DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN

FOR OBTAINING
Environmental Clearance under EIA Notification – 2006
Schedule Sl. No. 1 (a) (i): Mining Project

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

CLUSTER EXTENT = 20.27.5 hectares

Mr. S. RAJENDIRAN ROUGH STONE AND GRAVEL QUARRY
At
Siruthamur Village, Uthiramerur Taluk, Kancheepuram District

ToR issued vide Letter No. SEIAA-TN/F.NO.9689/TOR-1387/2023 Dated 07.03.2023.

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.
Thiru.S.Rajendiran **S/o Sevagaperumal** **2/4 Jothinagar main Road** **Ekkattutahngal** **Guindy, Chennai.**	3.35.5 ha & 275/1B, 275/2A, 238/1A, 238/1B, 238/1C & 238/1D

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com
NABET ACC. NO: NABET/EIA/2124/SA 0184
Valid till: Dec 31, 2023

ENVIRONMENTAL LAB

ACCURACY ANALABS LABORATORY

NABL Accredited & Recognised Laboratory

Baseline Study Period – March - May, 2022

APRIL-2023

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru.S. Rajendiran

"ToR issued vide Letter No. SEIAA-TN/F.No.9689/SEAC/ToR-1387/2023 dated 07.03.2023"

SPECIFIC CONDITIONS		
1	The proponent is requested to carry out a survey and enumerate on the structures located within 50m, 100m, 150m, 200m, 250m, 300m and 500m from the boundary of the mine lease area.	The information on structures at 50 m, 100 m, 150 m, 200 m, 250 m, 300 m and 500 m will be added in final EIA report.
2	Since the Karikili Bird Sanctuary is located at a distance of 13.6 km south, the PP shall obtain NBWL clearance.	The state government has declared Karikili as a Bird Sanctuary under Section 18(1) and Section 26(1)A of FCA, 1980. According to the notification, the ESZ constitutes 1 km of tank as core and 5 km belt around the tank as buffer. Therefore, NBWL is not required as the proposed project area is located 13.6 km from the Karikili Sanctuary.
3	The PP shall furnish the exact distance of the project location and Uthiramerur inscription.	The distance between the project site and Uthiramerur inscription is 16.26km NE km, as shown in Table 3.41 under Chapter III, pp.107-108.
4	The PP shall discuss in detail about execution of conditions laid down by PWD.	It is agreed.
5	The proponent shall discuss the funds for mitigation measures to be included in the EMP.	The funds required for EMP has been provided in Tables 10.9 and 10.10 under Chapter X, pp.176-181
6	The proponent shall adhere to the bench height – 5 m as stated in the approved mining plan.	The PP has been advised to form benches with dimensions of 5 m height and 5 m width as stated in the approved mining plan.
7	The proponent shall obtain Anna University Star	The PP has been advised to obtain

	Rating System.	Anna University Star Rating.
8	The PP shall leave 60 m safety distance for Reserve Forest adjoining the mining lease area as per the revenue records or any other standing orders as applicable.	There are three Reserve Forests (RFs) around the lease area. Of which, Kavanipakkam Reserve Forest is the only forest close to the lease area, located at 0.83 km E of the project site. Therefore, there are no reserve forests within 60 m from the project site.
9	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 I TWAD so as to assess the impacts on the wells due to mining activity. Necessary data and documentation in this regard may be provided	Detailed hydrogeological study was carried out. The results have been discussed Section 3.2 under Chapter III, pp.41-53.
10	The proponent shall submit the details regarding the nature of blasting activity which will be carried out	This proposed project involves the open cast semi-mechanized mining method with bench height and width of 5m each. The open cast semi- mechanized method involved drilling and blasting is proposed to extract rough stone and gravel.
11	The PP shall furnish DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., upto a radius of 25 km from the proposed site.	With respect to the suggestion made in the ToR, an application seeking details on distance of reserve forest & protected areas / Wild life sanctuaries & wild life corridors etc., within 25 km radius has been made to DFO at Kancheepuram. The document will be submitted along with the final EIA

		report.
12	The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.	The individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site will be submitted in the final EIA report.
13	In the case of proposed lease in an existing (or old) quarry where the benches are non existent (or) partially formed critical of the bench geometry approved in the Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the 'highwall' benches to ensure slope stability in the proposed quarry lease which shall be vetted by the concerned Asst Director of Geology and Mining, during the time of appraisal for obtaining the EC.	The action plan for realignment of benches for this proposed project will be submitted during presentation
14	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.	An agreement made between explosives supplying company and the proponent and a blaster certificate has already been included in the mining plan report attached in Annexure III.
15	Since the quarry lies in a cluster situation, the PP shall furnish a Standard Operating Procedure for carrying out the safe blasting operation while considering the adjacent quarries lies in a radial distance of 500 m from their quarry.	NONEL blasting is proposed for this project. A Standard Operating Procedure (SOP) for carrying out safe blasting operation has been provided in Section 2.6 under Chapter II, pp.20-28
16	Details of Green belt & fencing shall be included in the EIA Report.	Details of existing green belt and fencing will be provided in the final EIA report.
17	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 document containing video and photographic evidences will be submitted at the time of presentation, if

	the State with video and photographic evidences.		any.
18	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,		
	(i)	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	As the proposed project is a green field project, the conditions are not applicable to this project.
	(ii)	Quantity of minerals mined out.	
	(iii)	Highest production achieved in any one year	
	(iv)	Detail of approved depth of mining.	
	(v)	Actual depth of the mining achieved earlier.	
	(vi)	Name of the person already mined in that leases area.	
	(vii)	If EC and CTO already obtained, the copy of the same shall be submitted.	
	(viii)	Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
19	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Tope 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).		All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.4, under Chapter II, p-13
20	The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,		Drone video coverage will be submitted at the time of presentation.
21	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.		Photographs showing fencing, green belt have been included in Section 4.6 under Chapter IV, pp.110-138.
22	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned		The mineral reserves of the project have been discussed in Section 2.5

	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.	under Chapter II, p.17. The anticipated impact of mining on land, air, noise, water, soil, biology, and socio economy is discussed under Chapter IV, pp.110-138.
23	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.	Employment details of the proposed project are provided in Table 2.14 under Chapter II, p.29.
24	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data were collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed under chapter III, pp. 30-109.
25	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 R_Ollution. water pollution, climate change and flood control & health impam. AccOrdingly, the Environment Management plan should be prepared keeping the eoneerned q~ancl the surrounding haf;itations in the mind.	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII, pp.152-159.
26	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	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.
27	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies. Human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area 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 Section 3.1, pp.31-40 under Chapter III. The details of surrounding sensitive ecological features are provided in Table 3.41 under Chapter III, pp.107-108 Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.8 under Chapter II, p.23.
28	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. No dumps have been proposed outside the lease area.
29	Proximity to Areas declared '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. This project area is involved in the production of rough stone and gravel materials as per the approved mine plan.
30	Description of water conservation measures proposed	Water for dust suppression, greenbelt

	to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	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.
31	Impact on local transport infrastructure due to the Project should be indicated	Impact on local traffic due to the project is within the permissible limit. Details are provided in Section 3.7, pp.105-107.
32	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.	A detailed tree survey was caried out within 300 m radius and the results have been discussed in Section 3.5 under chapter-III, pp.68-97.
33	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6 under Chapter II, pp.20-28.
34	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.	The project proponent addressed the concerns from the public during public hearing will be submitted in the final EIA report.
35	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	The Public hearing advertisement will be updated in the final EIA report.
36	The PP shall produce/display the EIA report, Executive summery and other related information with respect to public hearing in Tamil Language also.	The Tamil version of draft EIA report and executive summary was submitted to TNPCB for public hearing.

37	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 and the FAE for ecology and biodiversity visited the study area and instructed the local people about the importance of protecting the biological environment.
38	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-l 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.	A detailed Greenbelt Development Plan dealing with carbon sequestration has been provided in Section 4.6 under Chapter IV, pp.128-134.
39	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.	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 spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist. Saplings used for greenbelt development have been shown in Section 4.6 under Chapter IV, pp.128-134.
40	A Disaster management Plan shall be prepared and included in the EIAIEMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	The details about disaster management Plan have been provided in Section 7.2 under Chapter VII, pp.145-147.
41	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	The details about risk assessment and management plan have been provided in Section 7.2 under Chapter VII,

	of the lease period.	pp.145-147.
42	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 discussed in detail in Section 4.8 under Chapter IV, pp.135 & 136.
43	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 under Chapter VIII, pp.163 & 164.
44	The Socio-economic studies should be carded 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.	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 29 people directly and 15 people indirectly as discussed in Section 8.1 and 8.2 under Chapter VIII, p.162.
45	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.
46	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 under Chapter VIII, pp.162-164.
47	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	The certified compliance is attached with this report in Annexure.

	previous EC with the site photographs which shall duly be certified by MoEF & CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	
48	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.	A detailed EMP is provided in Table 10.9 under Chapter X, pp.176-180.
49	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.	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
ADDITIONAL CONDITIONS		
1	The activity should not result in Co_2 release and temperature rise and add to micro climate alternations.	The results will be updated in the final EIA report.
2	The proponent shall ensure that the activity does not disturb the water bodies and natural flow of surface and ground water, nor cause any pollution, to water sources in the area.	
3	The proponent shall ensure that the activity does not disturb Soil health & bio-diversity, Climate change leading to Droughts, Floods etc.	
4	The proponent shall ensure that the activity does not Pollute leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.	
5	The proponent shall ensure that the activity does not make the Possibilities of water contamination and	

	impact on aquatic ecosystem health.	
6	The trees present in the site shall be protected, replanted elsewhere.	
7	The PP shall study the impact on Invasive Alien Species (IAP).	
Annexure 'B' **Cluster Management Committee**		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	A cluster management committee including all the proponents of the rough stone quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of green belt development plan, water sprinkling, blasting, etc.
2	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,	The members of the cluster management committee will be instructed to carry out EMP in coordination.
3	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	The List of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.	All the information has been discussed in Section 2.6 under Chapter II, pp.18-25.
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	It will be informed to the committee

	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.		The cluster management will be advised 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 workers /staff involved in the mining as well as the health of the public.		The information on the health of the workers and the local people will be updated periodically.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.		A proper action plan with reference to water, sanitation & safety will be devised and submitted by the committee to the respective authority.
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents		The committee will submit the fire safety and evacuation plan as discussed in Section 7.3 under Chapter VII, pp.148-152.
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institution on the following		
	a)	Soil health & soil biological, physical land chemical features.	
	b)	Climate change leading to Droughts, Floods etc.	

	c)	Pollution leading to release of Greenhouse gases (GHG), rise in Temperature & Livelihood of the local people.	The Study is under process. The results will be updated in the final EIA report.
	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.	
13	**Agriculture & Agro-Biodiversity**		
	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.
14	Impact on soil flora & vegetation around the project site.		Impact of the project on the ecology and biodiversity has been discussed in Section 4.2 and Section 4.6 under Chapter IV, pp.111-112 and pp.128 - 134
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.		Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III, pp.68-97. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV, pp.128-134.

16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora; fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	The ecological details have been provided in Section 3.5 under Chapter III, pp.68-97 and measures have been provided in Section 4.6 under Chapter IV, pp.128-134.
17	Action should specifically suggest 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
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV, pp.110 & 111.
19	The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV, pp.110-138.
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV, pp.124-131.
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6 under Chapter IV, pp.128-134.
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	There are no protected areas, National Parks, Corridors and Wildlife pathways near project site. The list of environmentally sensitive areas within 10 km radius has been provided in Table 3.41 under Chapter III, pp.107 &

		108
	Water Environment	
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1km (radius) so as to assess the impacts on the nearby 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.	A detailed hydrogeological study was carried out. The results have been discussed in Section 3.2 under Chapter III, pp.41-53.
24	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.112 & 113.
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.	A detailed study was carried out regarding the impact of mining on the environment. The results have been included in Chapter IV, pp.110-138.
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	As there are no water bodies near to the proposed project site during study period, a study about the impact of mining on fish habitats was not conducted.
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV, pp.110-138.
28	The project proponent shall study and furnish the	The impact of the proposed project on

	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.	aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV, pp.128-134.
29	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, pp.111-112.
30	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV, pp.112 & 113.
31	**Energy**	
	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.	The measures taken to control Noise, Air, water, and dust have been given under Chapter IV, pp.110-138.
32	**Climate Change**	
	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.	Greenbelt development plan as discussed in Section 4.6 under Chapter IV has been designed to reduce the impact of carbon emission on the environment, pp.128 - 134.
33	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
34	**Mine Closure Plan**	
	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the mine closure are shown in Table 2.9 under Chapter II, p.23.

EMP		
35	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued	A detailed Environment Management plan has been given under Chapter X, pp.166-181
36	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	A detailed Environment Management plan has been given in Tables 10.9 & 10.10 under Chapter X, pp.176-181.
Risk Assessment		
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining**.**	The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII, pp.145-147.
Disaster Management plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management Plan has been given under Chapter X, pp.166-181
Others		
39	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	The VAO certificate of 300 m radius will be attached with final EIA report.
40	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and	The project proponent addressed the concerns from the public during public

	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.	hearing. The response to comments has been given in Annexure IX.
41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The matter on plastic waste management has been given in Section 7.5 under Chapter VII, pp.159 - 160
STANDARD TERMS OF REFERENCE		
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	Not applicable. This is not a violation category project. This proposal falls under B1 category.
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. A copy of the ownership document has been 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.	The following will approve mine plan, EIA and public hearing will submitted in the final EIA report.
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as

	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).	shown in Figure 2.2, under Chapter II, p-10
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The baseline data sampling locations for all the environmental components are shown in Survey of India Toposheet under Chapter III
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 lease 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 shareholders or stakeholders at large, may also be detailed in the EIA Report.	The proponent has framed Environmental Policy and the same has been discussed in Section 10.1 under Chapter X, pp.166 & 167.
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	It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard,

	be detailed. The proposed safeguard measures in each case should also be provided.	compact and homogeneous body. The height and width of the bench will be maintained as 5m 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.	All the 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 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 Section 3.1 under Chapter III, pp.31 & 40. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.6, under Chapter II, p.22.
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 need 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 and the proposed project area is a patta land.
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. There are neither forests nor forest dwellers/forest dependent communities in the mine lease area. There is no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. The project doesn't attract Recognition of Forest Rights Act, 2006 as 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.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	Details about forest vegetation have been provided in Section 3.5, under

		Chapter III, pp.68-97
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.	A study was done on wildlife within the study area, as shown in Section 3.5 under Chapter III, pp.68-97. The impact on wild life has been discussed in Section 4.6 under Chapter IV, pp.128 - 134.
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	Information regarding the same has been given in Table 3.41 under Chapter III, pp.107 & 108.
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	A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III, pp.68-97. 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.

	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 'Aravalli 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.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable The project doesn't attract The C. R. Z. Notification, 2018.
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R plan / compensation details for the Project Affected People (PAP) is not anticipated.

22.	One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Baseline data were collected for the period of October 2022 - December 2022 as per CPCB notification and MoEF & CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.7 under Chapter III, pp. 31-107.
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 pre-dominant 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. The model results have been given in Section 4.4 under the Chapter IV, pp.114-123.
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 under Chapter II, p.27.

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 will be 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 were conducted and the results have been discussed in Section 4.3, under the Chapter IV, pp. 112-113.
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	Not Applicable. The ground water table is found at the depth of 60 m below ground level. The ultimate depth of quarry is 50 m BGL. Therefore, the mining activity will not intersect the ground water table. Data

	Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III, pp.41-53.
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 60 m AMSL. Ultimate depth of the mine is 50 m BGL. Depth to the water level in the area is 60 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 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.	A detailed Greenbelt Development Plan has been provided in Tables 4.14 and 4.15 in Section 4.6 under Chapter IV, pp.128-134.
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	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines

	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.	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 under Chapter III, pp.105-107.
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.6 under Chapter II, p.27.
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.	Progressive mine closure plan has been prepared for this project and is given in Section 2.6 under Chapter II, pp.20-28.
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under chapter IV, pp.135&136
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 under Chapter VIII, pp.163 & 164.
37.	Measures of socio-economic significance and influence to the local community proposed to be	No negative impact on socio-economic environment of the study area is

	provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	anticipated and this project shall benefit the Socio-Economic environment by offering employment for 29 people directly and 15 people indirectly, as discussed in Section 8.1 under Chapter VIII, p.162.
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 provided under Chapter X, pp.166-181.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	The same will be updated in the final EIA report after public hearing meeting.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 44,25,000/- In order to implement the environmental protection measures, an amount of Rs. 6507855 as capital cost and recurring cost as Rs. 3061532 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. 23538821, as shown in Tables 10.9 &10.10

		under Chapter X, pp.176-181.
42	A disaster management Plan shall be prepared and included in the EIA/EMP Report.	The details have been provided in Section 7.2 under Chapter VII, pp.145-147.
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 have been discussed under Chapter VIII, pp.162-164.
44.	Besides the above, the below mentioned general points are also to be followed:	
a)	Executive Summary of the EIA/EMP Report	Executive summary has been 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	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.	All the documents provided here are in English language.
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 in the 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 4th August, 2009,	Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4th August, 2009 have been followed while preparing the EIA

	which are available on the website of this Ministry, should be followed.	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.	No changes are made in the basic scope and the project parameters.
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.	The certified compliance report is provided in Annexure.
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.	All the plans related to mining have been included along with the approved mining plan report in Annexure.

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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.9689/SEAC/ToR-1387/2023 Dated:07.03.2023, this EIA report has been prepared for the project proponent, Mr. S. Rajendiran applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No.275/1B, 275/2A, 238/1A, 238/1B, 238/1C & 238/1D over an extent of 3.35.5 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 contains five proposed projects, known as P1, P2, P3, P4 and P5 and one Existing project. 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 **20.27.5** ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

Table 1.1 Details of Quarries within the Cluster Area of 500 m Radius

Proposed Quarries				
Code	**Name of the Owner**	**S.F. No/ Village**	**Extent (ha)**	**Status**
P1	S.Rajendiran	275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D Siruthamur	3.35.50	Applied Area
P2	M.S.Blue Stones	167/1(Part-1) Siruthamur	3.00.0	Proposed Area
P3	V.Sekar	167/1 (Part-2)	3.00.0	Proposed Area
P4	S.Hemprasath	170/2, 170/3, 170/4, 236/1B, 236/1C, 236/1D, 220/1A1(P) Siruthamur	4.88.0	Proposed Area
P5	N.Kanniyappan	277/1A, 277/1C, 277/1E, 277/1F, 277/2, 280/2, 277/1B, 277/1D	3.11.50	Proposed Area
Existing Quarry				
E1	R.Selvendrakumar	308/1,2, 3A, 3B, 3C, 3D, 3E, 3F, 5, 6, 7A, 7B, 8, 9, 10A, 10B, 10C, 11	2.92.50	08.11.2018 to 07.11.2023
	Total Cluster Extent		**20.27.5**	---

Source:

DD Letter - Rc.No.302/Q3/2020, Dated:07.10.2021.

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

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-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 screening, scoping, public consultation & appraisal.

Screening

Screening is the first stage of the EIA process. In this stage, the State level Expert Appraisal Committee (SEAC) examined the application of EC made by the proponent in Form 1 through online (Proposal No. SIA/TN/ MIN/412400/2022, dated 28.12.2022) 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 29.12.2022.

Scoping

The proposal was placed in the 250th meeting of SEAC on 03.03.2022. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) and the recommendation for ToR is subjected to the outcome of the Honourable NGT, Principal Bench, New Delhi (O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).

Public Consultation

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

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.

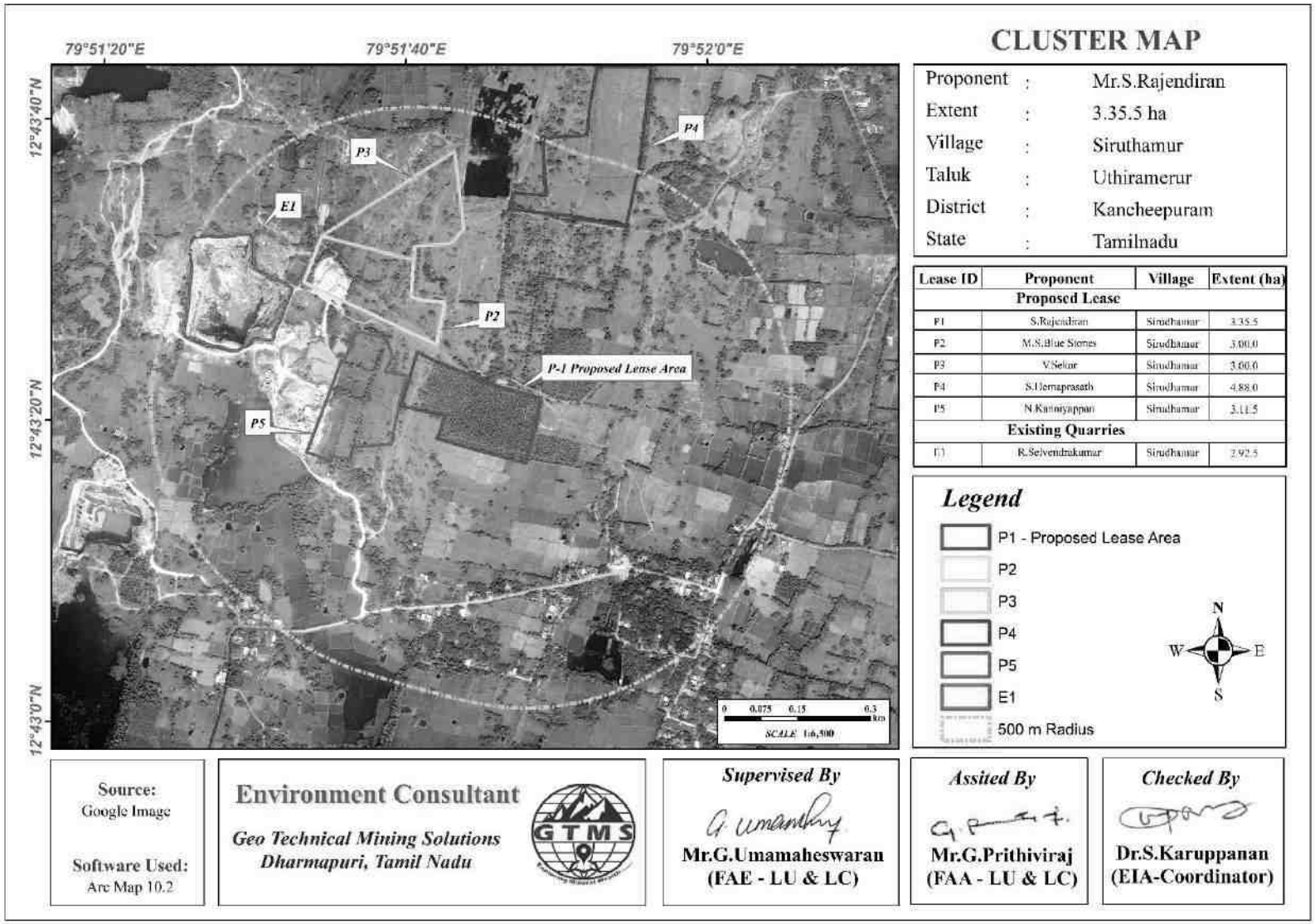


Figure 1.1 Location of the proposed and existing rough stone and gravel quarries in the cluster of 500 m radius

1.3 TERMS OF REFERENCE (ToR)

The SEAC framed a comprehensive Terms of Reference (ToR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued ToR to the proponent vide **Letter No: SEIAA-TN/F.No.9689/SEAC/ToR-1387/2023 Dated :07.03.2023** for the preparation of an EIA report.

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 1.2.

1.2 Details of Project Proponent

Name of the Project Proponent	**Mr. S. Rajendiran**
Address	S/o. Mr. Sevagaperumal, No.2/4, Jothi Nagar Main Road, Guindy, Chennai-600 032
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 Semi Mechanized method involving formation of benches with 5 m height and 5 m 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 1.3.

1.3 Salient Features of the Proposed Project

Name of the Quarry	Mr. S. Rajendiran Rough Stone & Gravel Quarry		
Toposheet No	57-P/14		
Latitude	12°43'17.16"N to 12°43'24.52"N		
Longitude	79°51'39.66"E to 79°51'49.00"E		
Highest Elevation	60 m AMSL		
Proposed Depth as per ToR	50 m BGL		
Ultimate Pit Dimension	Length(m)	Width(m)	Depth(m)
	172	121	50
Geological Resources	Rough Stone in m^3	Gravel in m^3	
	1609056	67044	
Mineable Reserves	Rough Stone in m^3	Gravel in m^3	
	638665	55070	
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3	
	638665	55070	
Method of Mining	Open-Cast Semi Mechanized Method		
Topography	Flat Topography		

Machinery proposed	Jack Hammer	4
	Compressor	1
	Hydraulic Excavator	1
	Tippers	4
Blasting Method	The quarrying operation is proposed to carried out by Open Cast Semi Mechanized mining in conjunction with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	29 Nos	
Project Cost	Rs.44,25,000 /-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	5.8 KLD	

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 DECSCRIPTION OF THE PROJECT

The proponent, **Mr. S. Rajendran-** is involved in the undertaking of establishment, construction, development, and closure of opencast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone. Therefore, the proponent had applied for quarry lease on 04.12.2020 to extract rough stone. The precise area communication letter was issued by Department of Geology and Mining, Kancheepuram vide Rc.No.302/Q3/2020, dated: 06.09.2021. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Assistant Director Department of Geology and Mining, Kancheepuram (Rc.No.302/Q3/2020, dated: 07.10.2021). 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, Kancheepuram District, as shown in Figure 2.2 & 2.3. The area lies between Latitudes from 12°43'17.16"N to 12°43'24.52"N and Longitudes from 79°51'39.66"E to 79°51'49.00"E. The maximum altitude of the project area is 60 m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

