னியப்பன்