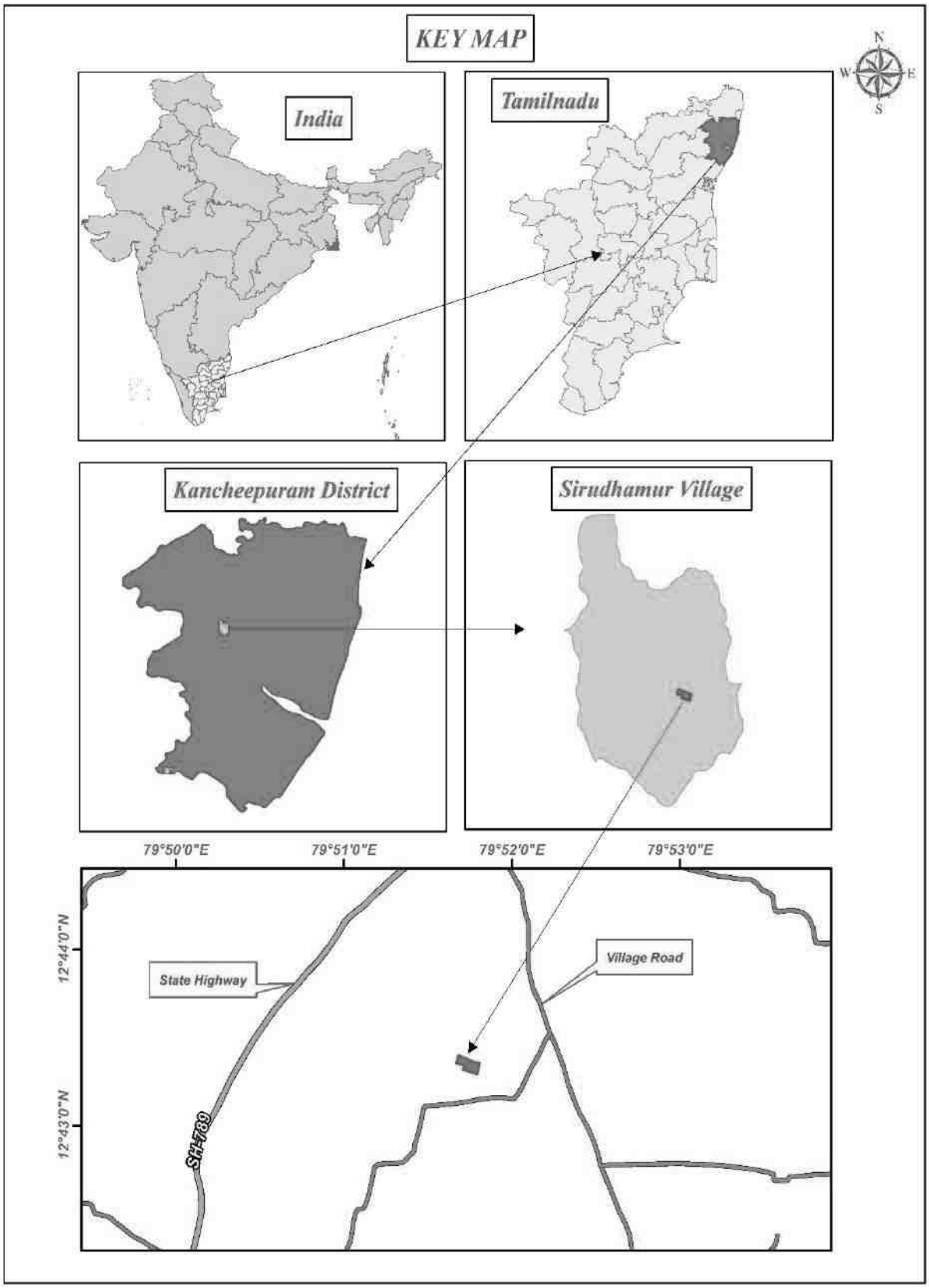


Figure 2.2 Key Map Showing Location of the Project Site

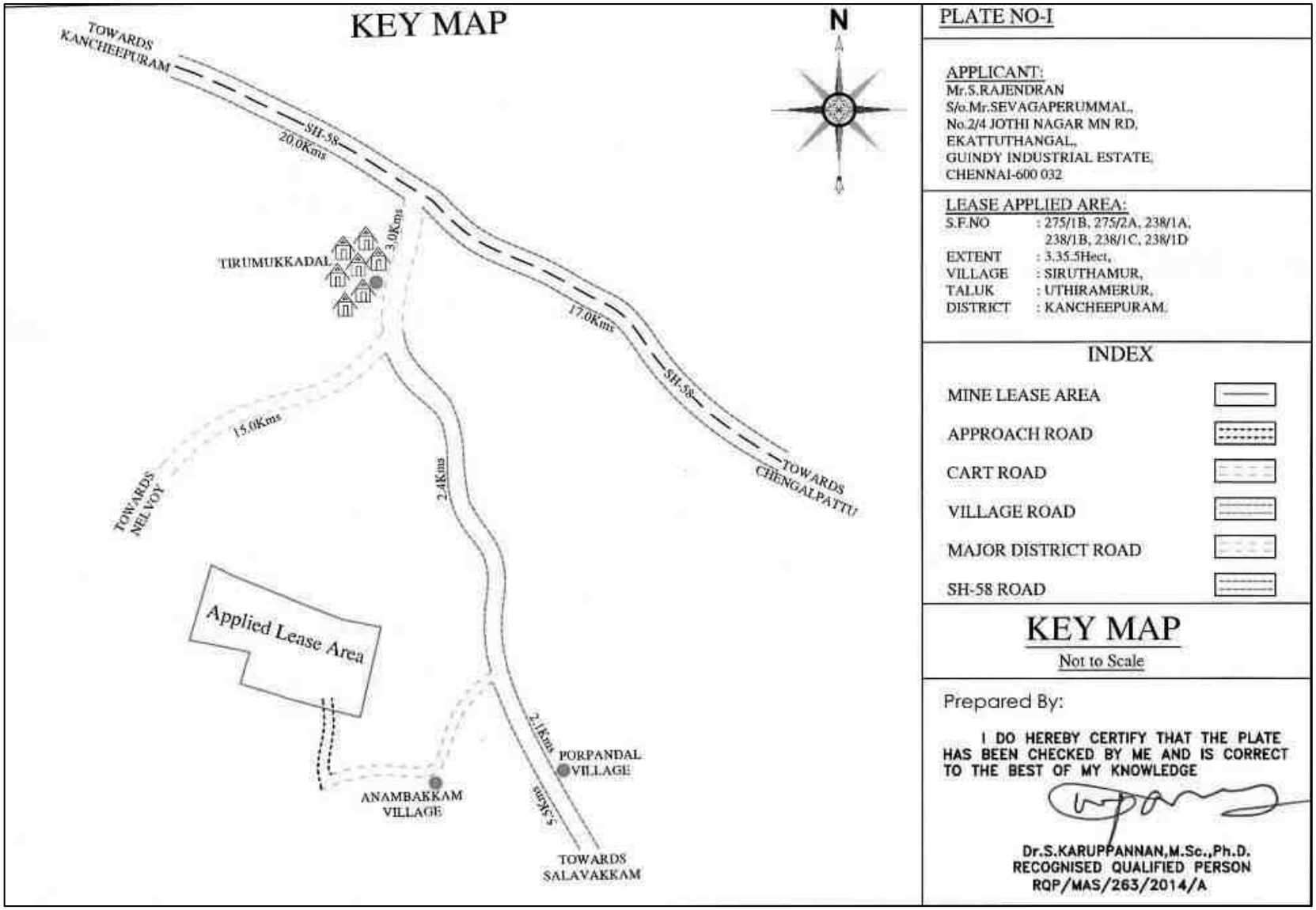


Figure 2.3 Site Connectivity to the Lease Area

Table 2.1 Site Connectivity to the Project Area

Nearest Roadways	SH-789 (Kancheepuram-Uthiramerur)	2.5 km SW
Nearest Town	Palur	8.0 km N
Nearest Railway Station	Palayaseevaram	7.5 km N
Nearest Airport	Chennai	52 km E
Nearest Seaport	Chennai	65 km NE

2.3 LEASEHOLD AREA

- The extent of the proposed project site is 3.35.5 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 2.4.

Table 2.2 Corner Coordinates of Proposed Project

Pillar ID	Latitude	Longitude
1	12°43’21.50’’N	79°51’49.00’’E
2	12°43’17.16’’N	79°51’47.98’’E
3	12°43’18.01’’N	79°51’44.68’’E
4	12°43’18.79’’N	79°51’42.12’’E
5	12°43’20.32’’N	79°51’42.61’’E
6	12°43’20.69’’N	79°51’40.84’’E
7	12°43’20.92’’N	79°51’39.66’’E
8	12°43’24.52’’N	79°51’40.78’’E
9	12°43’23.97’’N	79°51’41.84’’E
10	12°43’22.46’’N	79°51’45.59’’E
11	12°43’21.88’’N	79°51’47.10’’E
12	12°43’21.57’’N	79°51’48.64’’E

2.4 GEOLOGY AND GEOMORPHOLOGY

This section discusses about the geology and geomorphology of the study area of 5 km radius, as given below.

Geology

Study area is mainly composed of Charnockite, as shown in Figure 3.1.

Geomorphology

The lease area is geomorphologically located in Pediment Pediplain Complex, as shown in Figure 3.2.

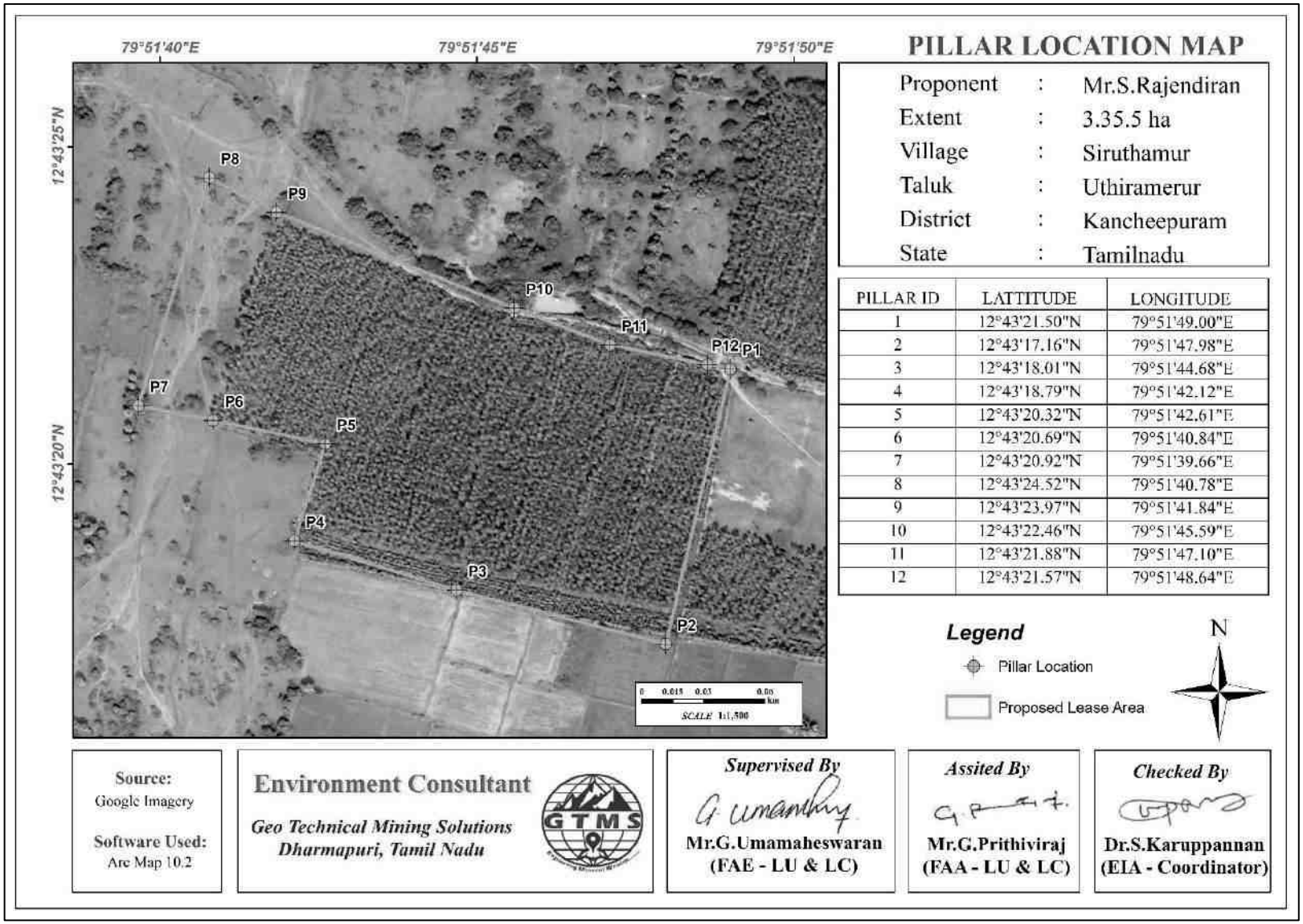


Figure 2.4 Google Earth Image Showing Lease Area with Pillars

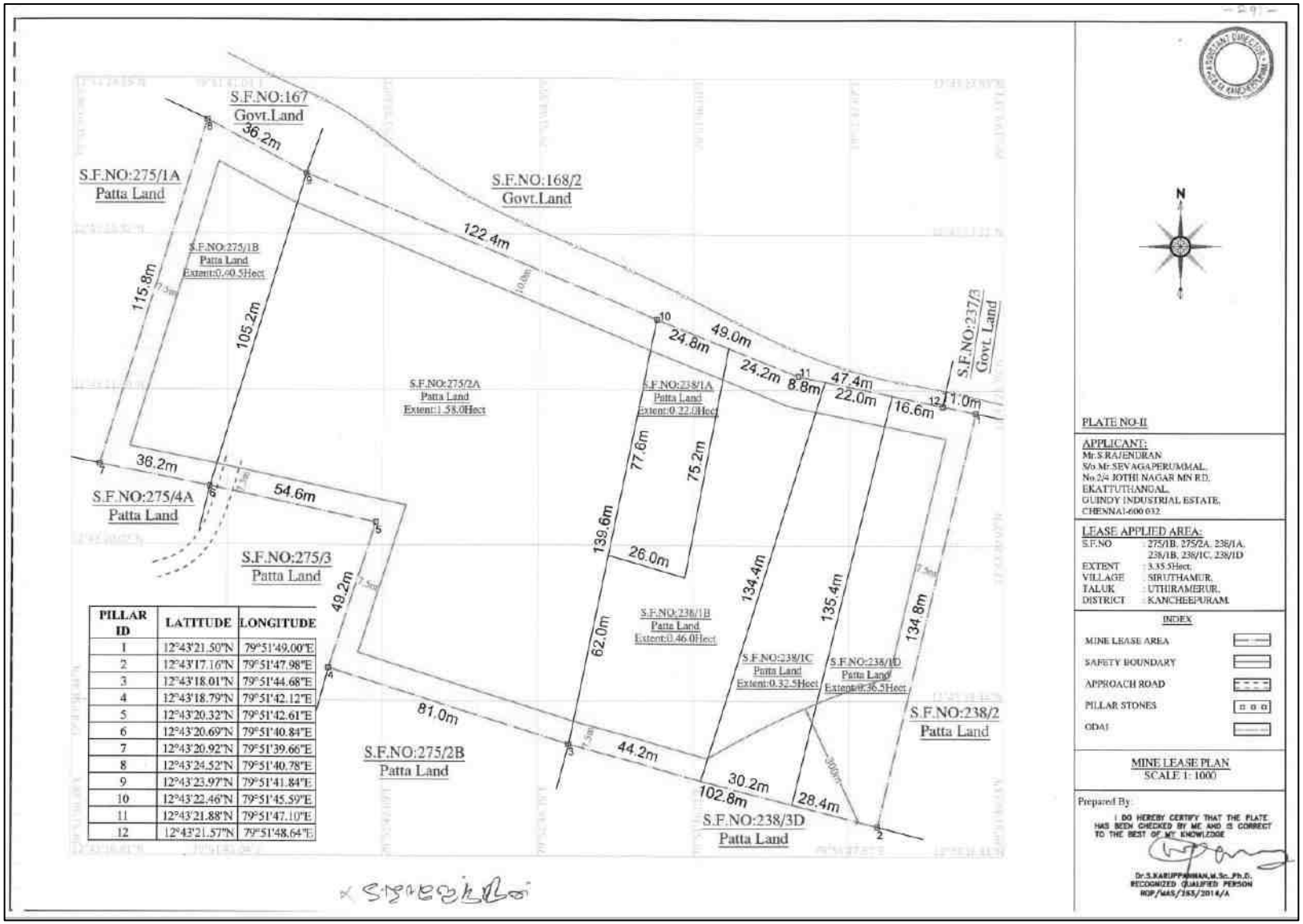


Figure 2.5 Mine Lease Plan

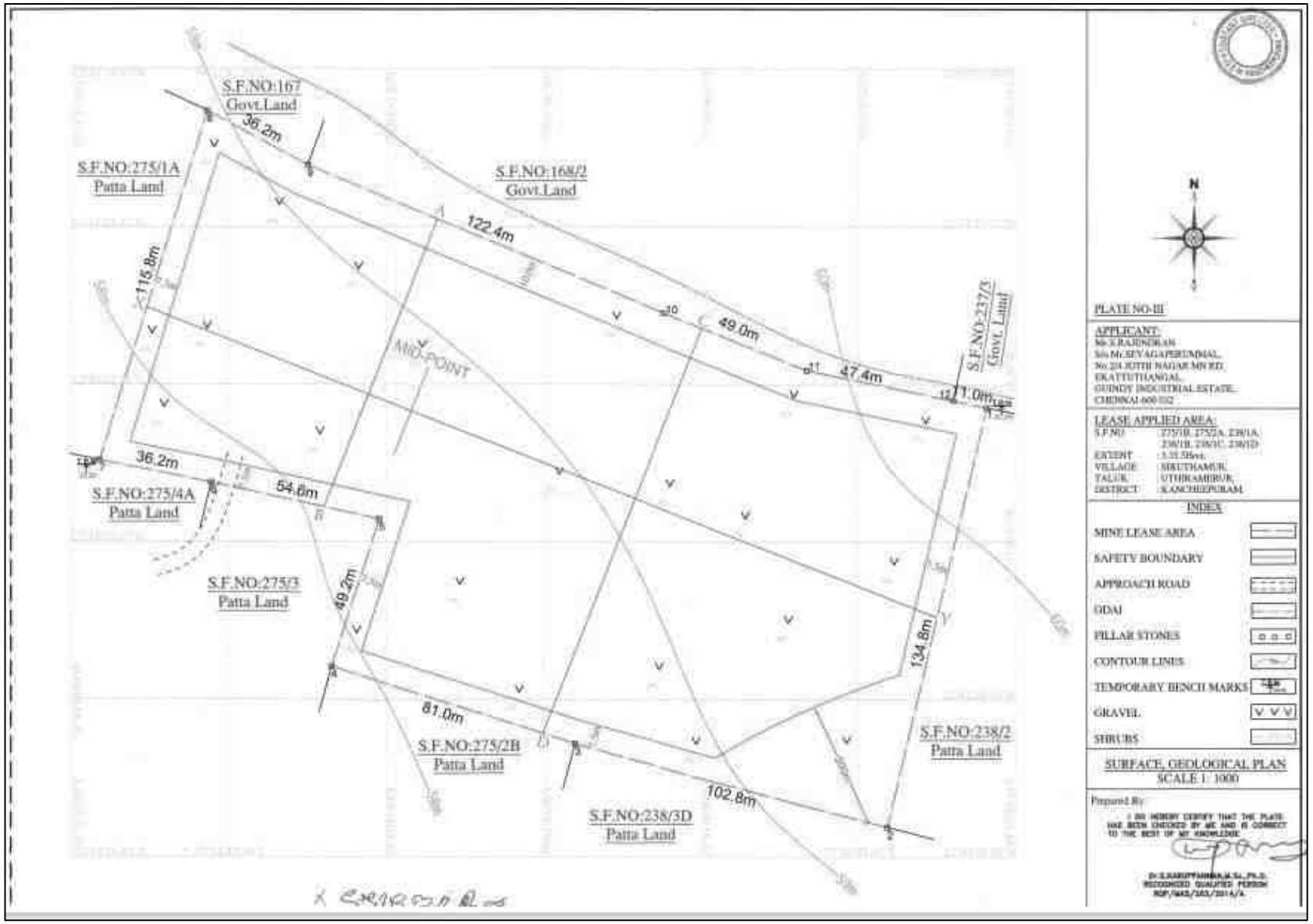


Figure 2.6 Surface and Geological Plan

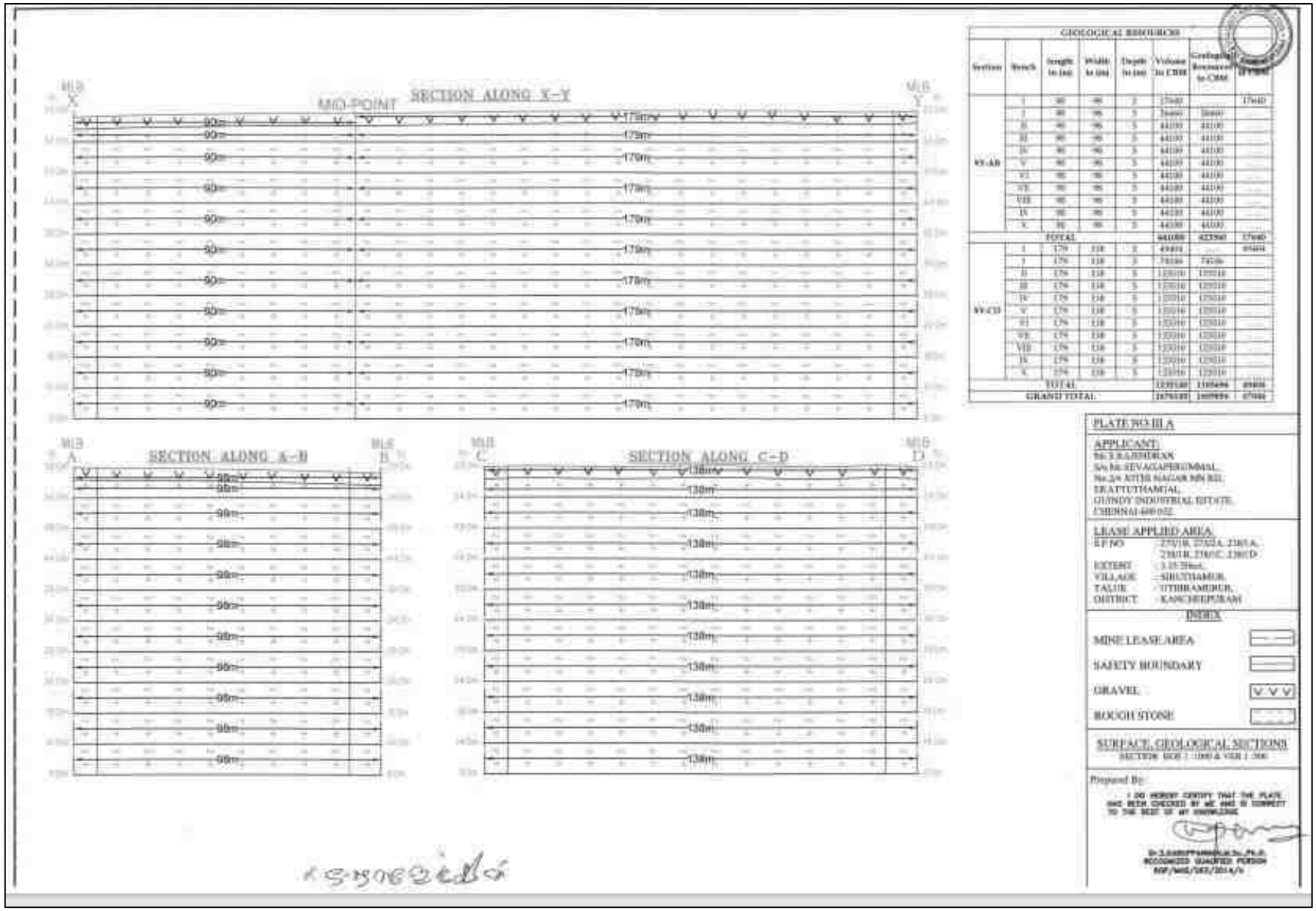


Figure 2.7 Geological Sections

2.5 QUANTITY OF RESERVES

The resources and reserves of rough stone 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 safety 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 50 m 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 & 2.7 and 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	1609056	67044
Mineable Reserves as per ToR in m^3	638665	55070
Proposed production as per ToR for 5 years m^3	638665	55070

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.4 & Figure 2.8 and Figure 2.8a.

Table 2.4 Year-Wise Production Details

Year	Rough Stone in (m^3)	Gravel in (m^3)/3 years
I	134159	24336
II	128070	21780
III	127736	8954
IV	126490	--
V	122210	--
Total	**638665**	**55070**

Source: Approved Mining Plan & ToR

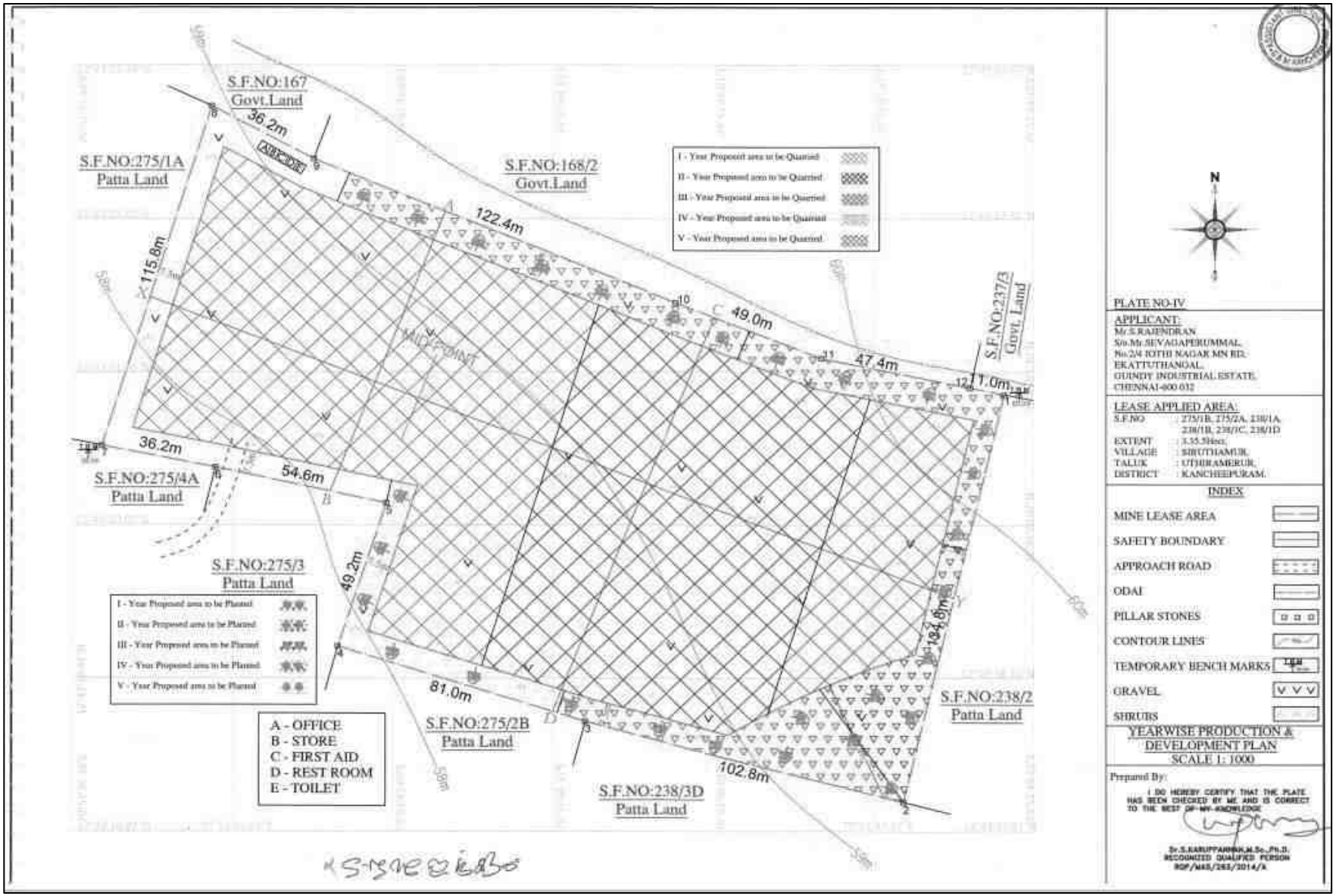


Figure 2.8 Yearwise Development and Production Plan

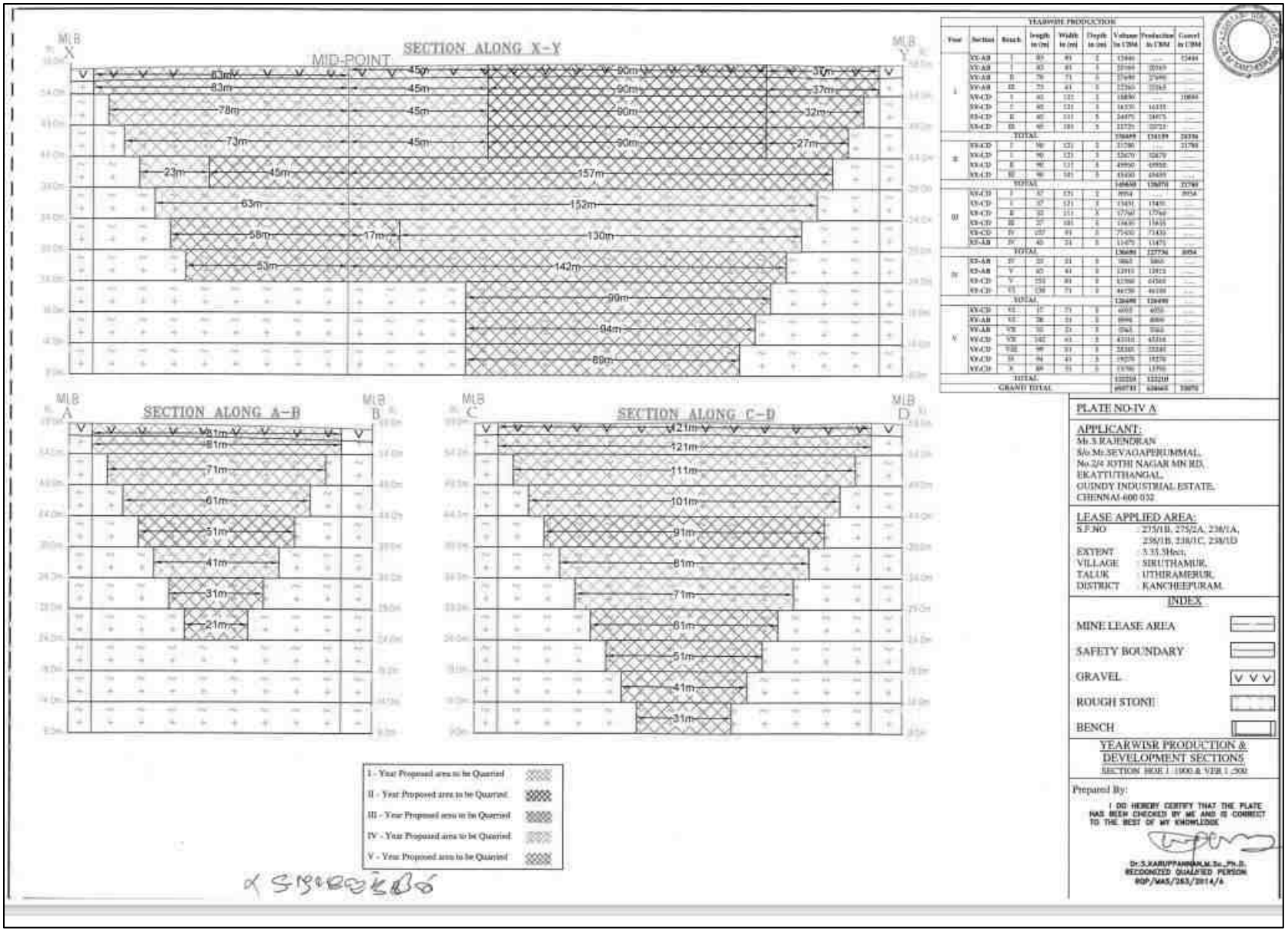


Figure 2.8a Year wise Development and Production Sections

2.6 MINING METHOD

The Quarrying operation is proposed to be carried out by open cast semi-mechanized mining method with the bench height and width of 5 m each. The open cast semi-mechanized method involving drilling and blasting is proposed to extract rough stone and gravel. The extracted rough stone will be loaded manually to the trucks for dispatch to the customers. In this project, NONEL blasting will be adopted to extract rough stone.

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.

Rules of Thumb for Blast Design

Based on practical experience and technical information, a set of rules for blasting have been provided as below (Chapter8 (nps.gov)). These rules will be applied to blast rocks in the proposed project.

Rule 1: **The detonation velocity (VOD) of the explosive should be close to the same value of the sonic velocity (VSO) of the rock to be blasted.**

The sonic velocity of a rock is considered to be a reliable indicator of its structural integrity and resistance to fragmentation. As the VOD of the explosive approaches close to the VSO of the rock, the blasting would result in relatively smaller size of fragmentation with uniformity. There is no value in using an explosive that has a VOD greatly in excess of the VSO of the rock, since there is little or no improvement in fragmentation above the VSO. When selecting an explosive to match up the VSO of a rock mass, variance of <10% in the velocities is acceptable.

Rule 2: Generally, select the densest explosive possible.

When the density of explosives is higher, the potential energy of the explosives can be greater and the more of it can be placed within a borehole of a given size.

Rule 3: Select explosives according to the characteristics of the rock formation to be blasted.

When planes of separation in the rock are smaller than the degree of fragmentation required, the rock can often be blasted by using lower density and lower detonation velocity explosives.

Rule 4: When using slurry or water gel explosives, always determine the critical temperature below which the explosive will fail to reliably detonate.

Almost all slurry explosives have a critical temperature below which they may not detonate, or may not sustain detonation in elongated columns. The explosives should not be used when the temperature of the explosive at time of loading is below that critical temperature.

Rule 5: The distance between holes (spacing) should not be greater than one-half the depth of the borehole.

When the distance between holes in a row is greater than one-half the depth of the hole, the angles of breakage intersect above the bottom of the holes. This causes both a great deal of vertical throw and a very uneven bottom.

Rule 6: Stemming should be equal to the burden.

Stemming is useful to confine and maximize efficient use of the explosive's energy. It also reduces noise as much as possible. If the stemming is greater than the burden, the rock at the top of the borehole will have less cracking from reflection and refraction of compressive and tensile waves. Therefore, stemming should be equal to burden. Drill fines can be used for loading the borehole.

Rule 7: Subdrill (if necessary) should be between 0.3 and 0.5 of spacing/burden.

Subdrill should be equal to 0.3 of burden. It will work when there is row-for-row delay. In blasts where the delay system is both row-for-row and hole-for-hole, the subdrill should be determined by the largest dimension, which can be the spacing or the burden. An average subdrill of 0.4 of spacing is best to use for planning purposes. Based on the above-mentioned rules, blasting design has been conceptualized and has been provided in Table 2.5.

Table 2.5 Conceptual Blasting Design

Blast hole Diameter (D) in mm	32
Burden (B) in m	1
Spacing (S) in m	0.97
Sub drill in m	0.3
Charge length (C) in m	0.64
Stemming	1
Hole Length (L) in m	1.9
Bench Height (BH) in m	1.6
Mass of explosive/hole in g	400
Stemming material size in mm	3.2
Burden stiffness ratio	1.64
Blast volume/hole in m3	1.59

Production of rough stone/day in m3	473
Number of blastholes/day	297
Blasthole pattern	Staggered/Rectangular
Mass of explosive /day in kg	119
Powder factor in kg/m3	0.25
Loading density	0.63
Type of explosives	Slurry
Diameter of packaging in mm	25
Initiation system	NONEL
Fly rock distance in m	23

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 2.6.

Table 2.6 Operational Details for Proposed Project

	Rough Stone (5 Years)	**Gravel (3 Years)**
Proposed production for 5 years	638665	55070
Number of Working Days /Annum	270	270
Production of /Day (m^3)	473	68
No. of Lorry Loads	79	11

2.6.2 Extent of Mechanization

List of machineries proposed for the quarrying operation is given in Table 2.7.

Table 2.7 Machinery Details

S. No.	**Type**	**No of Unit**	**Capacity**	**Make**	**Motive Power**
1	Jack Hammers	4	Hand held	-	Diesel Drive
2	Compressor	1	Air	-	Diesel Drive
3	Excavator	1	-	-	Diesel Drive
Haulage & Transport Equipment					
4	Tipper	4	15 M. T	-	Diesel Drive

2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan (Figure 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 3.35.5 ha of land is used for quarrying; about 0.60.0 ha of land is unutilized. Whereas, at the end of the mine life, about 2.63.0 ha of land will have been quarried; about 0.09.5 ha of

land will be used for green belt development and the rest will be used for road 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	2.63.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt & Dump	Nil	0.09.5
Unutilized area	3.35.5	0.60.0
Total	**3.35.5**	**3.35.5**

2.6.4 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
671 plants inside the lease area	134200	20130
1007 plants outside the lease area	301950	30195
Wire Fencing (3.35.5 ha)	671000	33550
Renovation of Garland Drain (3.35.5 ha)	33550	16775
Total	**1140700**	**100650**

Source: Environment Management Plan

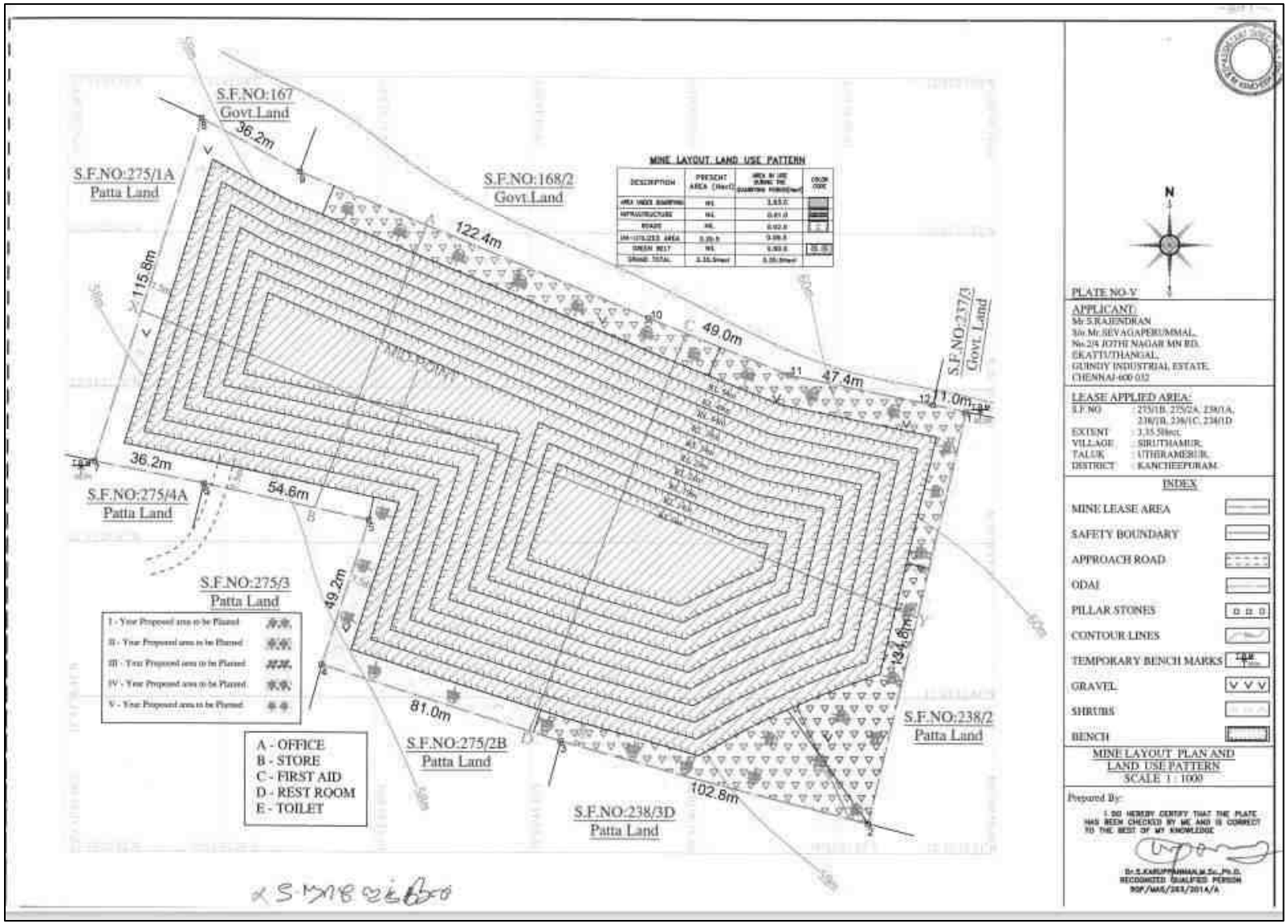


Figure 2.9 Mine Layout Plan and Land Use Pattern

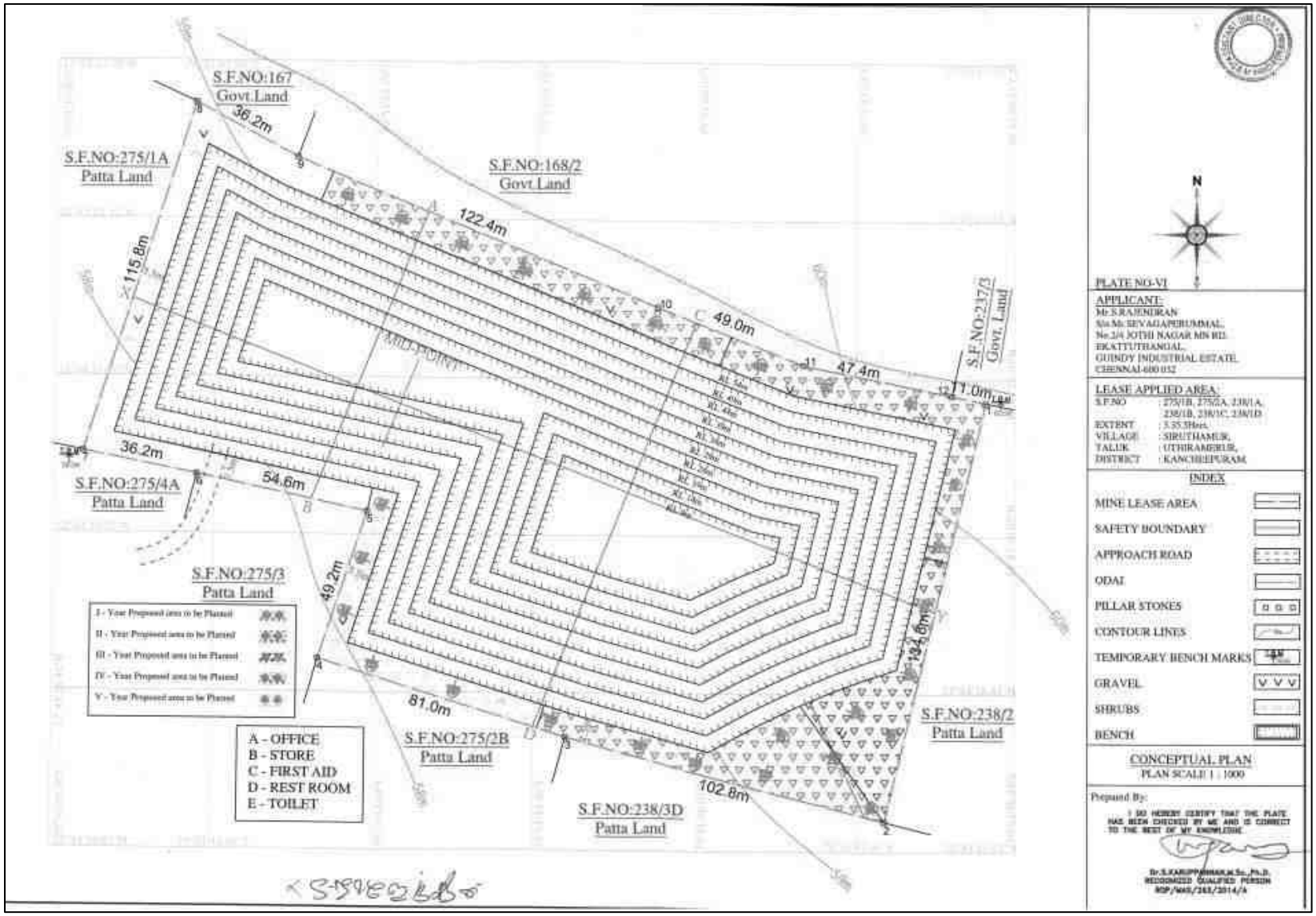


Figure 2.10 Conceptual Plan

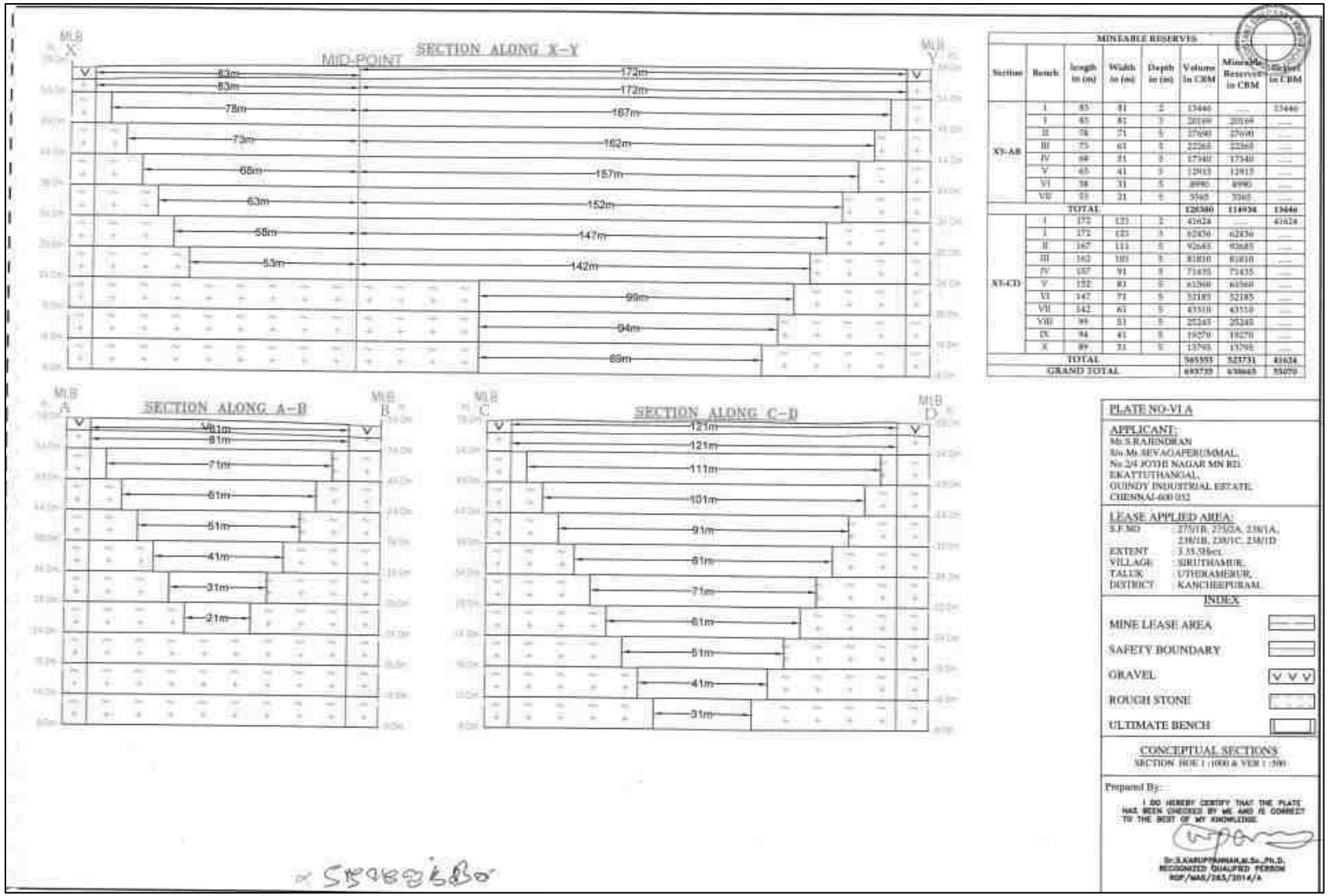


Figure 2.11 Conceptual Sections

2.6.5 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 given in Table 2.10.

Table 2.10 Ultimate Pit Dimension

Pit	Length (m)	Width (m) (Max)	Depth (m)
I	172	121	50

Source: Approved Mining Plan & ToR

2.6.6 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.

2.6.6.1 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.

2.6.7 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	2.0 KLD	Existing bore wells nearby the lease area
Green Belt development	2.0 KLD	Existing bore wells nearby the lease area
Drinking & Domestic	1.8 KLD	Existing bore wells and approved water vendors
Total	**5.8 KLD**	

Source: Prefeasibility Report

2.6.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12, Around 2992940 litres of HSD will be used for rough stone and gravel extraction during this 5 years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.12 Fuel Requirement Details

Fuel Requirement for Excavator			
Details	**Rough Stone (638665 m^3)**	**Gravel (55070 m^3)**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	10	---
Working Capacity (m^3/hr)	20	60	---
Time Required (hours)	31933	918	---
Total Diesel Consumption for 5 years (litre)	510932	9178	520110
Fuel Requirement for Compressor			
Average Rate of Fuel Consumption/hole (litre)	0.4	---	---
Number of Drillholes/day	297	---	---
Total Diesel Consumption for 5 years (litre)	160380	---	160380
Fuel Requirement for Tipper			
Average Rate of Fuel Consumption/Trip (litre)	20	20	---
Carrying Capacity in m^3	6	6	---
Number of Trips / days	79	7*	---
Number of Trips / 5 years	106444	9178	---
Total Diesel Consumption for 5 years (litre)	2128883	183567	2312450
Total Diesel Consumption by Excavator, Compressor and Tipper			**2992940**

** Number of truck loads for gravel has been normalized for 5 years.*

2.6.9 Capital Requirement

The project proponent will invest Rs. 44,25,000/- 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	Fixed Asset Cost	25,25,000
2	Operational Cost	10,00,000
3	EMP Cost	5,25,000
4	Expenditure Cost	3,75,000
Total Project Cost		**44,25,000**

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.	Highly Skilled	Quarry Manager	1
		Account Cum & Admin	1
2	Skilled	Earth Moving Operator	4
		Driver	4
		Blaster/Mat	1
3	Semi-Skilled	Helpers,Greaser's	3
4	Unskilled	Musdoor/ Labours	12
		Cleaners	2
		Attendant's	1
Total			**29**

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
		1st	2nd	3rd	4th	5th	
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 through May 2022** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Accuracy Analabs laboratory for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.

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 5 km radius from the periphery of the cluster, except for ecological study, which considers 10 km as buffer zone. Both core and buffer zones are taken as the study area. The data was collected from the study area to understand the existing environment conditions of the above-mentioned environmental components. Sampling methodologies for the various environmental parameters, including frequency of sampling, method of sample analysis, etc., are briefly given in Table 3.1.

Table 3.1 Monitoring Attributes and Frequency of Monitoring

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 5 km radius of the study area	Once during the study period	Study Area	Satellite Imagery & Primary Survey
*Soil	Physico-Chemical characteristics	Once during the study period	11 (1 core & 10 in buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi

*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	7 (3 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind speed Wind direction Temperature Cloud cover Dry bulb temperature Rainfall	1 hourly continuous mechanical/automatic weather station	1	Site specific primary data & secondary data from IMD Station
*Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X Fugitive dust	24 hours, twice a week	8 (1 core & 7buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-economic characteristics, Population statistics and existing infrastructure in the study area	Site visit & Census Handbook, 2011	Study area	Primary Survey, census handbook & need based assessments.

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

3.1 LAND ENVIRONMENT

The main objective of this section is to provide a baseline status of the study area covering 5 km radius around the proposed mine site so that temporal changes in the LU/LC pattern due to the mining activities can be assessed in future.

3.1.1 Geology and Geomorphology

Study area is mainly composed of charnockite, fluvial deposit and upper gondwana rocks, as shown in Figure 3.1.

Among the geomorphic units, pediment pediplain complex covers major part of the study area, as shown in Figure 3.2.

3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius. Totally, 9 LULC were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 206.43 ha accounting for 2.69 %, of which cluster area of 20.27.5 ha contributes only about 0.0436 %. This small percentage of mining activities shall not have any significant impact on the land environment.

Table 3.2 LULC Statistics of the Study Area

S. No.	Classification	Area (ha)	Area (%)
1	Barren Rocky/Stony waste	327.26	4.26
2	Crop land	3043.79	39.63
3	Dense forest	326.46	4.25
4	Fallow land	1157.96	15.08
5	Land with or without scrub	790.38	10.29
6	Mining / Industrial wastelands	206.43	2.69
7	Plantations	1156.81	15.06
8	Settlement	5.20	0.07
9	Water bodies	666.03	8.67
Total		**7680.31**	**100.0**

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The proposed lease area is located in a flat terrain with an altitude range of 58-60 m AMSL, showing relief of 2 m.

3.1.4 Drainage Pattern

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. The proposed area shows a portion of dendritic drainage pattern indicating uniform lithology beneath the surface, as shown in Figure 3.4.

3.1.5 Seismic Sensitivity

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

3.1.6 Soil Environment

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

3.1.6.1 Methodology

Eleven locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics as per the standard methods prescribed in "Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India". The physical and chemical characteristic results of soil samples are provided in Table 3.4.

Table 3.3 Soil Sampling Locations

S. No.	Sampling ID	Location	Distance (km)	Direction	Coordinates
1	S01	Kanniyappan Lease (1.62.0 ha)	0.18	SW	12°43'18.18"N 79°51'34.27"E
2	S02	Padoor	4.29	SW	12°42'36.97"N 79°49'24.76"E
3	S03	Kattankulam	4.31	SW	12°41'58.18"N 79°49'44.88"E
4	S04	Pazhaveri	1.83	NE	12°44'19.25"N 79°52'05.50"E
5	S05	Sirudamur	2.64	NW	12°44'35.28"N 79°50'54.56"E
6	S06	Vayalakkavoor	4.33	NW	12°44'05.80"N 79°49'23.38"E
7	S07	Edamichi	3.23	SE	12°41'53.89"N 79°52'53.41"E
8	S08	Thirumukkudal	3.23	N	12°45'09.17"N 79°51'34.05"E
9	S09	KanniyappanLease (3.11.5 ha)	1.12	SW	12°43'06.46"N 79°51'05.53"E
10	S10	Core	---	----	12°43'19.67"N 79°51'46.79"E
11	S11	Hemaprasad Lease	0.43	NNE	12°43'35.49"N 79°51'52.31"E

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

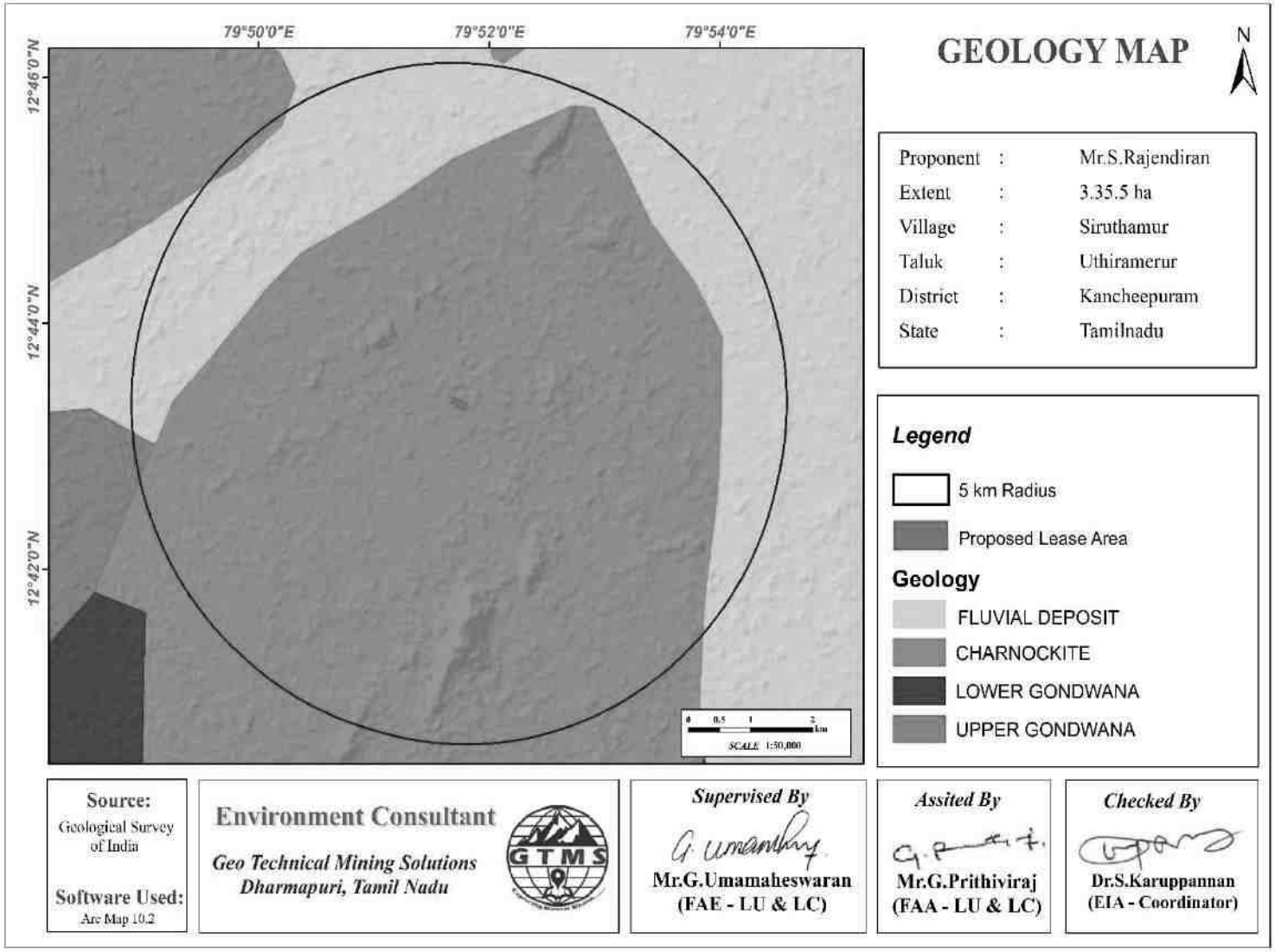


Figure 3.1 Geology Map of the Proposed Project Site

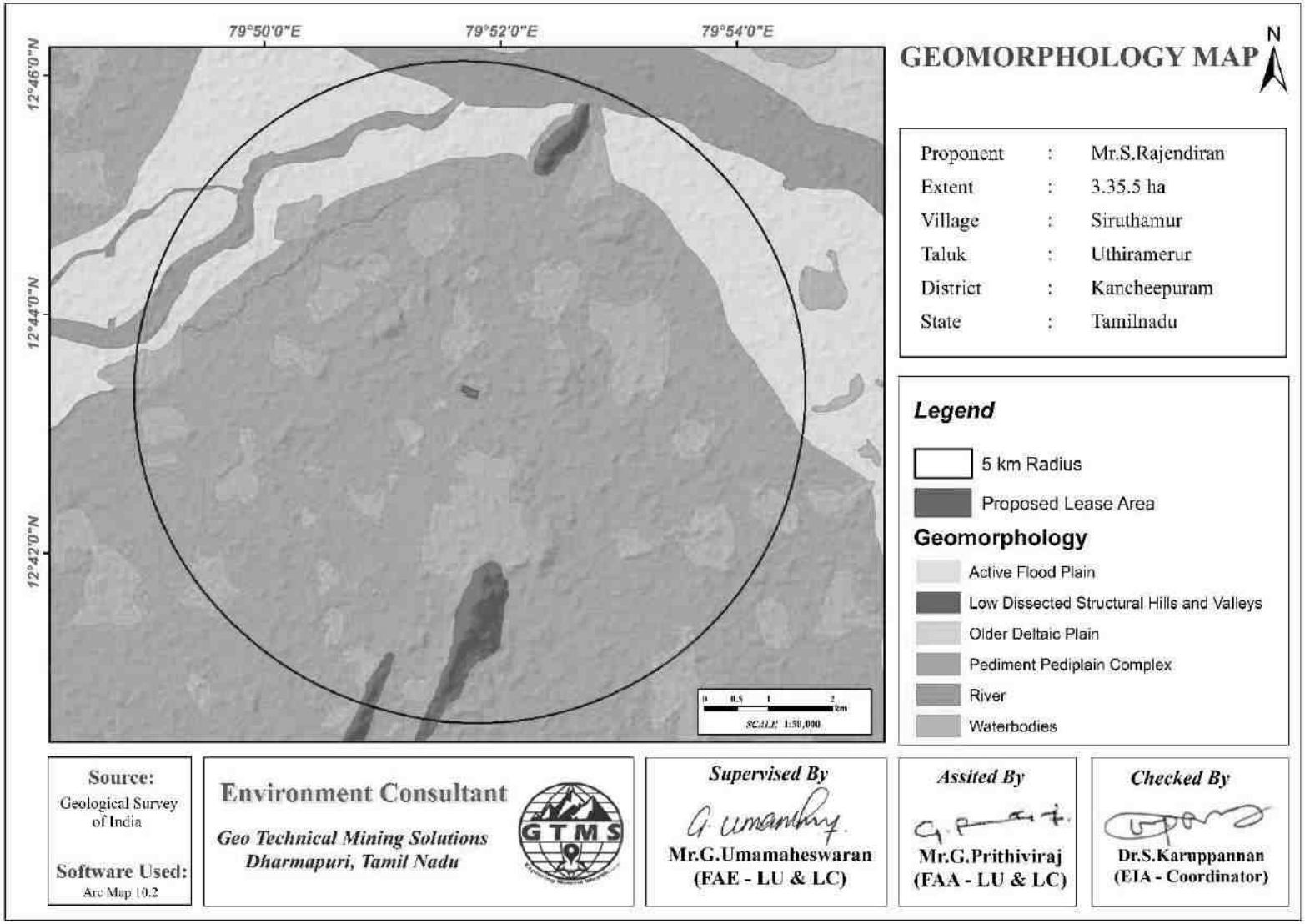


Figure 3.2 Geomorphology Map of the Proposed Project Site

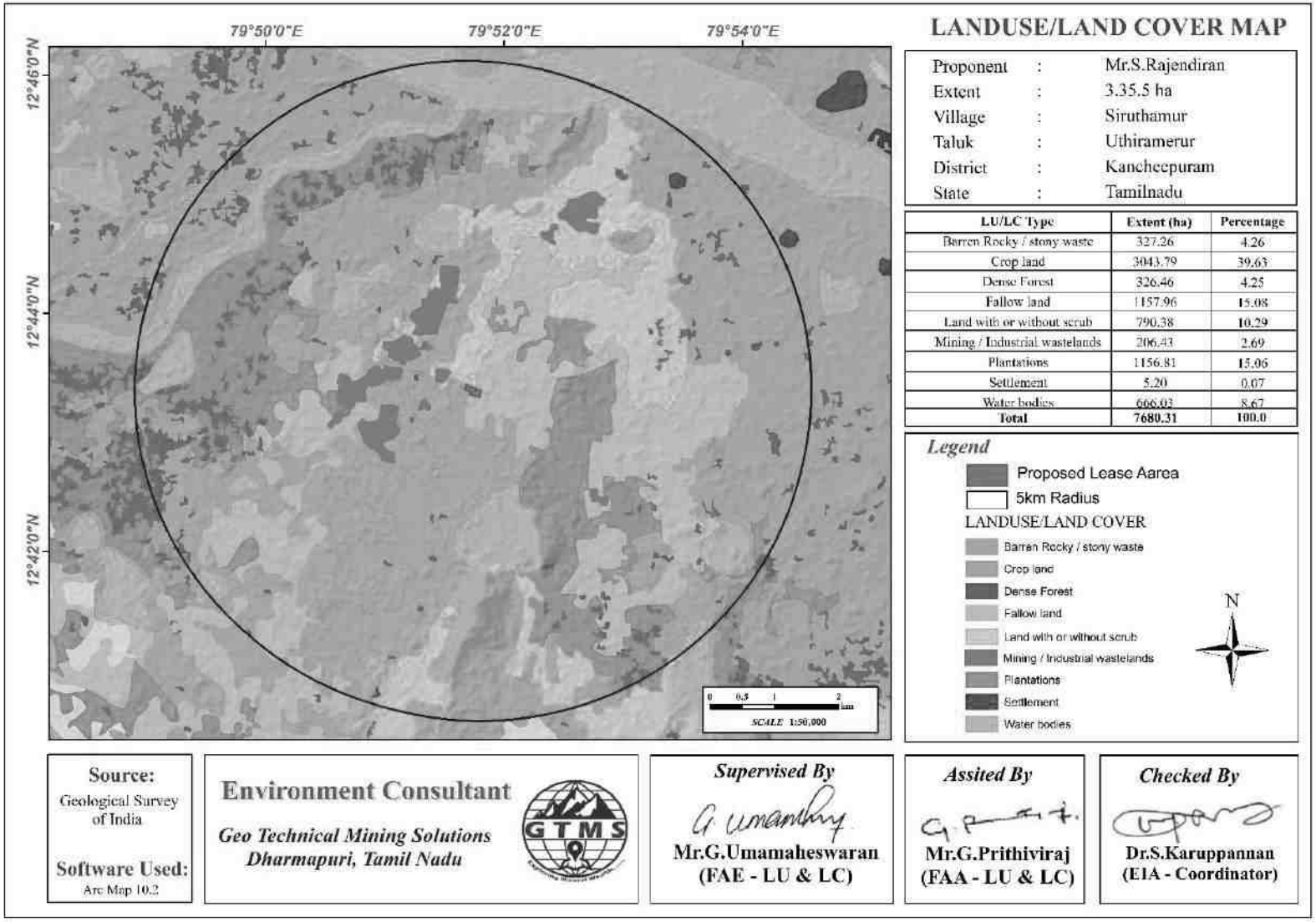


Figure 3.3 LULC Map of 5 km Radius from the Proposed Project Site

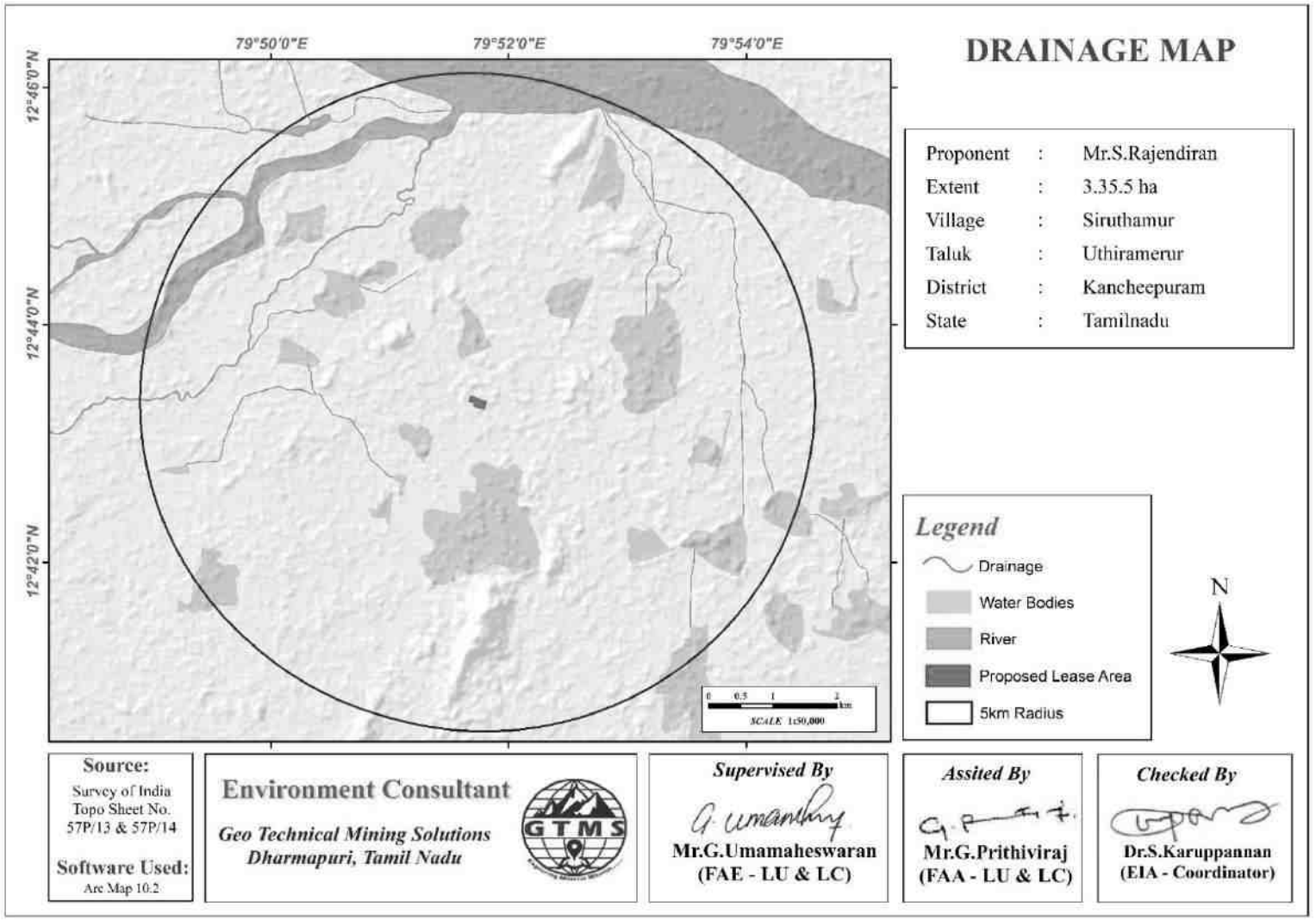


Figure 3.4 Drainage Map of 5 km Radius from the Proposed Project Site Showing a Portion of Dendritic Pattern

3.1.6.2 Results and Discussion

Physical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam, silty loam and silty clay. pH of the soil varies from 6.09 to 7.26 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 58.97 to 120.4 µs/cm. Dry matter content ranges between 64.19 and 94.87 g/cm^3.

Chemical Characteristics

Sodium ranges between 20 and 654 mg/kg. Potassium ranges between 308 and 910 mg/kg. Nitrogen ranges between 75.1 and 150 mg/kg. Phosphorus ranges between 0.84 and 1.9 mg/kg. Organic matter content ranges between 0.48 and 1.52%.

Soil Erosion

Soil erosion map shows that:

- Low to moderate soil erosion is in mine lease area. Soil Erosion Map Showing in Figure 3.6

Table 3.4 Summary of Soil Quality Result

S.No.	Parameters	Units	Result in Core	Result in Buffer		
				Minimum	Maximum	Average
1	pH @ 25℃	-	7.11	6.09	7.26	6.95
2	EC @ 25℃	µs/cm	101.45	58.97	120.4	84.55
3	Dry matter content	-	56.74	64.19	94.87	89.44
4	Water Content	%	7.12	5.30	10.24	7.16
5	Organic Matter	%	1.09	0.48	1.52	1.005
6	Soil Texture	%	Sandy Loam	Sandy Loam -Sandy Clay Loam		
7	Sand	%	51.13	45.54	59.52	54.7
8	Silt	%	31.29	50.58	35.63	25.86
9	Clay	%	17.58	10.76	24.9	20.42
10	Phosphorus	mg/kg	0.98	0.84	1.9	1.17
11	Sodium	mg/kg	319	20	654	544.5
12	Potassium	mg/kg	654	308	910	559.1
13	Nitrogen	mg/kg	110	75.1	150	115.32
14	Sulphur	%	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,** in association with GTMS*

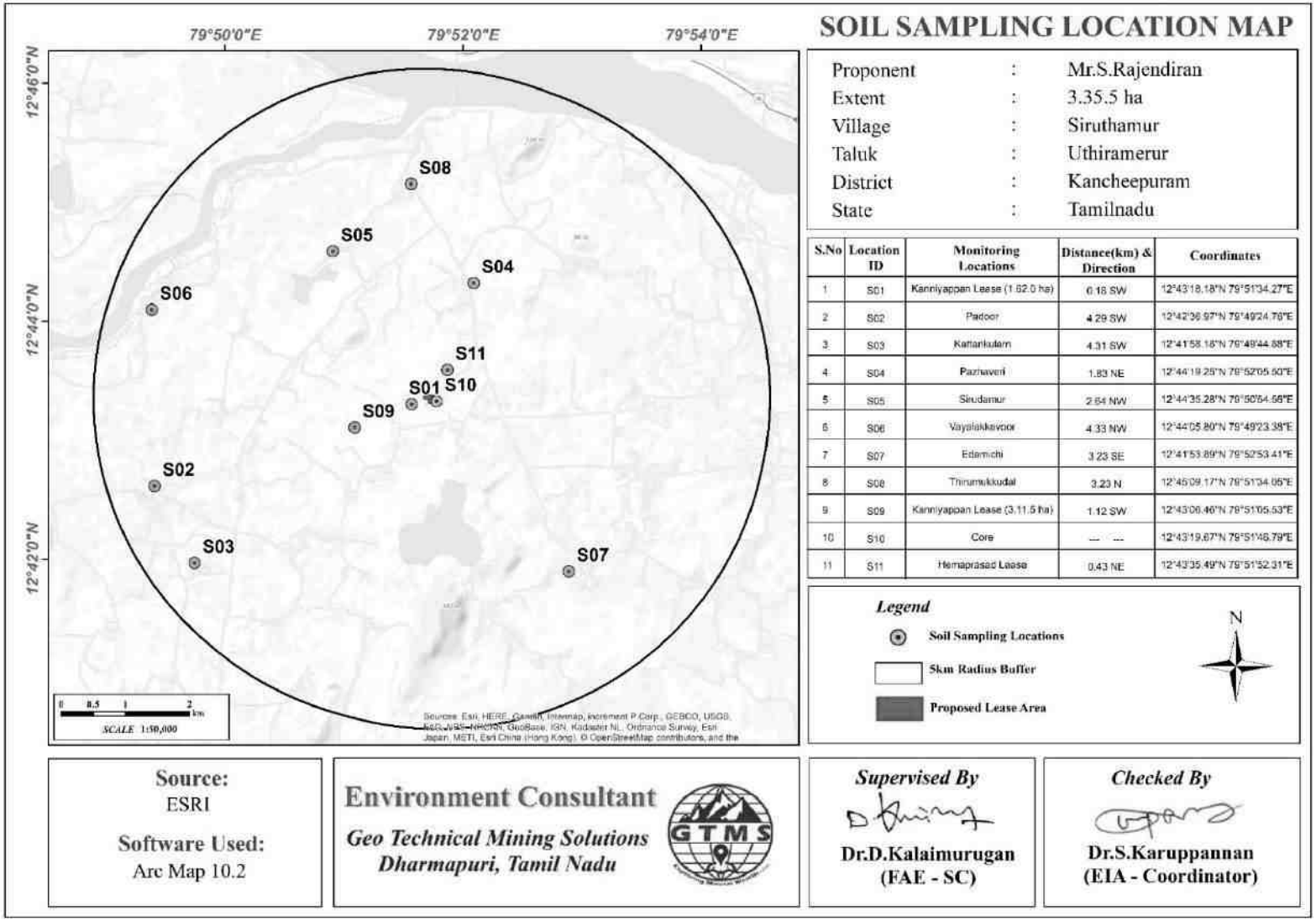


Figure 3.5 Map Showing Soil Sampling Locations within 5 km Radius around the Proposed Project Site

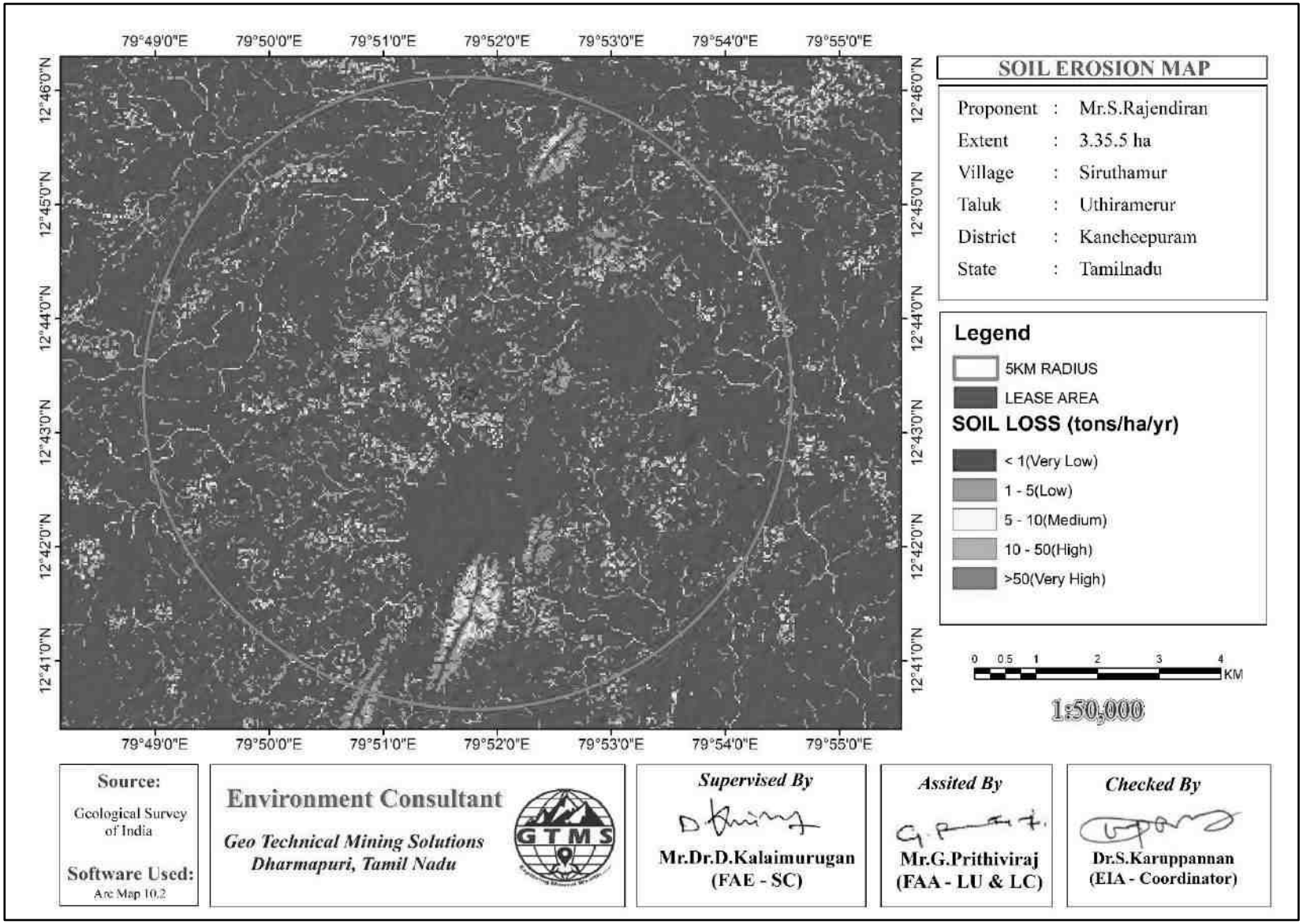


Figure 3.6 Map Showing Soil Erosion within 5 km Radius around the Proposed Project Site

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 baseline quality of surface and ground water Table 3.5.

Table 3.5 Water Sampling Locations

S. No.	Sampling ID	Location	Distance & Direction	Coordinates
1	SW1	Sirudamur Lake	0.4 km N	12°43'37.81"N,79°51'45.78"E
2	SW2	Kattankulam Lake	4.30 km SW	12°41'59.49"N,79°49'44.52"E
3	SW3	Edamichi Lake	2.40 km S	12°41'59.18"N,79°51'45.35"E
4	GW1	Pazhaveri	2.35 km NNE	12°44'19.15"N,79°52'40.02"E
5	GW2	Sirudamur	0.36 km S	12°43'07.05"N,79°51'41.90"E
6	GW3	Vayalakkavoor	5.1 km NW	12°44'50.30"N,79°49'19.78"E
7	GW4	Edamichi	3.40 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.*

3.2.1 Surface Water Resources and Quality

Sirudamur Lake, Kattankulam Lake and Edamichi Lake are the three prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 0.4 N of Sirudamur Lake, 4.30 km SW of Kattankulam Lake and 2.40 km S of Edamichi Lake, as shown in Table 3.5 and Figure 3.7. Three surface water samples, known as SW1, SW2 and SW3 were collected from the three surface water bodies to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the three samples.

Results for surface water samples in the Table 3.6 indicate that the physical and chemical parameters, and heavy metals are within permissible limits.

3.2.2 Ground Water Resources and Quality

Groundwater in the study area occurs in the crystalline rocks of Archaean age and Recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water

abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Four groundwater samples, known as GW1, GW2, GW3 and GW4 were collected from bore wells and analyzed for physico-chemical conditions and heavy metals contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.7. Table 3.7 summarizes ground water quality data of the four samples.

Results for ground water samples in the Table 3.7 indicate that the physical, chemical, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

3.2.3 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.

3.2.3.1 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 October through December, 2022 (Post Monsoon Season) and from March through May, 2022 (Pre-Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.8 and 3.9. According to the data, average depths to the static water table in open wells range from 7.27 to 9.43 m BGL in post monsoon and from 13.43 to 16.37 m BGL in pre monsoon. The bore well data thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of October through December 2022 (Post-Monsoon Season) vary from 47.33 to 51.60 m and from 55.43 to 58.43 m for the period of March through May, 2022 (Pre-Monsoon Season).

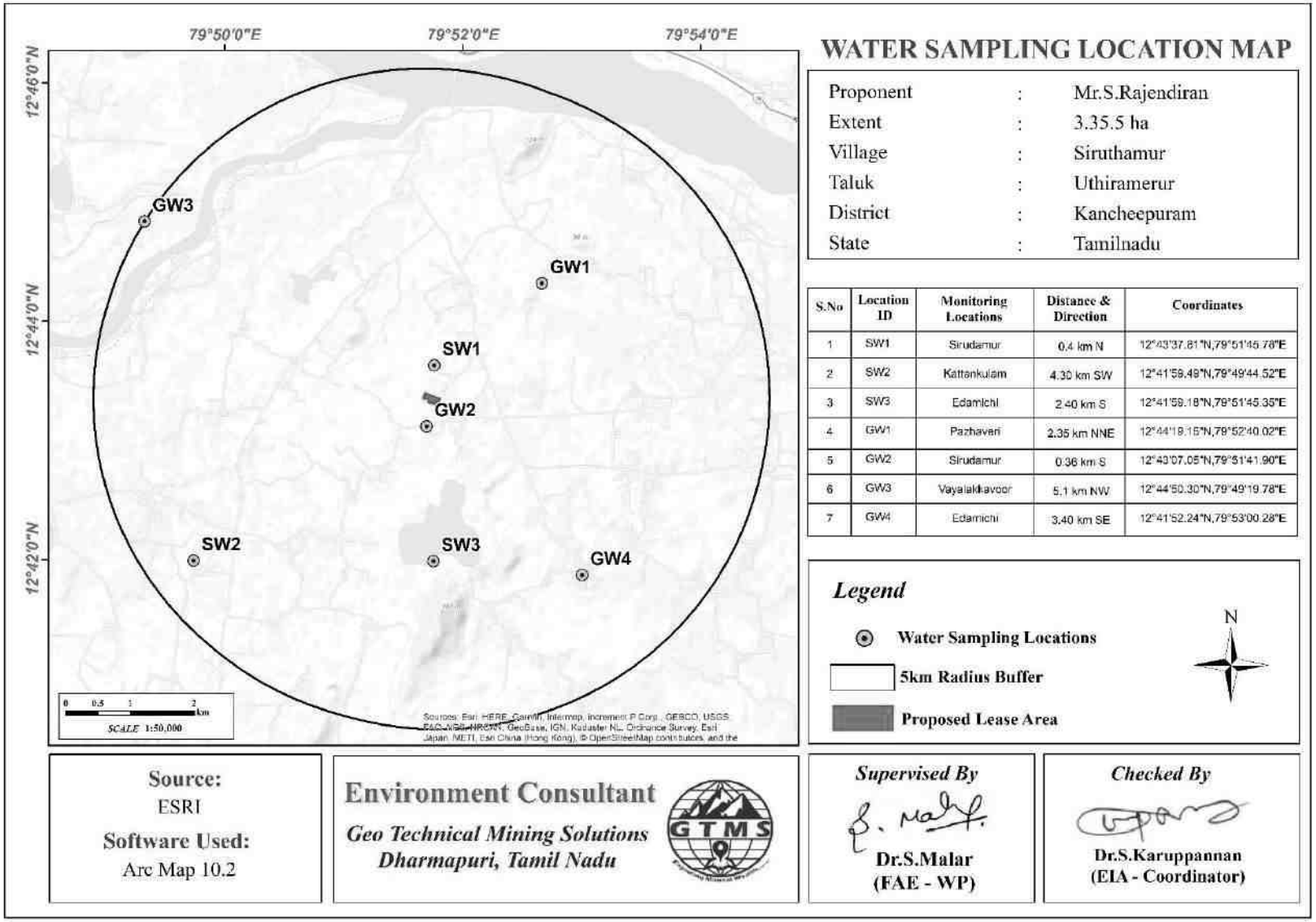


Figure 3.7 Map Showing Water Sampling Locations within 5 km Radius around the Proposed Project Site

Table 3.6 Surface Water Quality Result

S. No.	Parameters	Unit	Result in near Core	Result in Buffer			CPCB Designated Best Use	IS:2296-1982 Standards For Class A
				Minimum Limit	Maximum Limit	Average		
1	Color	Hazen	6	5	5	5	300	10
2	Turbidity	NTU	5	5	5	5	Not specified	Not specified
3	pH@ 25ºC	-	7.1	6.9	7.0	6.95	6.5 – 8.5	6.5 – 8.5
4	Electrical Conductivity @ 25°C	µs/cm	95	22	44	33	Not specified	Not specified
5	Total Dissolved Solids	mg /l	142	72	84	78	500	500
6	Total Hardness	mg/l	48.34	41.74	46.23	43.98	400	300
7	Calcium as Ca	mg/l	54.7	21.6	33.5	27.55	200	80.10
8	Magnesium as Mg	mg/l	27	18	24	21	100	24.28
9	Sodium as Na	mg/l	13	11	12	11.5	200	-
10	Potassium as K	mg/l	3	2	2	2	12	-
11	Chloride as Cl^-	mg/l	52	42	47	44.5	400	250
12	Sulphate as SO_4^-	mg/l	37	28	35	31.5	200	400
13	Iron as Fe	mg/l	BDL	BDL	BDL	BDL	Not specified	0.3

*Source: Sampling Results by **Accuracy Analabs Laboratory,** in association with GTMS.*

Table 3.7 Ground Water Quality Result

S. No.	Parameters	Units	Result in near Core	Result in Buffer			Standards as Per IS 10500: 2012	
				Minimum Limit	Maximum Limit	Average	Acceptable Limit	Permissible Limit
1	Color	Hazen	Agreeable	Agreeable	Agreeable	Agreeable	5	15
2	Turbidity	NTU	< 1	< 1	< 1	< 1	1	5
3	pH@ 25°C	-	7.73	7.35	7.63	7.52	6.5-8.5	No relaxation
4	EC @ 25°C	µs/cm	474	632	961	763.66	Not specified	Not specified
5	TDS	mg /l	289	586	686	728	500	2000
6	Total Hardness	mg /l	290	296	561	386.33	200	600
7	Calcium as Ca	mg/l	32	91	92	89.33	75	200
8	Magnesium as Mg	mg/l	21	17	20	18.66	30	100
9	Sodium as Na	mg/l	13	16	18	16.66	50	200
10	Potassium as K	mg/l	8	9	12	10.86	12	12
11	Total Alkalinity	mg/l	186	181	334	266.33	200	600
12	Chloride as Cl-	mg/l	148	138	275	186	250	1000
13	Sulphate as SO_4-	mg/l	32	61	84	72.33	200	400
14	Iron as Fe	mg/l	0.1	0.14	0.17	0.15	0.3	No relaxation
15	Fluoride as F	mg/l	0.41	0.52	0.72	0.60	1.0	1.5

*Source: Sampling Results by **Accuracy Analabs Laboratory,** in association with GTMS.*

Data on the depths to static water table and potentiometric surface 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 3.8-3.9. 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 3 located in Southern direction of the proposed project site respectively. The maps thus produced in bore wells are shown in Figures 3.10-3.11. From the groundwater flow map in fare that two monsoon seasons groundwater flows towards the bore well number 4 and 6 located in NE and SW direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Mar-2022	Apr-2022	May- 2022	Average		
DW01	15.1	15.4	15.7	15.40	12°43'22.71"N	79°51'54.03"E
DW02	13.9	14.6	15.7	14.73	12°43'7.75"N	79°52'17.49"E
DW03	15.2	16.4	17.2	16.27	12°43'3.06"N	79°51'41.96"E
DW04	14.8	15.6	15.8	15.40	12°43'19.50"N	79°51'19.98"E
DW05	12.7	13.2	14.4	13.43	12°43'55.75"N	79°52'7.49"E
DW06	14.3	15.7	15.9	15.30	12°42'25.85"N	79°51'20.71"E
DW07	15.2	16.6	17.3	16.37	12°42'56.38"N	79°50'43.49"E
DW08	15.4	16.1	16.7	16.07	12°44'8.10"N	79°50'53.59"E
DW09	15.6	16.5	16.9	16.33	12°42'40.27"N	79°52'40.03"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Water Table BGL(m)				Latitude	Longitude
	Oct-2022	Nov-2022	Dec-2022	Average		
DW01	6.8	7.1	8.4	7.43	12°43'22.71"N	79°51'54.03"E
DW02	7.2	8.2	9.5	8.30	12°43'7.75"N	79°52'17.49"E
DW03	7.1	7.8	8.7	7.87	12°43'3.06"N	79°51'41.96"E
DW04	8.1	8.6	9.6	8.77	12°43'19.50"N	79°51'19.98"E

DW05	8.9	9.2	10.2	9.43	12°43'55.75"N	79°52'7.49"E
DW06	7.6	8.7	9.7	8.67	12°42'25.85"N	79°51'20.71"E
DW07	6.8	7.4	7.6	7.27	12°42'56.38"N	79°50'43.49"E
DW08	7.5	7.9	8.2	7.87	12°44'8.10"N	79°50'53.59"E
DW09	7.2	8.1	8.5	7.93	12°42'40.27"N	79°52'40.03"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
	Mar-2022	Apr-2022	May- 2022	Average		
BW01	57.8	58.3	59.2	58.43	12°44'16.72"N	79°51'14.09"E
BW02	54.3	55.6	56.4	55.43	12°44'15.69"N	79°51'56.46"E
BW03	54.8	56.2	57.6	56.20	12°44'0.67"N	79°51'47.50"E
BW04	56.2	57.1	57.9	57.07	12°43'52.56"N	79°52'5.60"E
BW05	54.6	55.8	56.9	55.77	12°43'10.90"N	79°51'54.48"E
BW06	54.2	55.1	57.4	55.57	12°43'5.81"N	79°51'29.02"E
BW07	57.2	58.3	58.7	58.07	12°42'45.64"N	79°51'17.63"E
BW08	57.1	56.6	57.4	57.03	12°42'34.70"N	79°51'3.46"E
BW09	56.8	55.3	56.1	56.07	12°42'48.87"N	79°50'44.70"E

Source: Onsite monitoring data

Table 3.11 Post-Monsoon Water Level of Bore Wells within 2 km Radius

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2022	Nov-2022	Dec-2022	Average		
BW01	46.2	47.5	48.3	47.33	12°44'16.72"N	79°51'14.09"E
BW02	50.4	51.5	52.4	51.43	12°44'15.69"N	79°51'56.46"E
BW03	49.6	50.6	51.5	50.57	12°44'0.67"N	79°51'47.50"E
BW04	48.2	49.4	50.4	49.33	12°43'52.56"N	79°52'5.60"E
BW05	50.3	51.8	52.7	51.60	12°43'10.90"N	79°51'54.48"E
BW06	49.9	50.6	52.6	51.03	12°43'5.81"N	79°51'29.02"E
BW07	46.5	47.5	48.1	47.37	12°42'45.64"N	79°51'17.63"E
BW08	48.1	49.8	50.6	49.50	12°42'34.70"N	79°51'3.46"E
BW09	49.3	50.6	51.3	50.40	12°42'48.87"N	79°50'44.70"E

Source: Onsite monitoring data

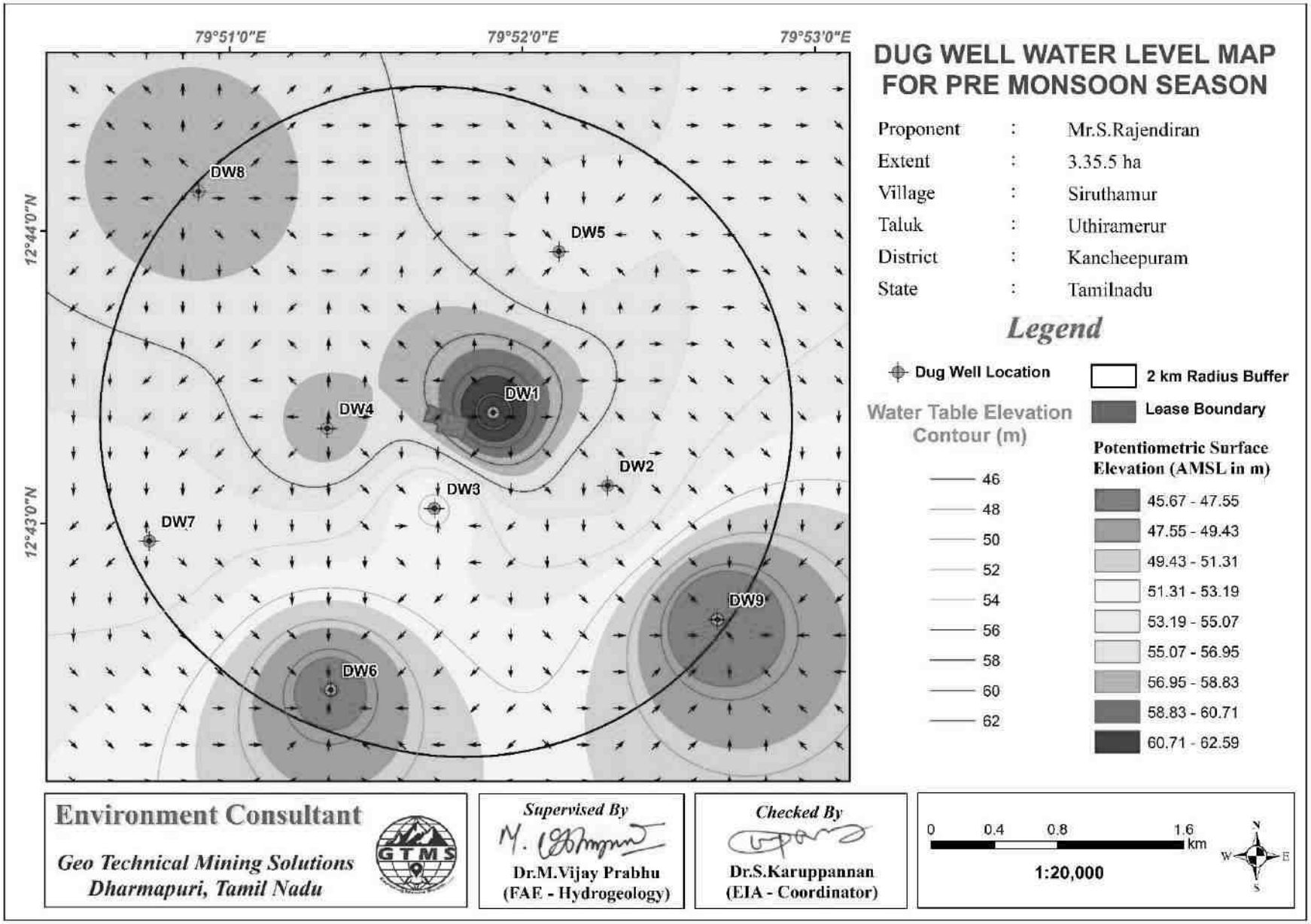


Figure3.8Groundwater Elevation Map Showing the Direction of Groundwater Flow during Pre- Monsoon Season

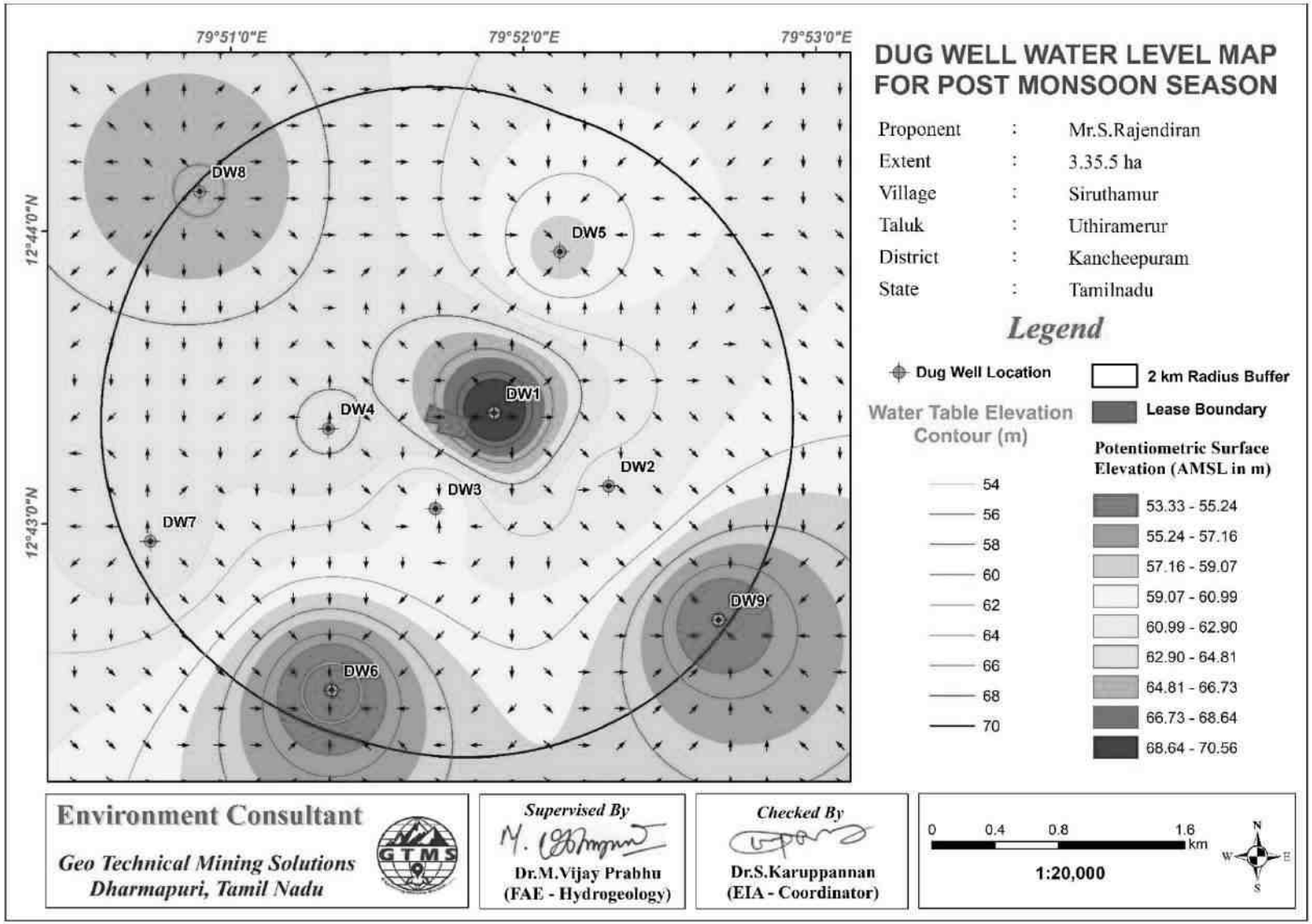


Figure 3.9 Open Well Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Post-Monsoon Season

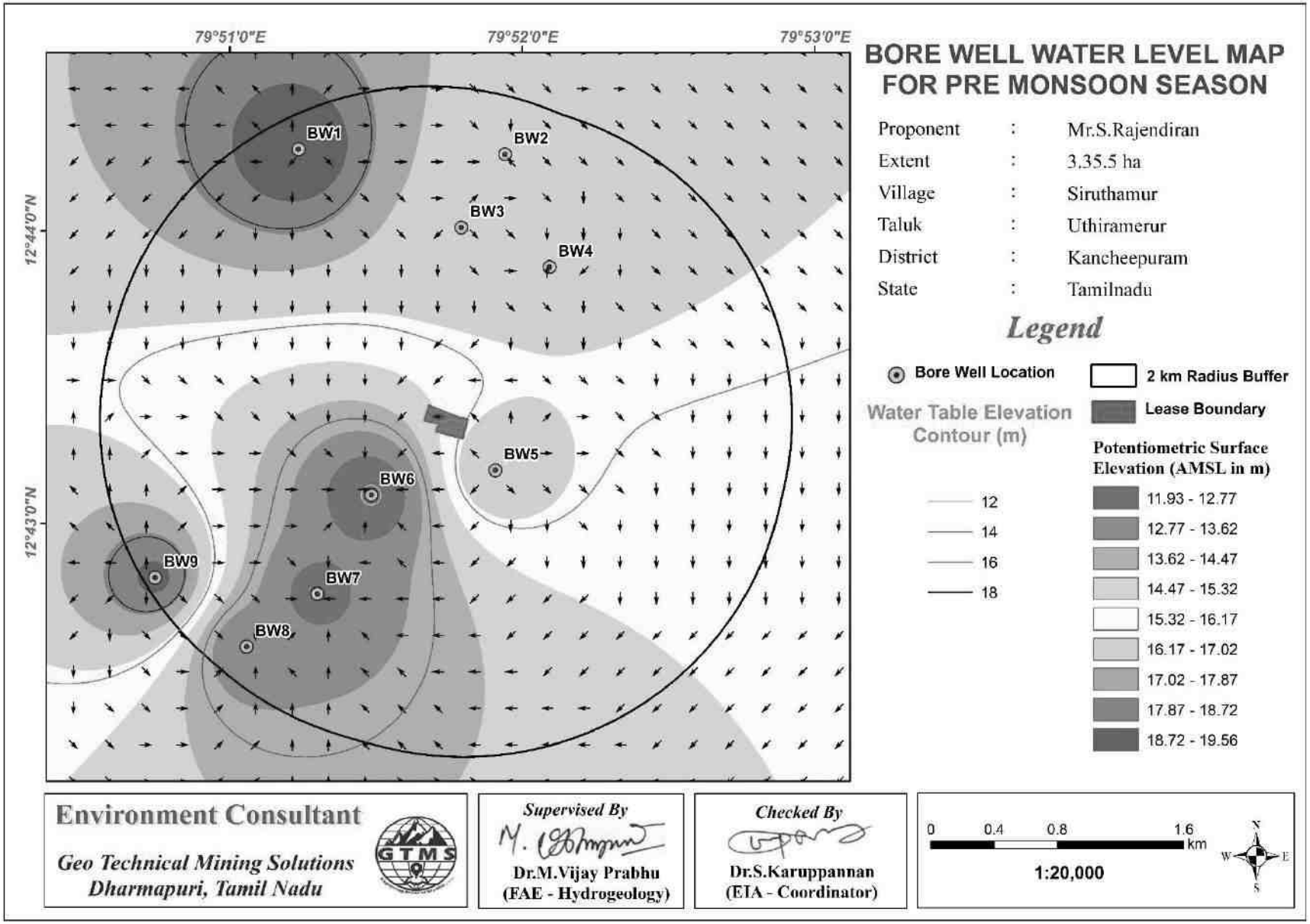


Figure 3.10 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Pre-Monsoon Season

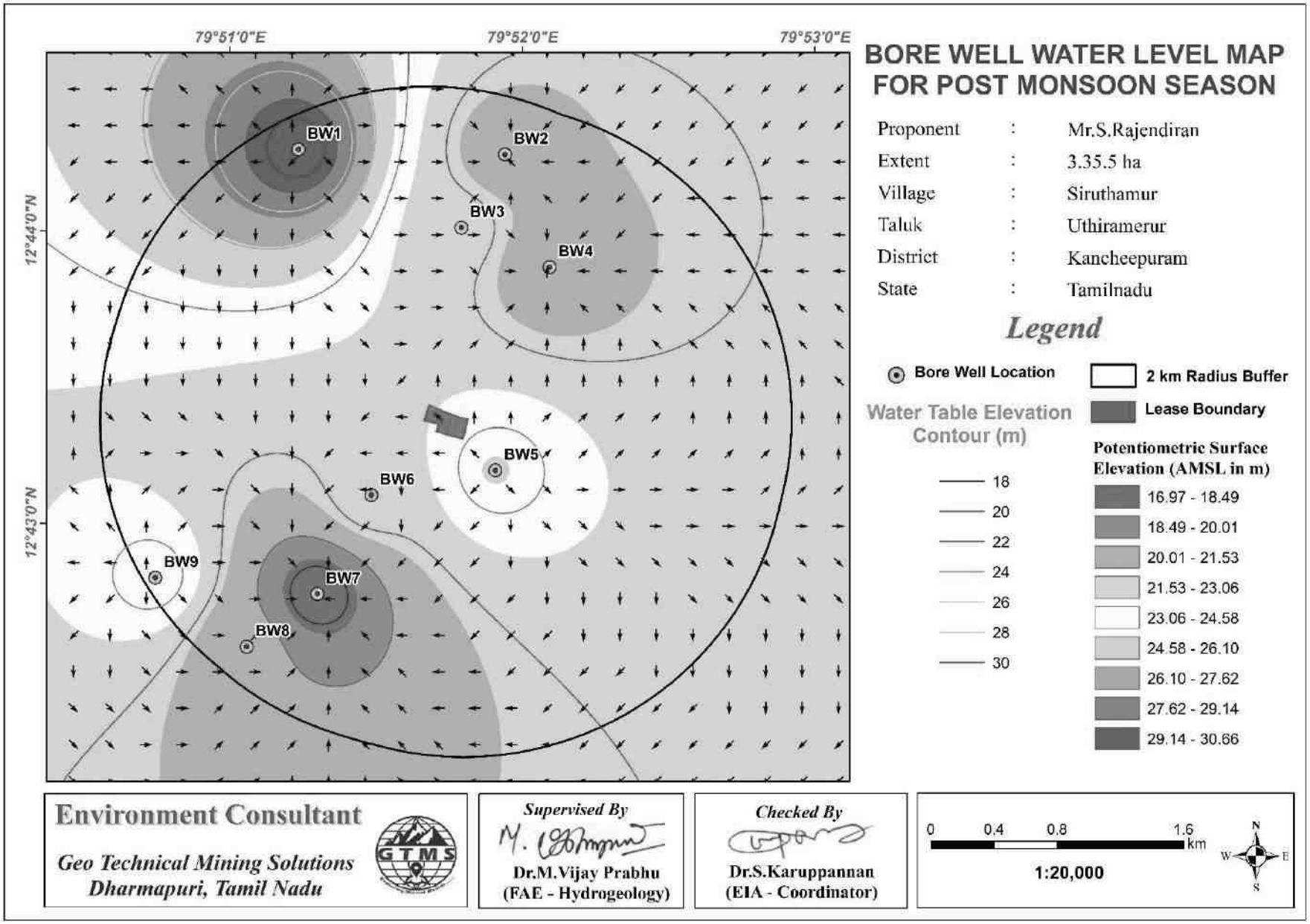


Figure 3.11 Borewell Static Groundwater Elevation Map Showing the Direction of Groundwater Flow during Post-Monsoon Season

3.2.3.2 Electrical Resistivity Investigation

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

Result

The Geophysical VES data obtained from the project site have been shown in Table 3.12. 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 3.12.

Table 3.12 Vertical Electrical Sounding Data

Location Coordinates – 12°43'22.40"N 79°51'41.01"E					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	5	2	16.50	0.741	125.05
2	10	2	75.43	0.245	167.91
3	15	5	62.86	0.454	288.48
4	20	5	117.86	0.326	369.37
5	25	5	188.58	0.263	496.74
6	25	10	82.50	0.594	490.67
7	30	10	125.72	0.580	582.30
8	35	10	176.79	0.406	718.27
9	40	10	235.73	0.368	876.45
10	45	10	302.51	0.355	1073.17
11	50	20	165.01	0.278	1189.65
12	60	20	251.44	0.272	786.42
13	70	20	353.59	0.269	1239.90
14	80	20	471.45	0.262	1281.12
15	90	20	605.03	0.257	1546.68
16	100	20	754.32	0.251	1785.32

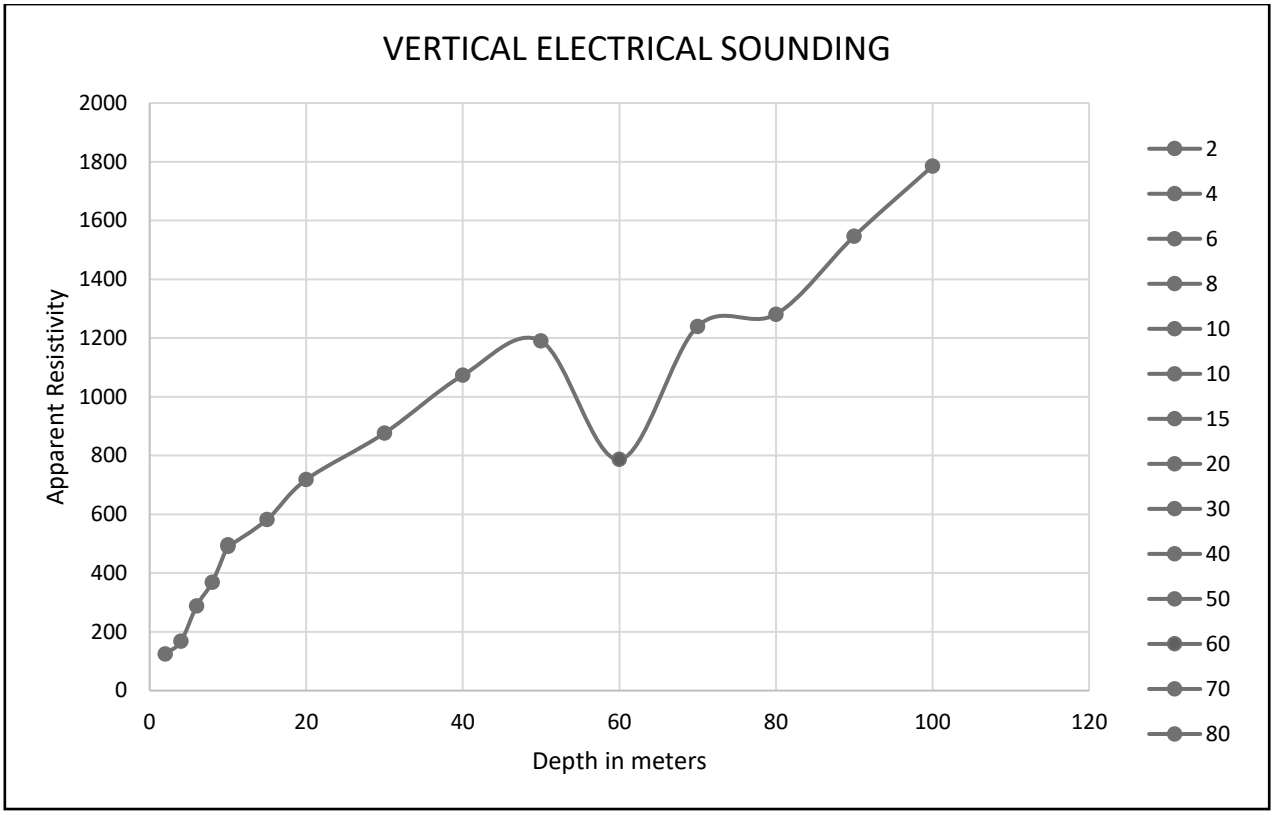


Figure 3.12 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60 m below Ground Level in Proposed Project

The rock formation of low resistivity values indicates occurrence of water at the depth of about 60 m below ground level. The maximum depth proposed for the proposed project is 50 m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

3.3 AIR ENVIRONMENT

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

3.3.1 Meteorology

3.3.1.1 Climatic Variables

A temporary meteorological station was installed at the project sites by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.13.

According to the onsite data, the temperature in March, 2022 varied from 18.04 to 31.30^{0}C with the average of 25.56^{0}C; in April, 2022 from 16.88 to 29.97^{0}C with the average of 24.23^{0}C; and in

May, 2022 from 17.48 to 29.51^{0}C with the average of 23.71^{0}C. In March, 2022, relative humidity ranged from 30.44 to 95.19 % with the average of 71.17%; in April, 2022, from 36.56 to 92.19 % with the average of 72.22 %; and in May,2022, from 36.19 to 93.19 % with the average of 72.29 %. The wind speed in March, 2022 varied from 0.35 to 8.80 m/s with the average of 3.96 m/s; in April, 2022 from 0.09 to 6.81 m/s with the average of 3.67 m/s; and in May, 2022 from 0.06 to 9.06 m/s with the average of 4.17 m/s. In March,2022, wind direction varied from 2.32 to 359.65^0 with the average of 119.25^0; in April, 2022, from 0.0 to 357.92^0 with the average of149.97 ^{0}; and in May, 2022, from 2.09 to 358.03^0 with the average of 207.43^0. In March,2022, surface pressure varied from 99.94 to 101.17 kPa with the average of 100.56 kPa; in April, 2022, from 99.87 to 101.08 kPa with the average of 100.45 kPa; and in May, 2022, from 99.38 to 100.58 kPa with the average of 100.06 kPa

Table 3.13 Onsite Meteorological Data

S. No.	Parameters		March,2022	April,2022	May,2022
1	Temperature (^{0}C)	Min	18.04	16.68	17.48
		Max	31.30	29.97	29.51
		Avg	25.56	24.23	23.71
2	Relative Humidity (%)	Min	30.44	36.56	36.19
		Max	95.19	92.19	93.19
		Avg	71.17	72.22	72.29
3	Wind Speed (m/s)	Min	0.35	0.09	0.06
		Max	8.80	6.81	9.06
		Avg	3.96	3.67	4.17
4	Wind Direction (degree)	Min	2.32	0.00	2.09
		Max	359.65	357.92	358.03
		Avg	119.25	149.97	207.43
5	Surface Pressure(kPa)	Min	99.94	99.87	99.38
		Max	101.17	101.08	100.58
		Avg	100.56	100.45	100.06

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

Rainfall

Table 3.14 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.

3.3.1.2 Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of March through May of the years from 2018 to 2021 and the seasonal wind rose for the study period of March through May 2022. The wind rose diagrams thus produced are shown in Figures 3.11-3.11a. Figure 3.12 reveals that:

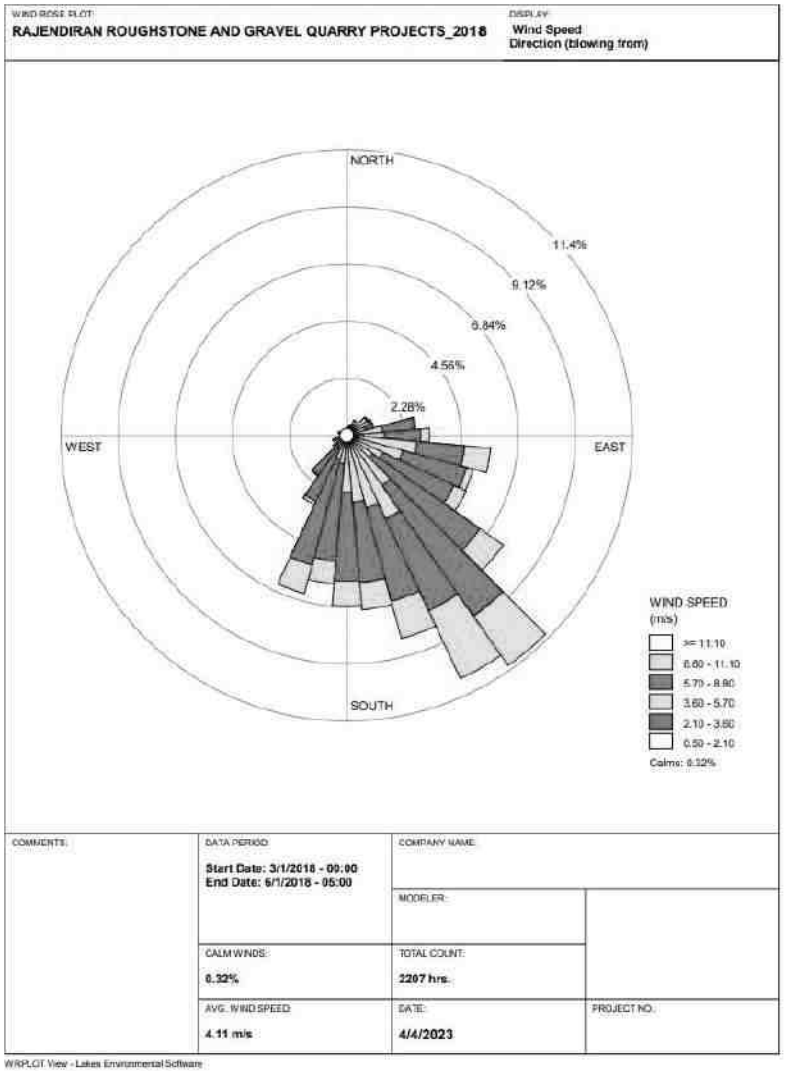
- ❖ The measured average wind velocity during the study period is 3.94m/s.
- ❖ Predominant wind was dominant in the directions ranging from southeast to northwest.

3.3.2 Ambient Air Quality Study

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

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

Accessibility and power availability



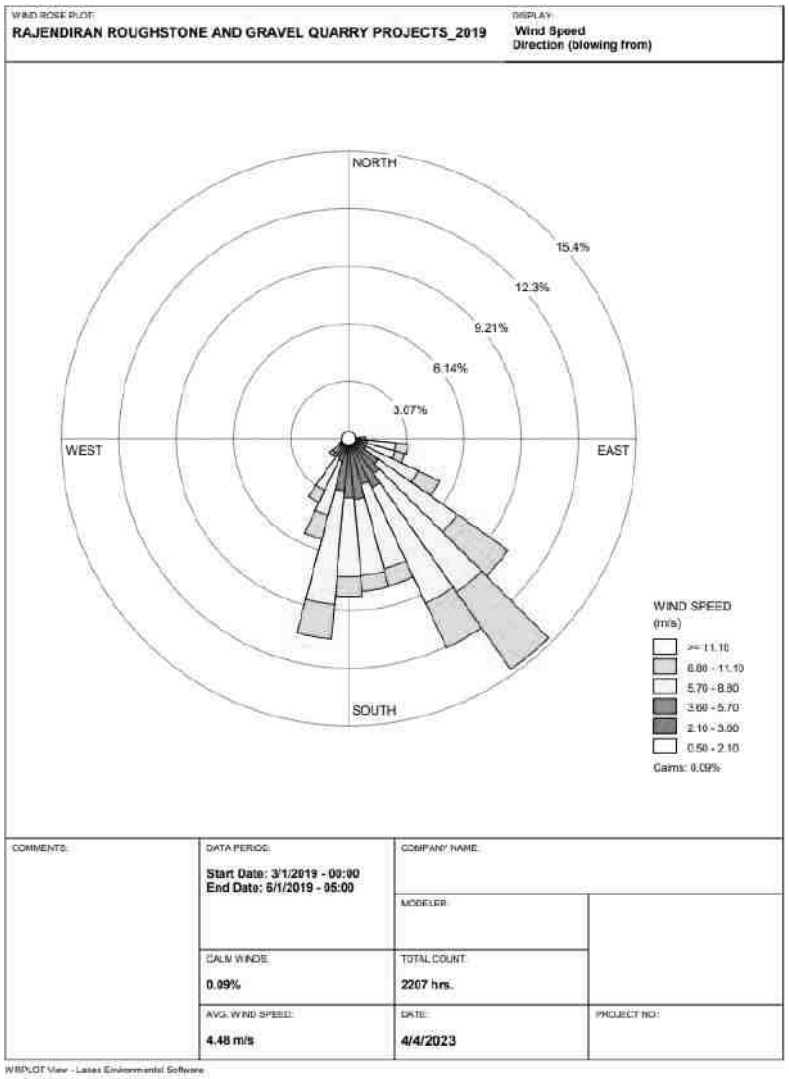
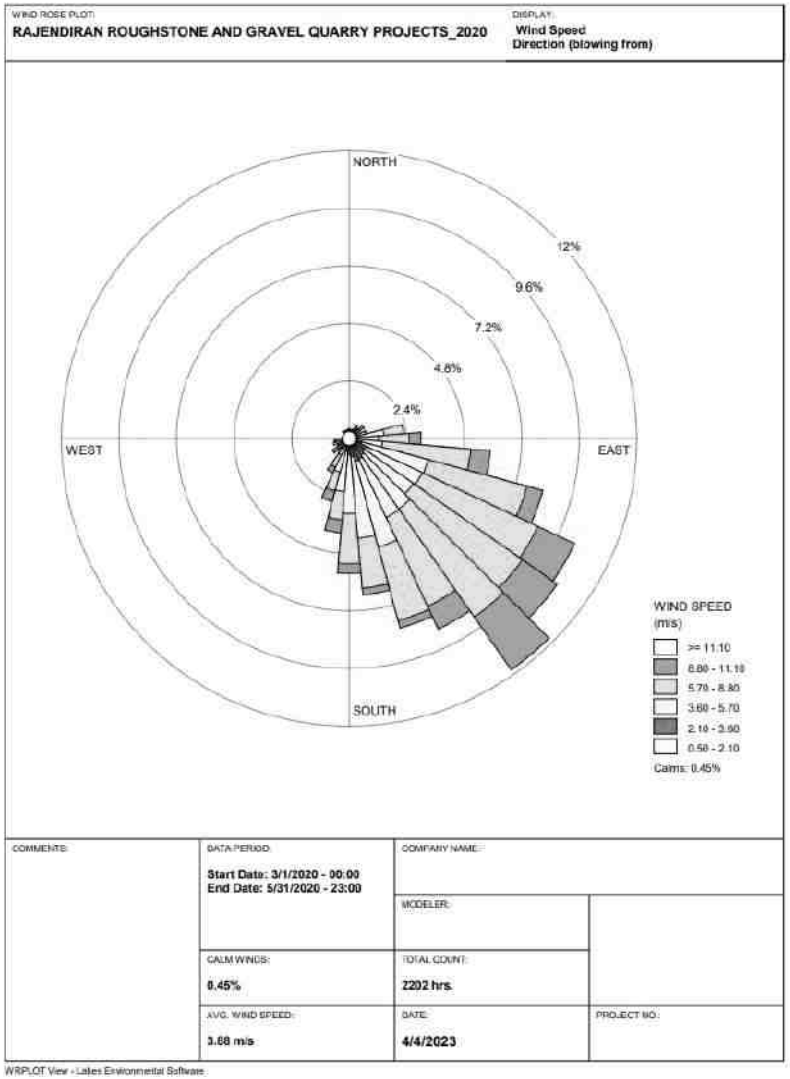


Figure 3.13 Windrose Diagram for 2018 and 2019 (March to May)



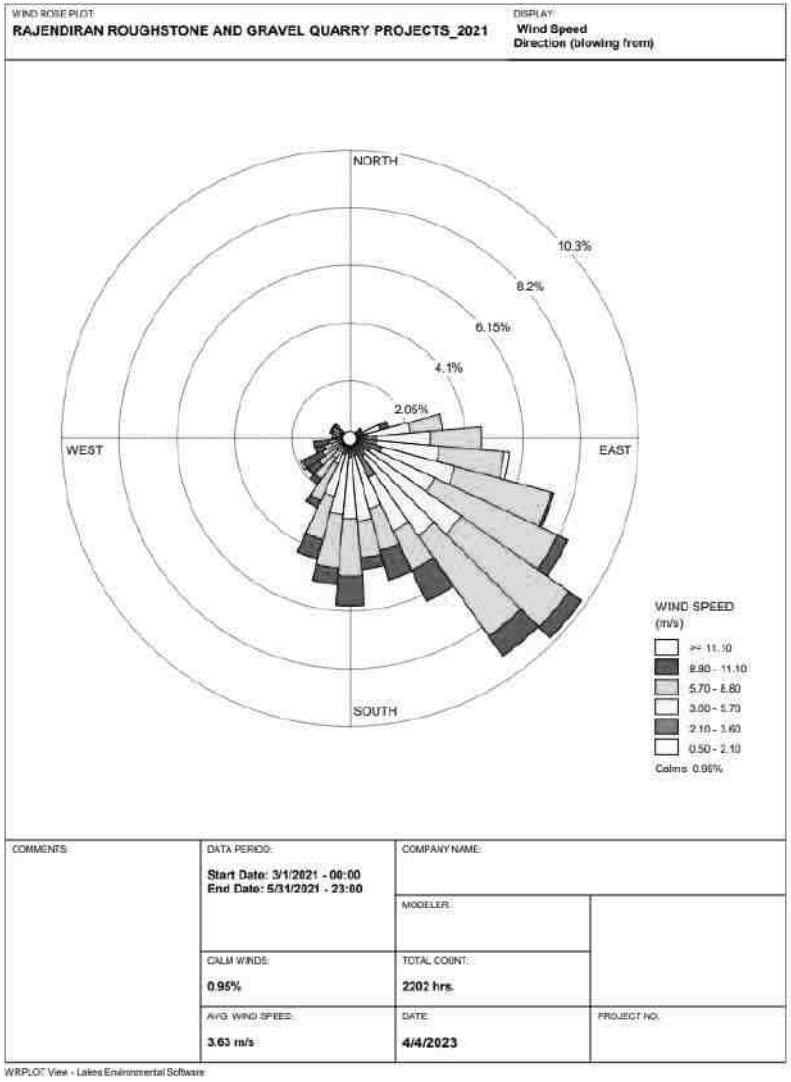


Figure 3.13(A) Windrose Diagram for 2020 and 2021 (March through May 2022)

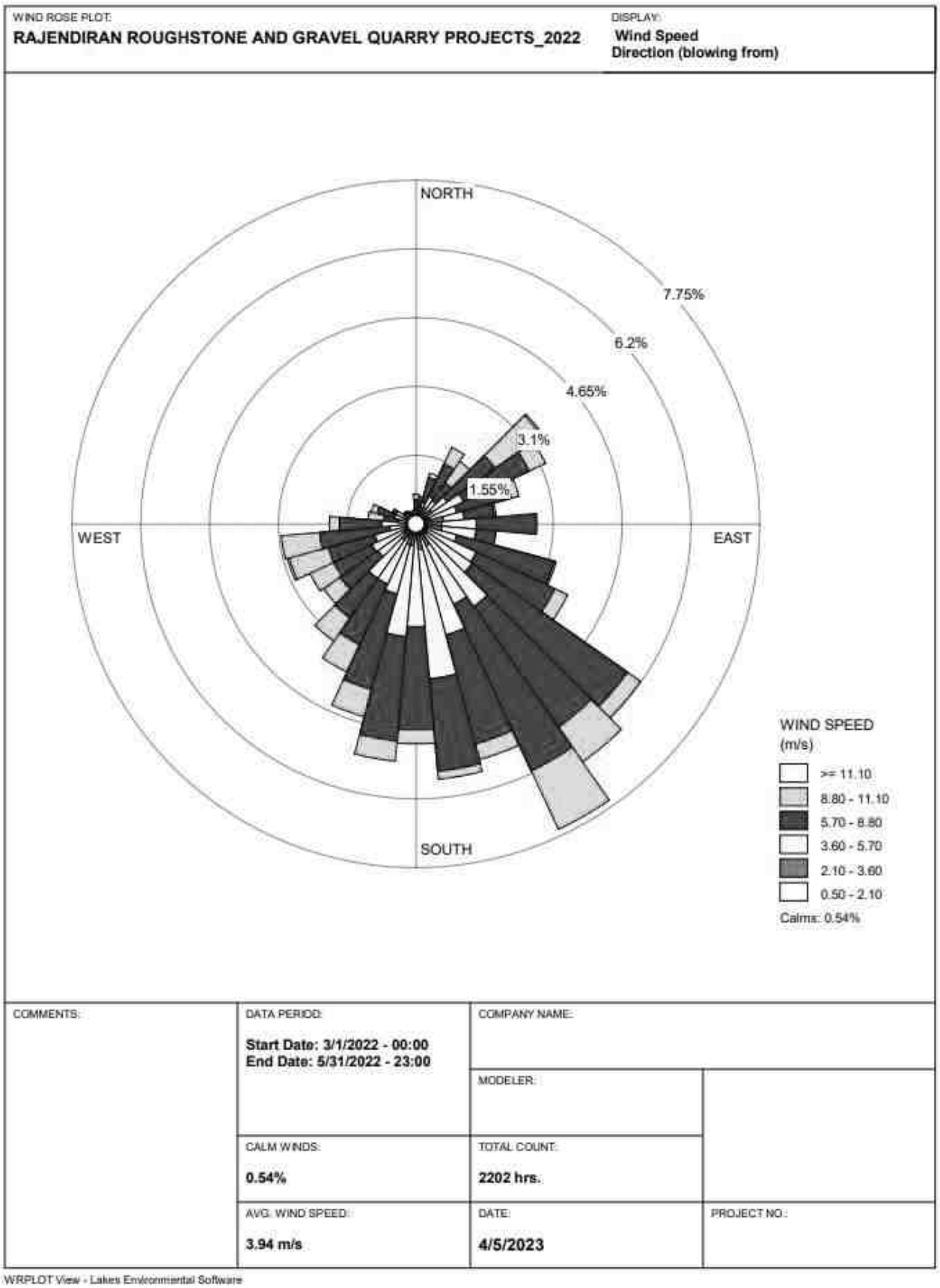


Figure 3.14 Onsite Wind Rose Diagram

Table 3.15 Methodology and Instrument Used for AAQ Analysis

Parameter	Method	Instrument
$PM_{2.5}$	Gravimetric method Beta attenuation method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM_{10}	Gravimetric method Beta attenuation method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO_2	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
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 3.16 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO_2 ($\mu g/m^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_X ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} ($\mu g/m^3$)	Annual Avg. 24 hours	60.0 10°.0	60.0 10°.0
4	$PM_{2.5}$ (µg/m3)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at eight (8) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period **March through May 2022** 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 space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for $PM_{2.5}$, PM_{10}, sulphur dioxide (SO_2) and nitrogen dioxide (NOx). The sampling locations are shown in Figure 3.15 and average concentrations of air pollutants are summarized in Tables 3.17.

Table 3.17 Ambient Air Quality (AAQ) Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates
1	AAQ1	Kanniyappan Lease	0.12	W	12°43'19.87"N, 79°51'35.87"E
2	AAQ2	Padoor	1.88	SW	12°42'48.39"N, 79°50'46.86"E
3	AAQ3	Kattankulam	4.24	SW	12°41'53.58"N, 79°49'51.00"E
4	AAQ4	Pazhaveri	2.94	NE	12°44'30.33"N, 79°52'56.85"E
5	AAQ5	Madhur	1.87	NNW	12°44'19.05"N 79°51'12.97"E
6	AAQ6	Vayalakkavoor	4.46	NW	12°44'10.33"N, 79°49'20.52"E
7	AAQ7	Edamichi	3.80	SSE	12°41'20.08"N, 79°52'28.96"E
8	AAQ8	Thirumukkudal	3.87	N	12°45'30.23"N, 79°51'37.33"E

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

Results

As per the monitoring data, $PM_{2.5}$ from 20.10 µg/m^3 to 26.15 µg/m^3, PM_{10} ranges from 40.34 µg/m^3 to 45.84µg/m^3; SO_2 from 6.06µg/m^3 to 9.61 µg/m^3; NO_x from 16.73 µg/m^3 to 23.56µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

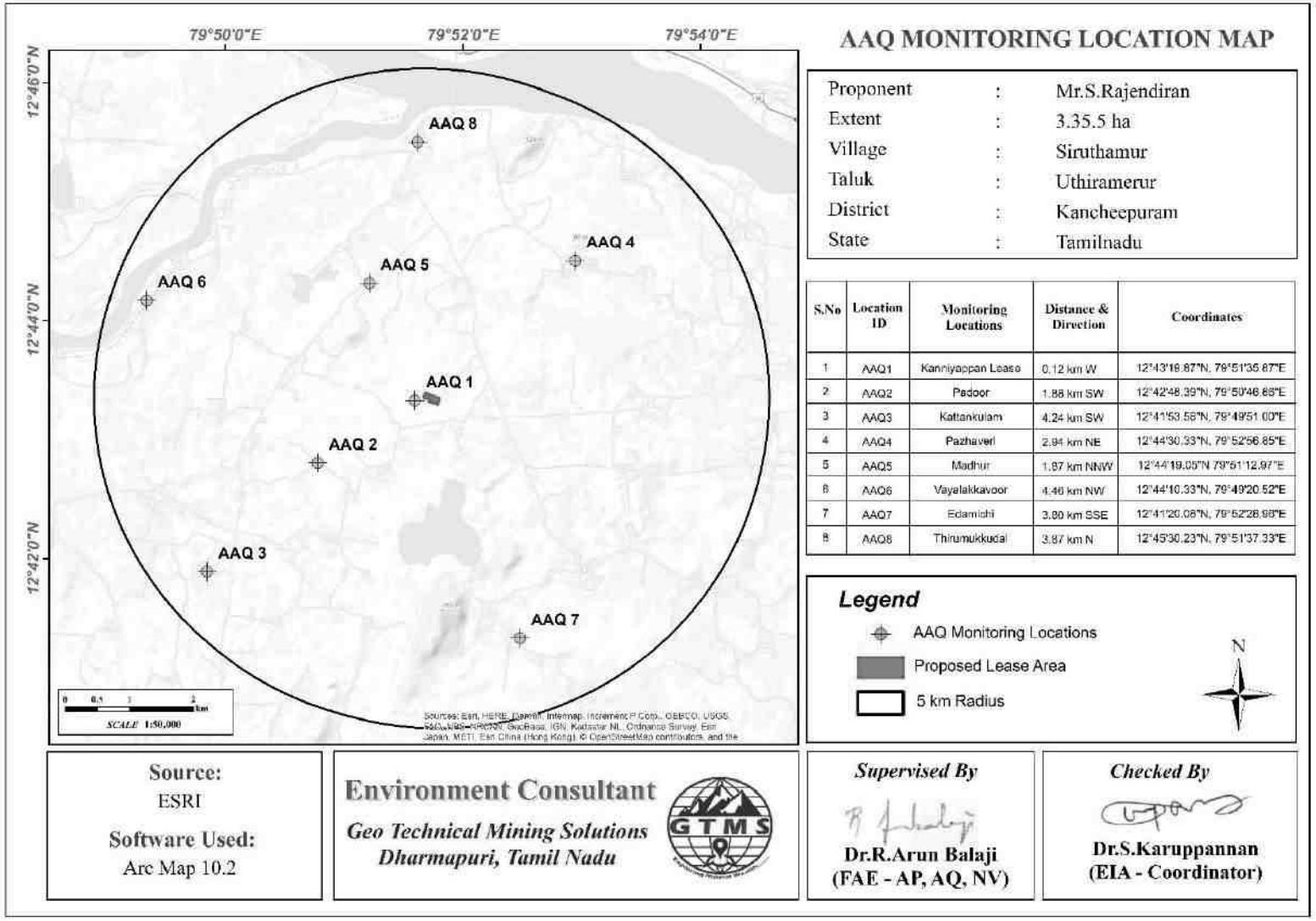


Figure 3.15 Map Showing Ambient Air Quality Monitoring Station Locations around 5 Km Radius from the Proposed Project Site

Table 3.18 Summary of AAQ Result

Station ID	$PM_{2.5}$ Max	Min	Mean	98th Percentile	PM_{10} Max	Min	Mean	98th Percentile
AAQ1	35.4	25.9	32.40	35.26	55.5	47.5	52.23	55.45
AAQ2	27.2	22.4	25.08	27.02	47.1	42.7	45.23	47.01
AAQ3	21.7	17.5	20.27	21.70	41.9	37.2	39.58	41.76
AAQ4	23.8	20.7	22.30	23.66	43.0	38.9	40.99	42.82
AAQ5	26.8	17.8	24.39	26.80	45.9	39.8	43.43	45.53
AAQ6	22.7	17.4	20.10	22.65	42.0	36.2	38.86	41.36
AAQ7	25.9	18.9	23.30	25.72	46.6	42.5	44.68	46.55
AAQ8	25.7	20.2	23.52	25.72	44.7	37.9	42.18	44.61
	SO_2				NO_X			
AAQ1	14.4	8.6	11.53	14.03	28.1	19.2	23.85	27.87
AAQ2	10.8	5.1	8.70	10.52	25.6	19.8	22.24	25.19
AAQ3	7.8	4.7	5.89	7.70	19.4	6.9	16.78	19.31
AAQ4	7.7	4.9	6.48	7.65	20.7	16.4	18.75	20.56
AAQ5	8.9	6.1	7.23	8.76	22.8	18.7	20.85	22.57
AAQ6	6.8	5.2	6.08	6.80	21.4	15.6	18.70	21.03
AAQ7	10.0	7.2	8.66	9.95	24.6	19.5	22.40	24.24
AAQ8	10.5	6.7	8.63	10.41	25.9	17.7	21.72	24.89

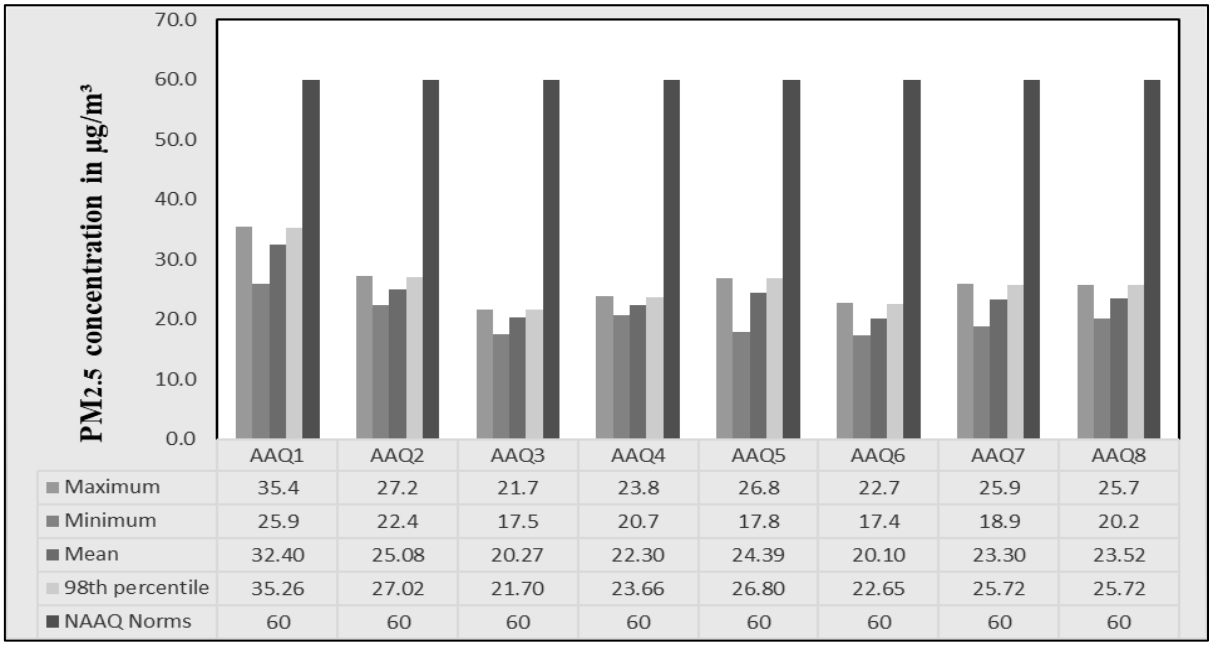
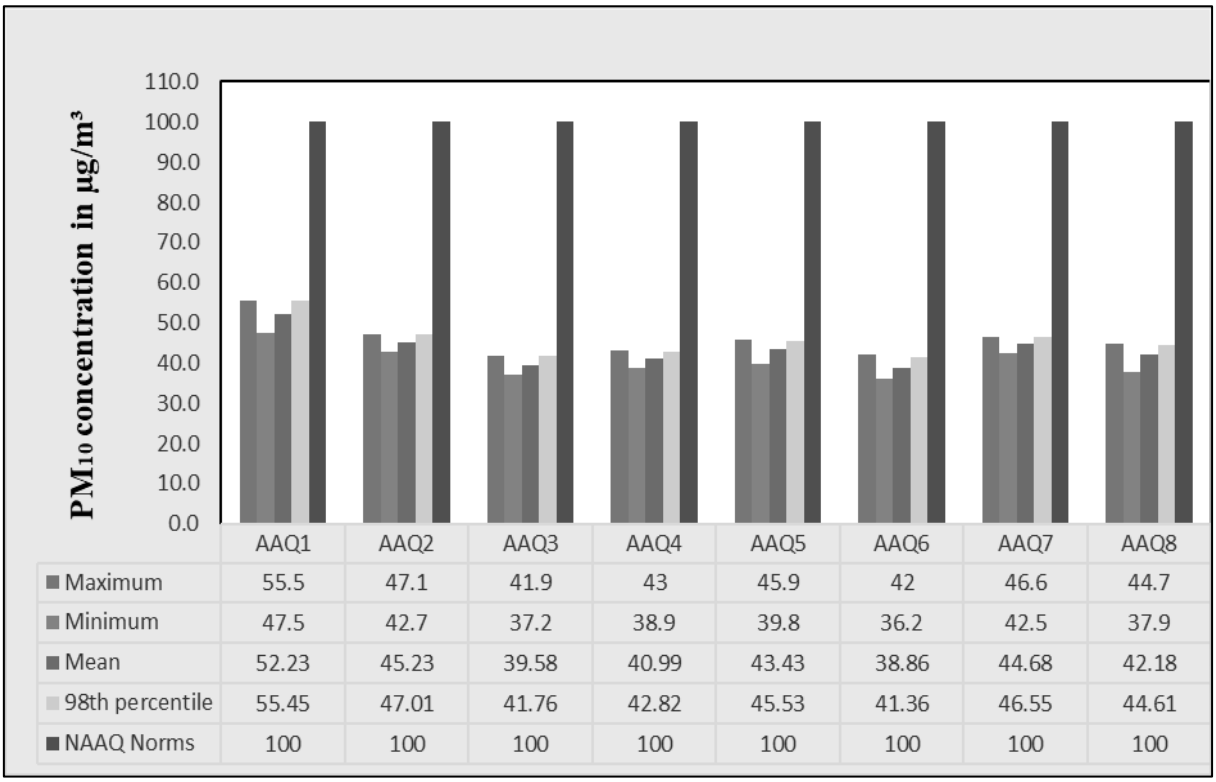
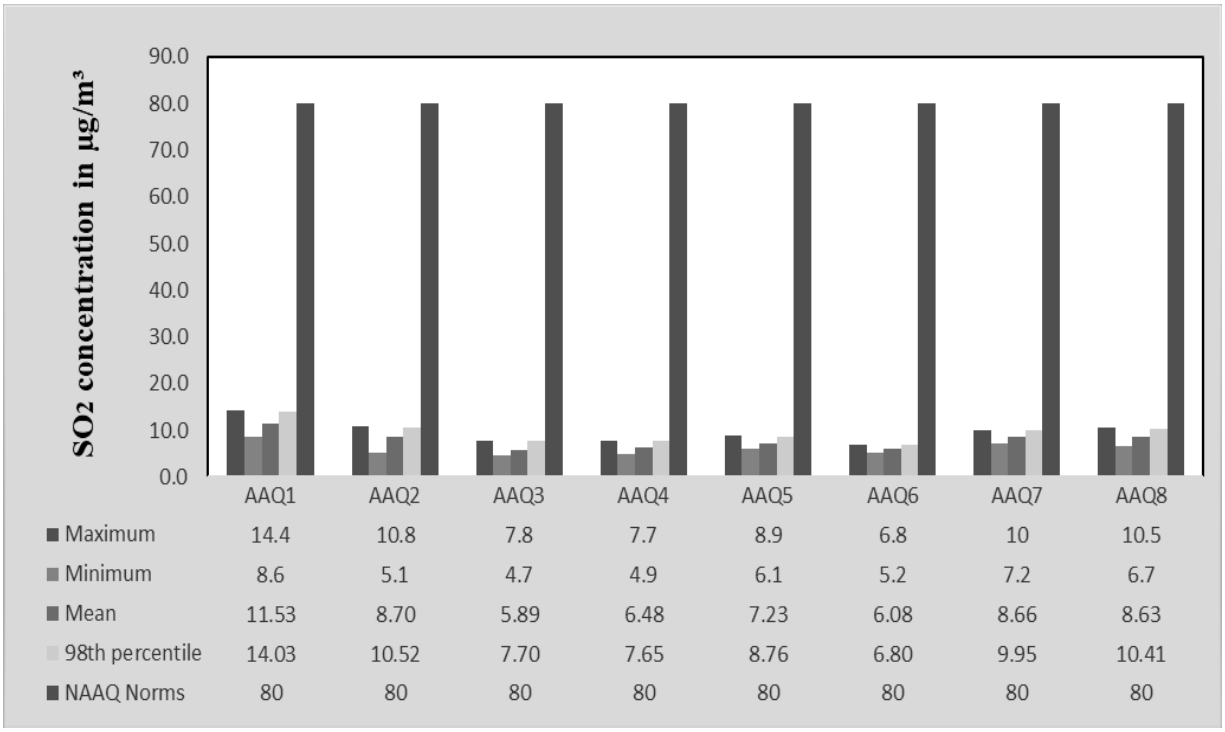


Figure 3.16 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of $PM_{2.5}$ Measured from the eight Air Quality Monitoring Stations within 5 km Radius



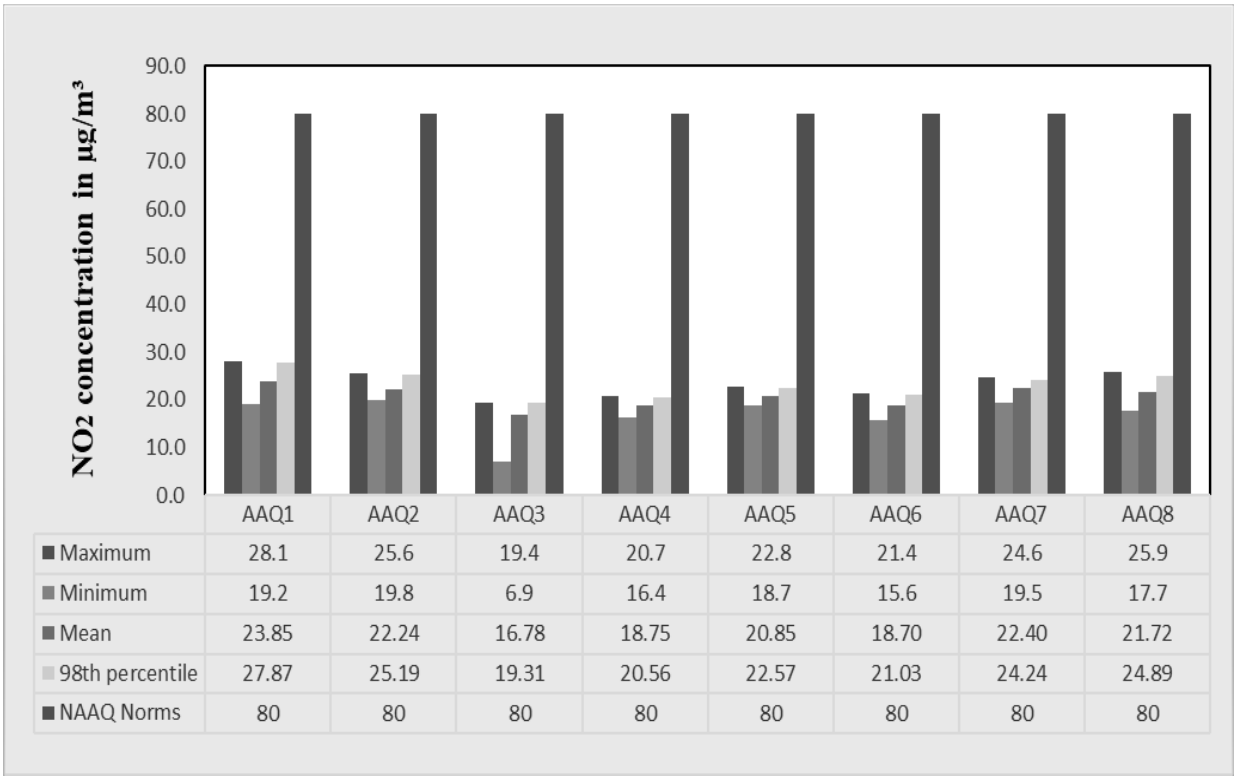
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Maximum	55.5	47.1	41.9	43	45.9	42	46.6	44.7
Minimum	47.5	42.7	37.2	38.9	39.8	36.2	42.5	37.9
Mean	52.23	45.23	39.58	40.99	43.43	38.86	44.68	42.18
98th percentile	55.45	47.01	41.76	42.82	45.53	41.36	46.55	44.61
NAAQ Norms	100	100	100	100	100	100	100	100

Figure 3.17 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of PM_{10} Measured from the eight Air Quality Monitoring Stations within 5 km Radius



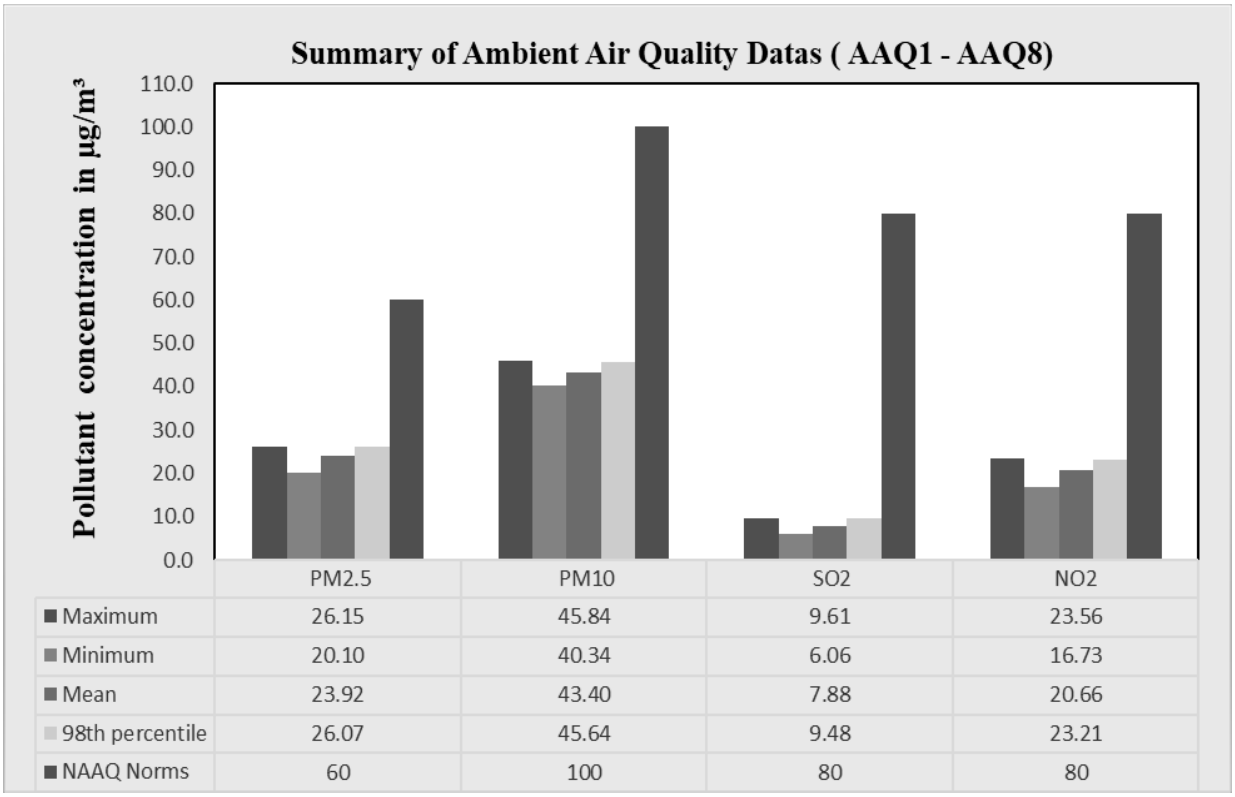
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Maximum	14.4	10.8	7.8	7.7	8.9	6.8	10	10.5
Minimum	8.6	5.1	4.7	4.9	6.1	5.2	7.2	6.7
Mean	11.53	8.70	5.89	6.48	7.23	6.08	8.66	8.63
98th percentile	14.03	10.52	7.70	7.65	8.76	6.80	9.95	10.41
NAAQ Norms	80	80	80	80	80	80	80	80

Figure 3.18 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of SO_2 Measured from the eight Air Quality Monitoring Stations within 5 km Radius



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8
Maximum	28.1	25.6	19.4	20.7	22.8	21.4	24.6	25.9
Minimum	19.2	19.8	6.9	16.4	18.7	15.6	19.5	17.7
Mean	23.85	22.24	16.78	18.75	20.85	18.70	22.40	21.72
98th percentile	27.87	25.19	19.31	20.56	22.57	21.03	24.24	24.89
NAAQ Norms	80	80	80	80	80	80	80	80

Figure 3.19 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of NO_2 Measured from the eight Air Quality Monitoring Stations within 5 km Radius



	PM2.5	PM10	SO2	NO2
Maximum	26.15	45.84	9.61	23.56
Minimum	20.10	40.34	6.06	16.73
Mean	23.92	43.40	7.88	20.66
98th percentile	26.07	45.64	9.48	23.21
NAAQ Norms	60	100	80	80

Figure 3.20 Bar Chart Showing Maximum, Minimum, and the Average Concentrations of Pollutants in the Atmosphere within 5 km Radius

3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Eight (8) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.19 and spatial occurrence of the locations are shown in Figure 3.23.

Table 3.19 Noise Monitoring Locations

S. No.	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates
1	N1	Kanniyappan Lease	0.14	W	12°43'18.42"N, 79°51'35.82"E
2	N2	Sirudamur	0.37	S	12°43'06.83"N, 79°51'40.96"E
3	N3	Kattankulam	4.19	SW	12°41'53.33"N, 79°49'53.30"E
4	N4	Pazhaveri	2.90	NE	12°44'28.97"N, 79°52'56.40"E
5	N5	Madhur	1.87	NNW	12°44'19.05"N, 79°51'12.97"E
6	N6	Vayalakkavoor	4.38	NW	12°44'11.80"N, 79°49'23.81"E
7	N7	Edamichi	3.78	SSE	12°41'20.08"N, 79°52'26.90"E
8	N8	Thirumukkudal	3.85	N	12°45'29.69"N,79°51'37.19"E

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

Table 3.20 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level (dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (L_{eq} in dB(A))	
N1	Kanniyappan Lease	Industrial area	48.6	36.5	75	70
N2	Sirudamur	Residential area	45.6	35.6	55	45
N3	Kattankulam	Residential area	42.5	30.9	55	45
N4	Pazhaveri	Residential area	42.9	31.5	55	45
N5	Madhur	Residential area	40.2	29.8	55	45
N6	Vayalakkavoor	Residential area	39.8	30.8	55	45
N7	Edamichi	Residential area	38.0	27.6	55	45
N8	Thirumukkudal	Residential area	44.9	33.0	55	45

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

Ambient noise levels were measured at 8 locations around the proposed project area. Noise levels recorded in core zone during day time was 48.6 dB (A) Leq and during night time was 36.5 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 38 to 45.6dB (A) Leq and during night time from 27.6 to 35.6 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.21 and 3.22.

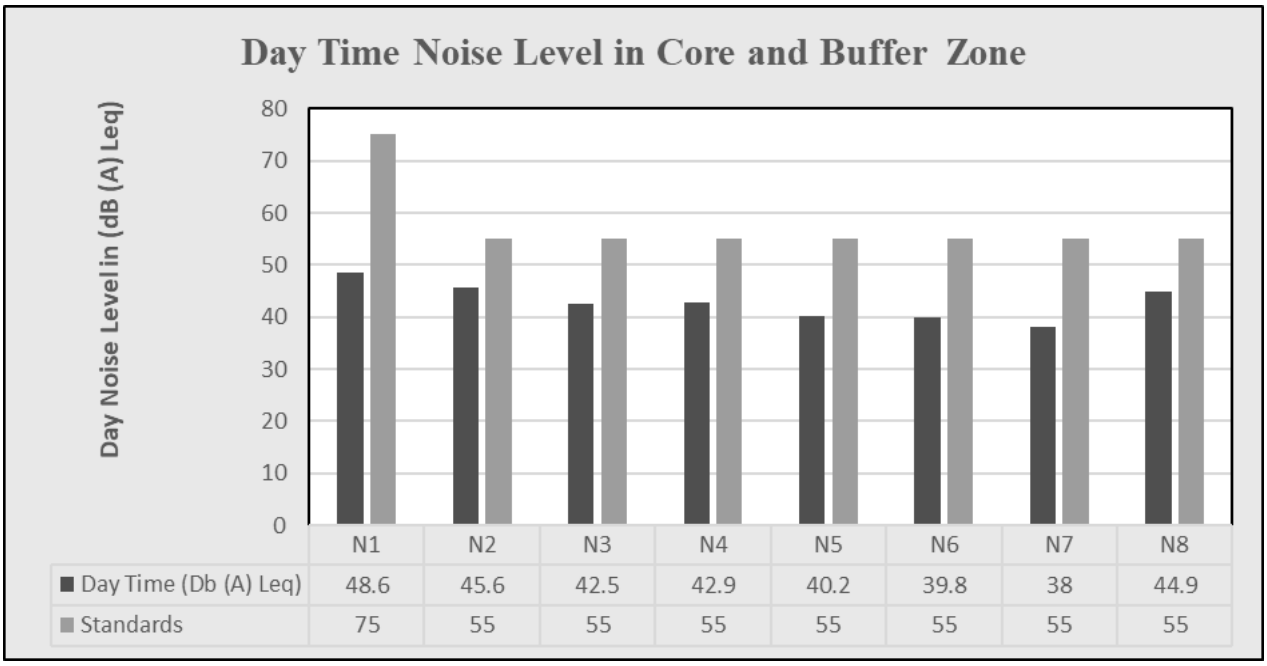


Figure 3.21 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

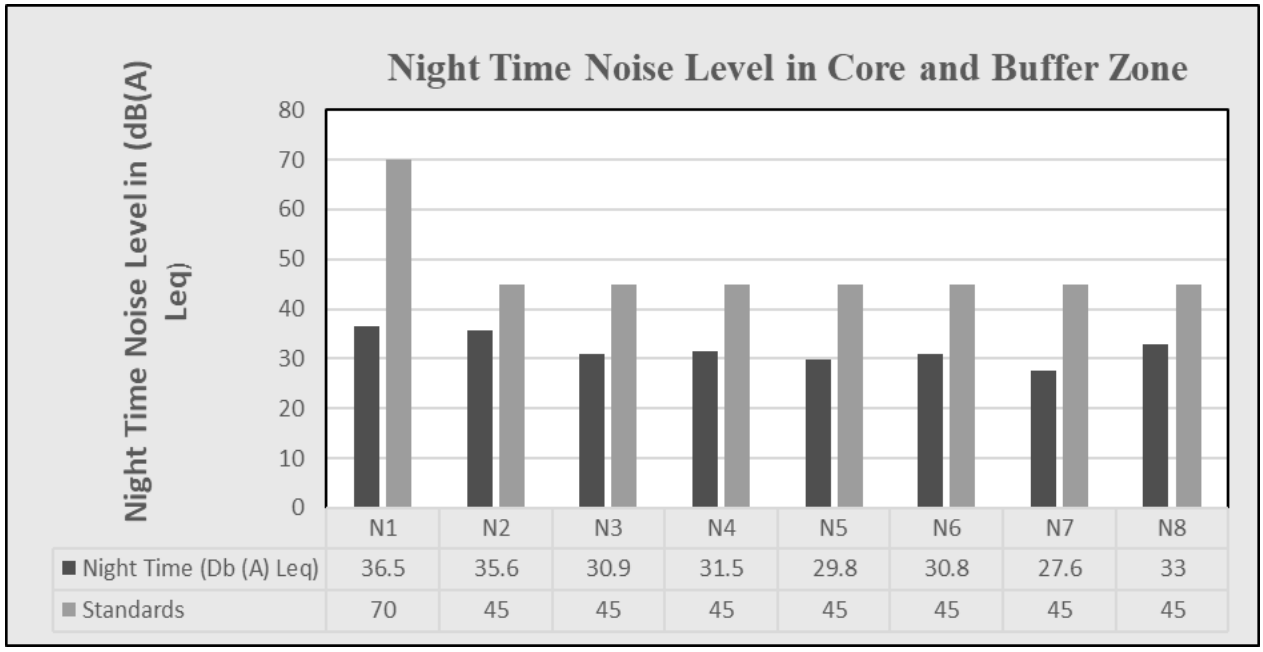


Figure 3.22 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

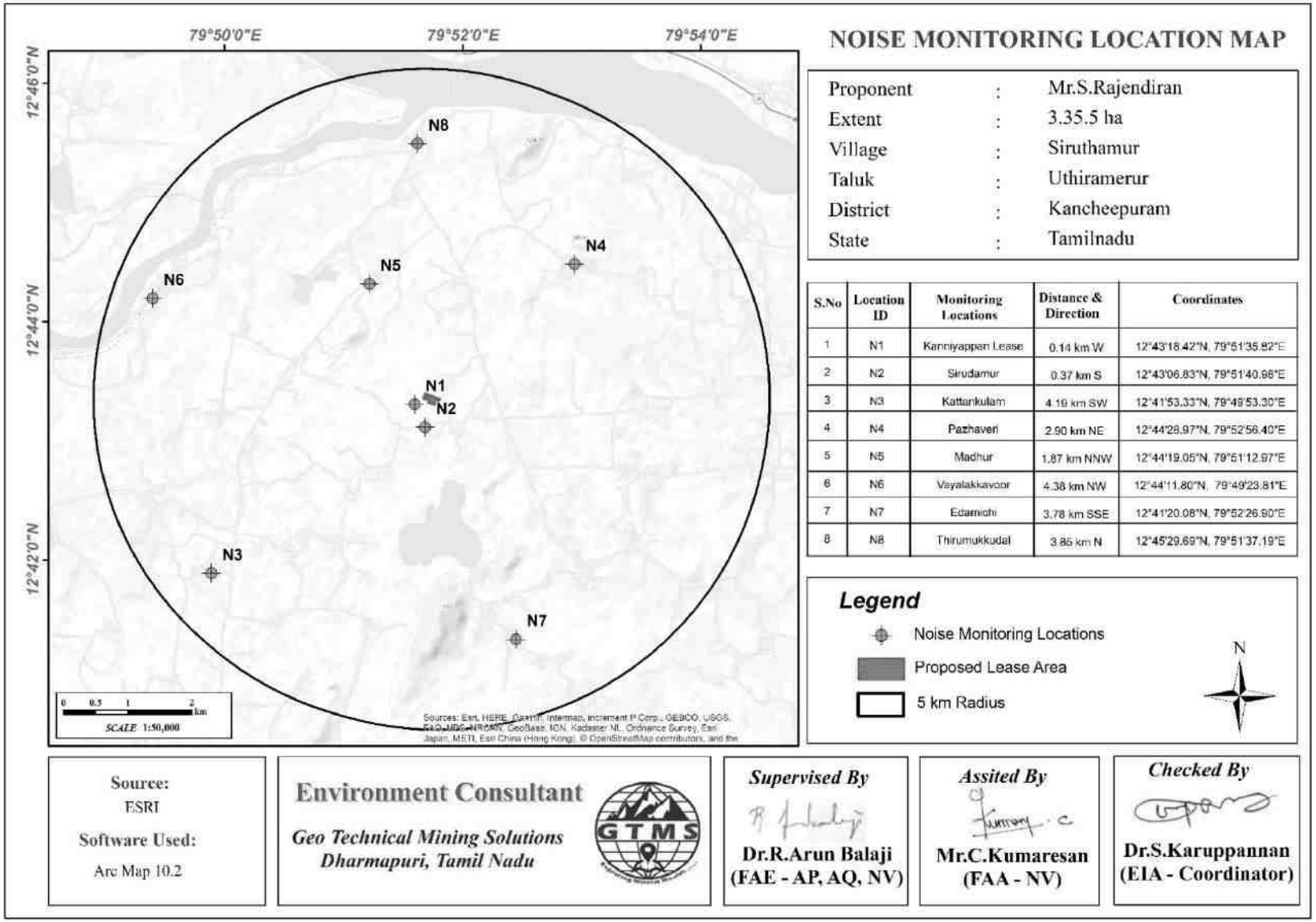


Figure 3.23 Map Showing Noise Level Monitoring Station Locations Around 5 km Radius from the Proposed Project Site

3.5 BIOLOGICAL ENVIRONMENT

An ecological survey was conducted to collect the baseline data regarding flora and fauna in the study area of 10 km radius. Data were 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.

Methodology

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

Figure 3.24 Quadrates Sampling Methods of Flora

Phyto-Sociological Studies

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

Table 3.21 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

Shannon – Wiener Index, Evenness and Richness

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant. The corresponding formulas are given in Table 3.22.

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

Description	Formula
Species diversity – Shannon – Wien Index	**$H= E [(p_i)*In(p_i)]$** 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 Marg ale	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

3.5.1 Flora

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

Flora in core zone

75% of Eucalyptus trees in the lease area are artificially planted, and 4 Phoenix sylvestris trees are in the quarry lease area.

Figure 3.25 Trees in Mine Lease area

3.5.2 Flora in 300m Radius

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.

3.5.3 Flora in 10 km Radius Buffer Zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area 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.

Table 3.23 Flora in 300 Meter Radius

S.No	Local Name	Scientific name	Family name	Total No. of species	Total of Quadrants with species	Total No. of Quadrants	Density	Frequency (%)	Abundance	Relative Density	Relative Frequency	IVI	IUCN Conservation Status
Trees													
1	Velikathan maram	*Prosopis juliflora*	Fabaceae	3	2	5	0.6	40.0	1.5	17.6	16.7	34.3	Not Listed
2	Aya Maram	*Holoptelea integrifolia*	Ulmaceae	2	1	5	0.4	20.0	2.0	11.8	8.3	20.1	Not Listed
3	Panai maram	*Borassus flabellifer*	Arecaceae	4	3	5	0.8	60.0	1.3	23.5	25.0	48.5	Not Listed
4	Vembu	*Azadirachta indica*	Meliaceae	5	4	5	1.0	80.0	1.3	29.4	33.3	62.7	Not Listed
5	Eshamaram	*Phoenix Reclinata*	Arecaceae	2	2	5	0.6	40.0	1.5	17.6	16.7	34.3	Not Listed
Shrubs													
6	Erukku	*Calotropis gigantea*	Apocynaceae	6	5	10	0.6	50.0	1.2	21.4	20.8	42.3	Not Listed

7	Avarai	*Senna auriculata*	Fabaceae	9	8	10	0.9	80.0	1.1	32.1	33.3	65.5	Not Listed
8	Sappathikalli	*Cereus pterogonus*	Cactaceae	8	7	10	0.8	70.0	1.1	28.6	29.2	57.7	Not Listed
9	Unichedi	*Lantana camara*	Verbenaceae	5	4	10	0.5	40.0	1.3	17.9	16.7	34.5	Not Listed
Herbs													
10	Thumbai	*Leucas aspera*	Lamiaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
11	Poolai poondu	*Aerva lanata*	Amaranthaceae	7	6	15	0.5	40.0	1.2	7.0	7.0	14.0	Not Listed
12	Korai	*Cyperus rotundus*	Cyperaceae	5	4	15	0.3	26.7	1.3	5.0	4.7	9.7	Not Listed
13	Nerunji	*Tribulus terrestris*	Zygophyllales	8	7	15	0.5	46.7	1.1	8.0	8.1	16.1	Not Listed
14	Nayuruv	*Achyranthes aspera*	Amaranthaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
15	Pink Blumea	*Blumea axillaris*	Asteraceae	5	4	15	0.3	26.7	1.3	5.0	4.7	9.7	Not Listed
16	Rail Pindu	*Croton bonplandianus*	Euphorbiaceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
17	Communist pacha	*Chromolaena odorata*	Asteraceae	7	6	15	0.5	40.0	1.2	7.0	7.0	14.0	Not Listed
18	veattukayapundu	*Tridax Procumbens*	Asteraceae	8	7	15	0.5	46.7	1.1	8.0	8.1	16.1	Not Listed
19	Mosukkattan	*Passiflora foetida*	Passifloraceae	6	5	15	0.4	33.3	1.2	6.0	5.8	11.8	Not Listed
20	Perandai	*Cissus quadrangularis*	Vitaceae	9	8	15	0.6	53.3	1.1	9.0	9.3	18.3	Not Listed
21	Arugam Pill	*Cynodon dactylon*	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 300 Meter Radius

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

Table 3.25 Species Richness in 300 Meter Radius

Details	H	H max	Evenness	Species Richness
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

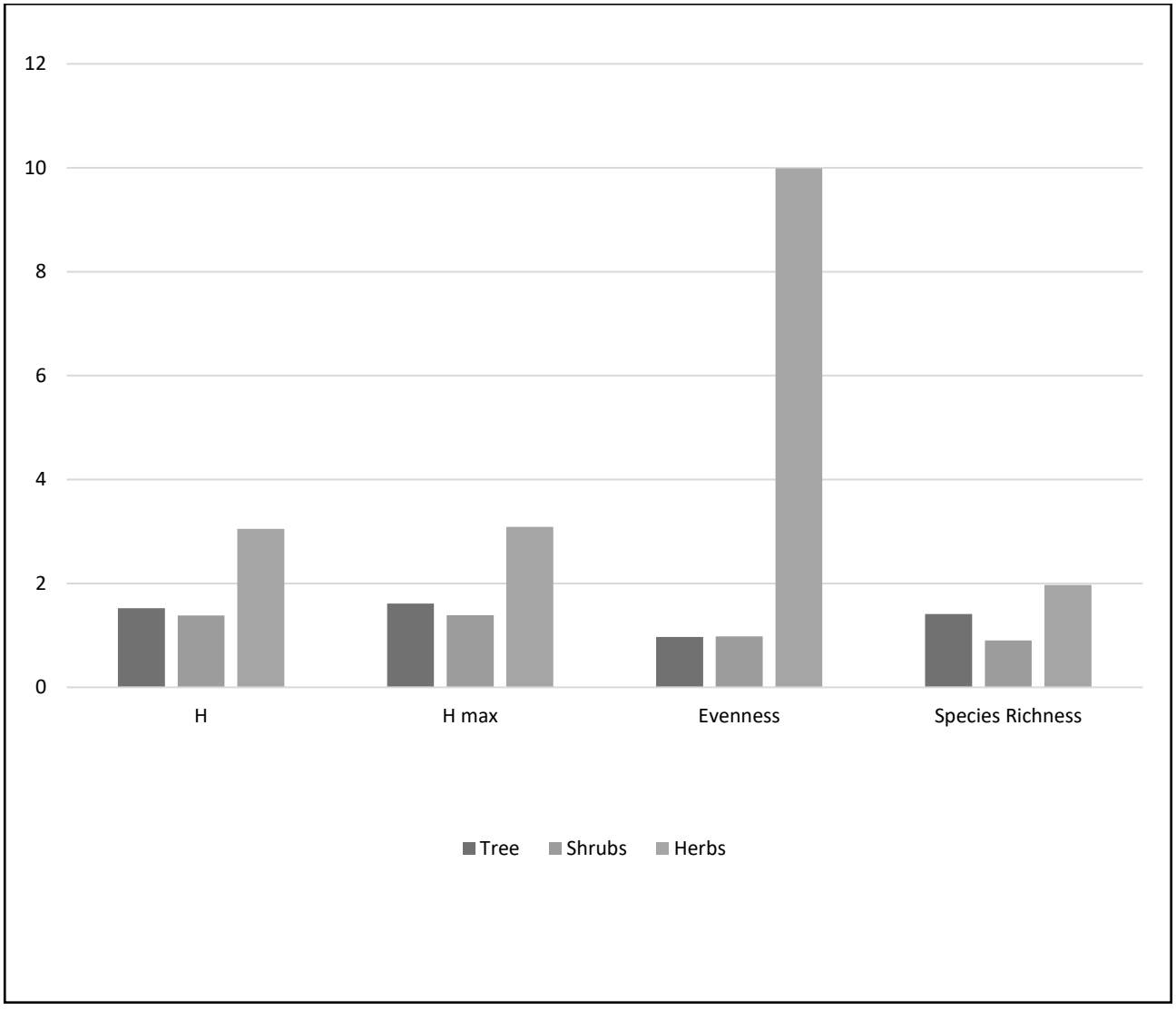


Figure 3.26 Floral diversity species Richness (Index) in 300 Meter Radius

Table 3.26 Flora in 10km Radius 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
TREES													
1	Vembu	*Azadirachta indica*	Meliaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
2	Pongam oiltree	*Pongamia pinnata*	Fabaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
3	Karuvelam	*Acacia nilotica*	Mimosaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
4	Thennai maram	*Cocos nucifera*	Arecaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
5	Puliyamaram	*Tamarindus indica*	Legumes	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
6	Athi	*Ficus recemosa*	Moraceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
7	Vazhaimaram	*Musa*	Musaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
8	Nettilinkam	*Polylathia longifolia*	Annonaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
9	Amanakku	*Ricinus communis*	Euphorbiaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
10	Perumungil	*Bambusa bambos*	Poaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed

11	Karungali	*Acacia sundra*	Legumes	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
12	Sapota	*Manilkara zapota*	Sapotaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
13	Eucalyptus	*Eucalyptus globules*	Myrtaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
14	Navalmaram	*Sygygium cumini*	Myrtaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
15	Ezhumuchaipalam	*Citrus lemon*	Rutaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
16	Alamaram	*Ficus benghalensis*	Moraceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
17	Panai maram	*Borassus flabellifer*	Arecaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
18	Manga	*Mangifera indica*	Anacardiaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
19	Thekku	*Tectona grandis*	Verbenaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
20	Nelli	*Emblica officinalis*	Phyllanthaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
21	Karuvelam maram	*Vachellia nilotica*	Fabaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
22	Vadanarayani	*Delonix elata*	Fabaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
23	Marudaani	*Lawsonia inermis*	Lythraceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed
24	Pappali maram	*Carica papaya L*	Caricaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
25	Nochi	*Vitex negundo*	Verbenaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
26	Vilvam	*Aegle marmelos*	Rutaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
27	Nuna maram	*Morinda citrifolia*	Rubiaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
28	Koyya	*Psidium guajava*	Myrtaceae	5	4	10	0.5	40.0	1.3	5.0	5.7	10.7	Not Listed

29	Seethapazham	*Annona reticulata*	Annonaceae	4	3	10	0.4	30.0	1.3	4.0	4.3	8.2	Not Listed
30	vagai	*albizia lebbeck*	Fabaceae	3	2	10	0.3	20.0	1.5	3.0	2.9	5.8	Not Listed
31	Savuku	*Casuarina equisetifolia*	Casuarinaceae	2	1	10	0.2	10.0	2.0	2.0	1.4	3.4	Not Listed
SHRUBS													
32	Avarai	*Senna auriculata*	Fabaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
33	Sundaika	*Solanum torvum*	Solanaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
34	Arali	*Nerium indicum*	Apocynaceae	9	8	15	0.6	53.3	1.1	7.5	7.8	15.3	Not Listed
35	Idlipoo	*xoracoc cinea*	Rubiaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
36	Neermulli	*Hydrophila auriculata*	Acanthaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
37	Icham	*Phoenix pusilla*	Arecaceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
38	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
39	Kattamanakku	*Jatropha curcas*	Euphorbiaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
40	Thuthi	*Abutilon indicum*	Meliaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
41	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae	8	7	15	0.5	46.7	1.1	6.7	6.9	13.5	Not Listed
42	Kundumani	*Abrus precatorius*	Fabaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
43	Erukku	*Calotropis gigantea*	Apocynaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed

44	Kealaka	*carissa carandas*	Apocynaceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
45	cirututti	Hibiscus vitifolius	Malvaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
46	rigida	Ehretia rigida	Boraginaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
47	Marul-umattai	Xanthium strumarium L	Asteraceae	5	4	15	0.3	26.7	1.3	4.2	3.9	8.1	Not Listed
48	Venmalar	Ligustrum vulgare	Oleaceae	6	5	15	0.4	33.3	1.2	5.0	4.9	9.9	Not Listed
49	Unishedi	Lantana camara	Verbenaceae	7	6	15	0.5	40.0	1.2	5.8	5.9	11.7	Not Listed
HERBS, CLIMBER, CREEPER & GRASSES													
50	Nayuruv	*Achyranthes aspera*	Amaranthaceae	6	5	25	0.2	0.1	0.1	0.4	87.5	7.9	Not Listed
51	Veetukaayapoondu	*Tridax procumbens*	Asteraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
52	Koraikkilangu	*Cyperus articulates*	Cyperaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
53	Kuppaimeni	*Acalypha indica*	Euphorbiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
54	Chempu	*Colocasia indica*	Araceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
55	Karisilanganni	*Eclipta prostata*	Asteraceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
56	Korai	*Cyperus rotundus*	Cyperaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
57	Kunnakora	*Cyperus compressus*	Cyperaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
58	Milagai	*Capsicum frutescens*	Solanaceae	7	8	25	0.3	32.0	0.9	2.5	3.3	5.7	Not Listed
59	Kanamvazha	*Commelina benghalensis*	Commelinaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed

60	Nai kadugu	*Celome viscosa*	Capparidaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
61	Thumbai	*Leucas aspera*	Lamiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
62	Parttiniyam	*Parthenium hysterophorus*	Asteraceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
63	Mukurattai	*Boerhavia diffusa*	Nyctaginaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
64	Thulasi	*Ocimum tenuiflorum*	Lamiaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
65	Manathakkali	*Solanumnigrum*	Solanaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
66	Kumipoondu	*Gomphrena celosioides*	Amaranthaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
67	Kattuthulasi	*Ocimum sanctum*	Lamiaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
68	Kattukolingi	*Tephrosia purpurea*	Fabaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
69	Wight, Contrib	*Blumea axillaris*	Asteraceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
70	Kovai	*Coccinia grandis*	Cucurbitaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
71	Perandai	*Cissus quadrangularis*	Vitaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
72	Mudakkotan	*Cardiospermum helicacabum*	Sapindaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
73	Karkakartum	*Clitoria ternatea*	Fabaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
74	Nannari	*Hemidesmus indicus*	Asclepiadaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
75	Kovakkai	*Coccinia grandis (L.)*	Cucurbitaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed

76	Malli	*Jasminum augustifolium*	Oleaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
78	Musumusukkai	*Mukia maderaspatana*	Cucurbitaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
79	Mosukkattan Poonaipiduku	*Passiflora foetida*	Passifloraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
80	Ptruukodi	*Helinus integrifolius*	Rhamnaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
81	Kattuppirantai	*Causonis trifolia*	Vitaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
82	Vallikeerai	*Ipomoea aquatica*	Convolvulaceae	5	4	25	0.2	16.0	1.3	1.8	1.6	3.4	Not Listed
83	Siru Puladi	*Desmodium triflorum*	Fabaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
84	Sithrapaalavi	*Euphorbia prostrata*	Euphorbiaceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
85	Korai	*Cyperus rotandus*	Poaceae	6	5	25	0.2	20.0	1.2	2.1	2.0	4.1	Not Listed
86	Malai Mookuthi Poondu	*Wedelia trilobata*	Asteraceae	7	6	25	0.3	24.0	1.2	2.5	2.4	4.9	Not Listed
87	Nellu	*Oryza sativa*	Poaceae	9	8	25	0.4	32.0	1.1	3.2	3.3	6.4	Not Listed
88	Pullu	*Eragrostis ferruginea*	Poaceae	10	9	25	0.4	36.0	1.1	3.5	3.7	7.2	Not Listed
89	Chevvarakupul	*Chloris barbata*	Amaranthaceae	8	7	25	0.3	28.0	1.1	2.8	2.8	5.7	Not Listed
90	Arugampul	*Cynodon dactylon*	Poaceae	11	10	25	0.4	40.0	1.1	3.9	4.1	7.9	Not Listed
91	kathalai	*Opuntia guatemalensis*	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 10 km Radius Buffer Zone

S.No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Tree						
1	Vembu	*Azadirachta indica*	2	0.02	-3.92	-0.08
2	Pongam oiltree	*Pongamia pinnata*	4	0.04	-3.23	-0.13
3	Karuvelam	*Acacia nilotica*	2	0.02	-3.92	-0.08
4	Thennai maram	*Cocos nucifera*	3	0.03	-3.52	-0.10
5	Puliyamaram	*Tamarindus indica*	2	0.02	-3.92	-0.08
6	Athi	*Ficus recemosa*	3	0.03	-3.52	-0.10
7	Vazhaimaram	*Musa*	5	0.05	-3.01	-0.15
8	Nettilinkam	*Polylathia longifolia*	3	0.03	-3.52	-0.10
9	Amanakku	*Ricinus communis*	2	0.02	-3.92	-0.08
10	Perumungil	*Bambusa bambos*	4	0.04	-3.23	-0.13
11	Karungali	*Acacia sundra*	2	0.02	-3.92	-0.08
12	Sapota	*Manilkara zapota*	4	0.04	-3.23	-0.13
13	Eucalyptus	*Eucalyptus globules*	2	0.02	-3.92	-0.08
14	Navalmaram	*Sygygium cumini*	3	0.03	-3.52	-0.10
15	Ezhumuchaipalam	*Citrus lemon*	5	0.05	-3.01	-0.15
16	Alamaram	*Ficus benghalensis*	2	0.02	-3.92	-0.08
17	Panai maram	*Borassus flabellifer*	3	0.03	-3.52	-0.10
18	Manga	*Mangifera indica*	4	0.04	-3.23	-0.13
19	Thekku	*Tectona grandis*	2	0.02	-3.92	-0.08
20	Nelli	*Emblica officinalis*	5	0.05	-3.01	-0.15
21	Karuvelam maram	*Vachellia nilotica*	4	0.04	-3.23	-0.13
22	Vadanarayani	*Delonix elata*	3	0.03	-3.52	-0.10
23	Marudaani	*Lawsonia inermis*	5	0.05	-3.01	-0.15
24	Pappali maram	*Carica papaya L*	4	0.04	-3.23	-0.13
25	Nochi	*Vitex negundo*	3	0.03	-3.52	-0.10
26	Vilvam	*Aegle marmelos*	2	0.02	-3.92	-0.08

27	Nuna maram	*Morinda citrifolia*	4	0.04	-3.23	-0.13
28	Koyya	*Psidium guajava*	5	0.05	-3.01	-0.15
29	Seethapazham	*Annona reticulata*	4	0.04	-3.23	-0.13
30	vagai	*albizia lebbeck*	3	0.03	-3.52	-0.10
31	Savuku	*Casuarina equisetifolia*	2	0.02	-3.92	-0.08
H (Shannon Diversity Index) =3.38						
Shrubs						
32	Avarai	*Senna auriculata*	7	0.06	-2.84	-0.17
33	Sundaika	*Solanum torvum*	8	0.07	-2.71	-0.18
34	Arali	*Nerium indicum*	9	0.08	-2.59	-0.19
35	Idlipoo	*xoracoc cinea*	6	0.05	-3.00	-0.15
36	Neermulli	*Hydrophila auriculata*	7	0.06	-2.84	-0.17
37	Icham	*Phoenix pusilla*	5	0.04	-3.18	-0.13
38	Chaturakalli	*Euphorbia antiquorum*	8	0.07	-2.71	-0.18
39	Kattamanakku	*Jatropha curcas*	6	0.05	-3.00	-0.15
40	Thuthi	*Abutilon indicum*	7	0.06	-2.84	-0.17
41	Chemparuthi	*Hibiscu rosa-sinensis*	8	0.07	-2.71	-0.18
42	Kundumani	*Abrus precatorius*	6	0.05	-3.00	-0.15
43	Erukku	*Calotropis gigantea*	7	0.06	-2.84	-0.17
44	Kealaka	*carissa carandas*	5	0.04	-3.18	-0.13
45	cirututti	Hibiscus vitifolius	6	0.05	-3.00	-0.15
46	rigida	Ehretia rigida	7	0.06	-2.84	-0.17
47	Marul-umattai	Xanthium strumarium L	5	0.04	-3.18	-0.13
48	Venmalar	Ligustrum vulgare	6	0.05	-3.00	-0.15
49	Unishedi	Lantana camara	7	0.06	-2.84	-0.17
H (Shannon Diversity Index) =2.88						

HERBS, CLIMBER, CREEPER & GRASSES						
50	Nayuruv	*Achyranthes aspera*	6	0.02	-3.86	-0.08
51	Veetukaayapoondu	*Tridax procumbens*	7	0.02	-3.71	-0.09
52	Koraikkilangu	*Cyperus articulates*	5	0.02	-4.04	-0.07
53	Kuppaimeni	*Acalypha indica*	7	0.02	-3.71	-0.09
54	Chempu	*Colocasia indica*	6	0.02	-3.86	-0.08
55	Karisilanganni	*Eclipta prostata*	8	0.03	-3.57	-0.10
56	Korai	*Cyperus rotundus*	6	0.02	-3.86	-0.08
57	Kunnakora	*Cyperus compressus*	8	0.03	-3.57	-0.10
58	Milagai	*Capsicum frutescens*	7	0.02	-3.71	-0.09
59	Kanamvazha	*Commelina benghalensis*	6	0.02	-3.86	-0.08
60	Nai kadugu	*Celome viscosa*	5	0.02	-4.04	-0.07
61	Thumbai	*Leucas aspera*	7	0.02	-3.71	-0.09
62	Parttiniyam	*Parthenium hysterophorus*	6	0.02	-3.86	-0.08
63	Mukurattai	*Boerhavia diffusa*	5	0.02	-4.04	-0.07
64	Thulasi	*Ocimum tenuiflorum*	9	0.03	-3.46	-0.11
65	Manathakkali	*Solanumnigrum*	8	0.03	-3.57	-0.10
66	Kumipoondu	*Gomphrena celosioides*	6	0.02	-3.86	-0.08
67	Kattuthulasi	*Ocimum sanctum*	9	0.03	-3.46	-0.11
68	Kattukolingi	*Tephrosia purpurea*	7	0.02	-3.71	-0.09
69	Wight, Contrib	*Blumea axillaris*	6	0.02	-3.86	-0.08
70	Kovai	*Coccinia grandis*	5	0.02	-4.04	-0.07
71	Perandai	*Cissus quadrangularis*	9	0.03	-3.46	-0.11
72	Mudakkotan	*Cardiospermum helicacabum*	6	0.02	-3.86	-0.08
73	Karkakartum	*Clitoria ternatea*	7	0.02	-3.71	-0.09

74	Nannari	*Hemidesmus indicus*	5	0.02	-4.04	-0.07
75	Kovakkai	*Coccinia grandis (L.)*	6	0.02	-3.86	-0.08
76	Malli	*Jasminum augustifolium*	7	0.02	-3.71	-0.09
78	Musumusukkai	*Mukia maderaspatana*	8	0.03	-3.57	-0.10
79	Mosukkattan Poonaipiduku	*Passiflora foetida*	7	0.02	-3.71	-0.09
80	Ptruukodi	*Helinus integrifolius*	6	0.02	-3.86	-0.08
81	Kattuppirantai	*Causonis trifolia*	7	0.02	-3.71	-0.09
82	Vallikeerai	*Ipomoea aquatica*	5	0.02	-4.04	-0.07
83	Siru Puladi	*Desmodium triflorum*	6	0.02	-3.86	-0.08
84	Sithrapaalavi	*Euphorbia prostrata*	7	0.02	-3.71	-0.09
85	Korai	*Cyperus rotandus*	6	0.02	-3.86	-0.08
86	Mookuthi Poondu	*Wedelia trilobata*	7	0.02	-3.71	-0.09
87	Nellu	*Oryza sativa*	9	0.03	-3.46	-0.11
88	Pullu	*Eragrostis ferruginea*	10	0.04	-3.35	-0.12
89	Chevvarakupul	*Chloris barbata*	8	0.03	-3.57	-0.10
90	Arugampul	*Cynodon dactylon*	11	0.04	-3.25	-0.13
91	kathalai	*Opuntia guatemalensis*	9	0.03	-3.46	-0.11
H (Shannon Diversity Index) =3.69						

Table 3.28 Species Richness (Index) in 10 km Radius 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

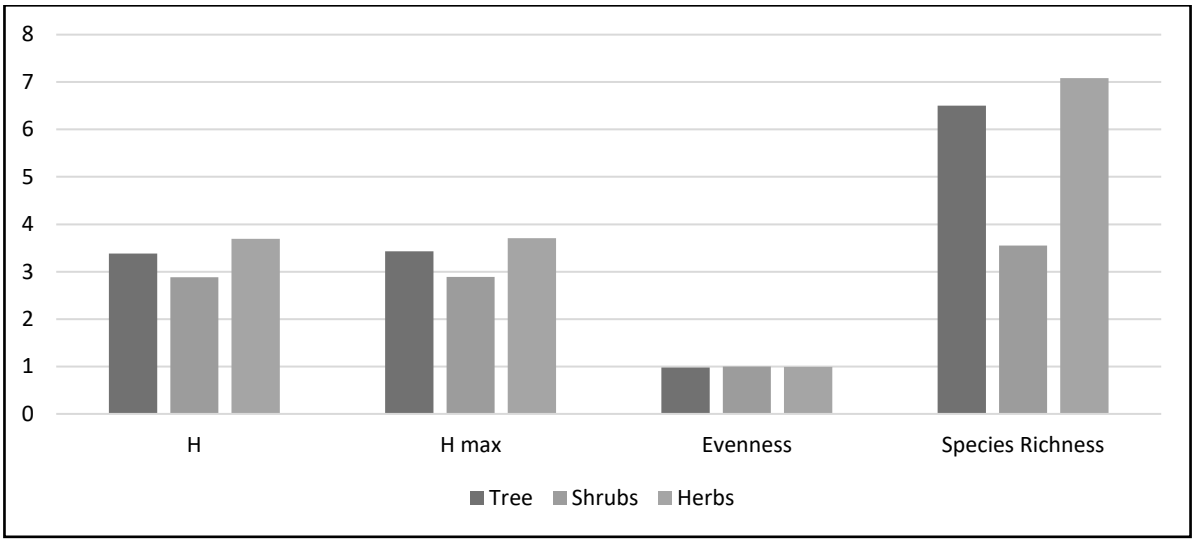


Figure 3.27 Floral diversity species Richness (Index) in 10km Radius Buffer Zone

Borassus flabellifer

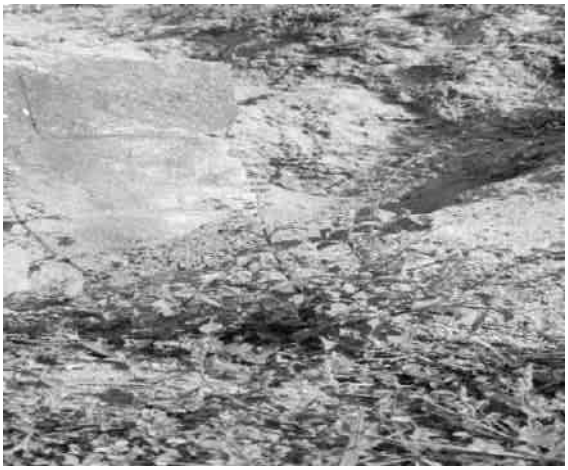
Helinus integrifolius

Cissus quadrangularis

Leucas aspera

Ipomoea carnea

carissa carandas



Ocimum tenuiflorum

Tephrosia purpurea

Phoenix sylvestris

croton bonplandianus

Chloris barbata

Blumea axillaris

Ruellia nudiflora

Ficus hispida

Andrographis echioides

Ehretia rigida

Prosopis juliflora

Hibiscus vitifolius L

Xanthium strumarium L

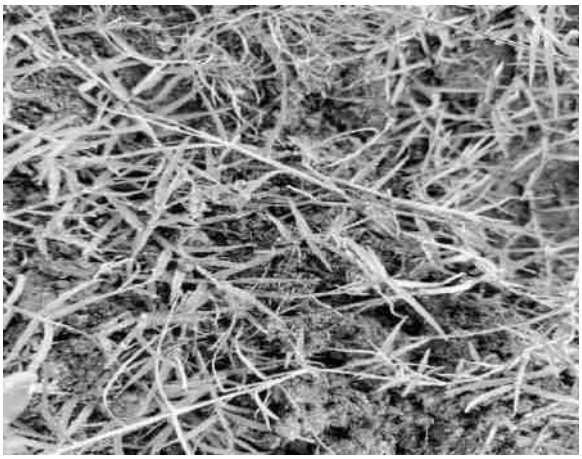
Jatropha gossypiifolia L

Panicum maximum

Coccinia grandis (L.)

Lantana camara

Parthenium hysterophorus



Cynodondactylon (L.)

Opuntia guatemalensis

Azadirachta indica

Tectona grandis

Eucalyptus obliqua

Casuarina equisetifolia

Figure 3.28 Flora in Core and buffer Area

3.5.4 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	*Eichornia crassipe*	Water hyacinth	Agayatamarai	NA
2	*Aponogetonnatans*	Floating lace plant	Kottikizhnagu	NA
3	*Nymphaea nouchali*	Blue water lily	Nellambal	LC
4	*Carex cruciata*	Cross Grass	Koraipullu	NA
5	*Cynodon dactylon*	Scutch grass	Arugampul	LC
6	*Cyperus exaltatus*	Tall Flat Sedge	Koraikizhangu	LC

*LC- Least Concern, NA-Not yet assessed

3.5.5 Forest Vegetation

The mine lease area is exhibiting a slightly elevated terrain. Kavanippakkam Reserve Forest has located about 0.83 km East side on the Edamichi RF 2.45 km on the South side and Marudam RF 7.35 km 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, Albiziz amara, Buchanania lanzan, and Dodonaea viscosa*. Reserve Forest Details mentioned in Figure 3.29. There are no critically endangered, endangered, vulnerable and endemic species were observed.

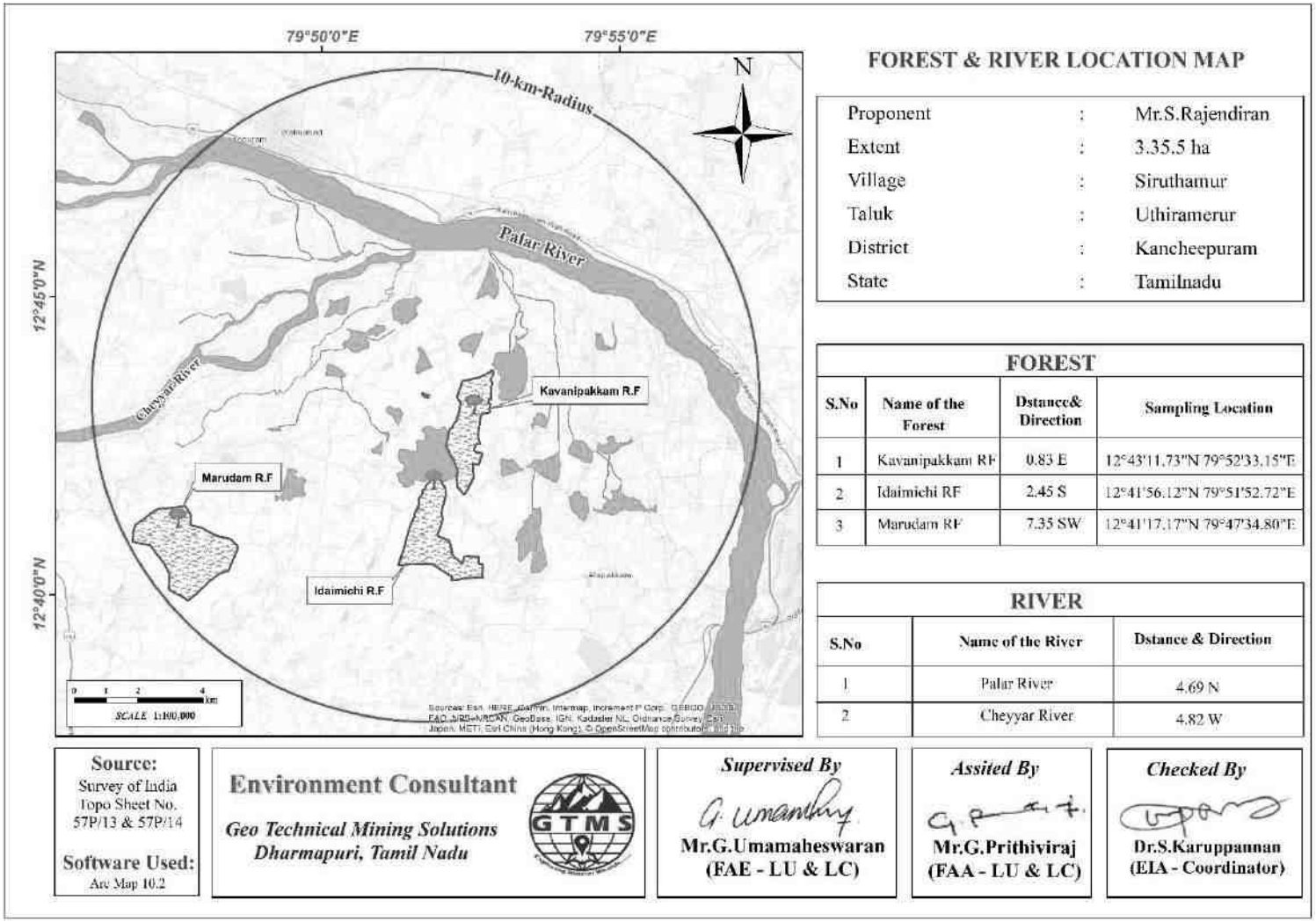


Figure 3.29 Toposheet showing forest and river locations around 10km radius from the proposed project site

3.5.6 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.

3.5.6.1 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) 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.

3.5.6.2 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	*Sympetrum fonscolombii*	NL	LC
2	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
3	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
4	Stick insect	Lonchodidae	*carausius morosus*	NL	LC
5	Mottled emigrant	Peridae	*Catopsilia pyranthe*	NL	LC
6	Acraea violae	Nymphalidae	*Acraea violae*	NL	LC
REPTILES					
1	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC

2	Common house gecko	Gekkonidae	*Hemidactylus frenatus*	NL	LC
3	Fan-Throated Lizard	Agamidae	*Sitanaponticeriana*	NL	LC
MAMMALS					
1	Indian Field Mouse	*Muridae*	*Mus booduga*	Schedule IV	NL
AVES					
1	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
2	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
3	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
4	House crow	Corvidae	*Corvus splendens*	NL	LC
5	Koel	Cucalidae	*Eudynamys scolopaceus*	Schedule IV	LC
6	Grey drongo	Dicruridae	*Dicrurus leucophaeus*	Schedule IV	LC

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

3.5.6.3 Fauna in Buffer Zone

Taxonomically a total of 36 species belonging to 27 families have been recorded from the buffer mining lease area. Based on habitat classification the majority of species were Birds 16 followed by10 Insects, 4 Reptiles, 3 Mammals and 3 Amphibians. There are 2 Schedule II species and 21 are under schedule IV according to Indian wild life Act 1972. 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	*Danaus chrysippus*	Schedule IV	LC
2	Milkweed butterfly	Nymphalidae	*Danainae*	NL	LC
3	Blue tiger	Nymphalidae	*Tirumala limniace*	Schedule IV	LC
4	Mottled emigrant	Peridae	*Catopsilia pyranthe*	NL	LC
5	Striped tiger	Nymphalidae	*Danaus plexippus*	Schedule IV	LC
6	Ant	Formicidae	*Camponotus Vicinus*	NL	NL
7	Lesser grass blue	Lycaenidae	*Danaus plexippus*	Schedule IV	LC
8	Praying mantis	Mantidae	*mantis religiosa*	NL	NL
9	Grasshopper	Acrididae	*Hieroglyphus sp*	NL	LC
10	Common Tiger	Nymphalidae	*Danaus genutia*	Schedule IV	LC
REPTILES					
1	Chameleon	Chamaeleonidae	*Chameleon zeylanicus*	Sch II (Part II)	LC
2	Garden lizard	Agamidae	*Calotes versicolor*	NL	LC
3	Green Vine snake	Colubridae	*Ahaetulla nasuta*	Schedule IV	LC
4	Rat snake	Colubridae	*Ptyas mucosa*	Sch II (Part II)	LC
MAMMALS					
1	Indian palm squirrel	Sciuridae	*Funambulus palmarum*	Schedule IV	LC
2	Indian Field Mouse	Muridae	*Mus booduga*	Schedule IV	LC
3	Home mouse	Muridae	*Mus musculus tytleri*	NL	LC
AVES					
1	House crow	Corvidae	*Corvussplendens*	NL	LC
2	Cattle egret	Ardeidae	*Bubulcus ibis*	NL	LC
3	Black drongo	Dicruridae	*Dicrurus macrocercus*	Schedule IV	LC
4	Red-vented Bulbul	Pycnonotidae	*Pycnonotuscafer*	Schedule IV	LC
5	Indian pond heron	Ardeidae	*Ardeola grayii*	Schedule IV	LC
6	Asian green bee-eater	Meropidae	*Meropsorientalis*	NL	LC
7	Small Sunbird	Nectariniidae	*Nectarinia asiatica*	Schedule IV	LC

8	Common myna	Sturnidae	*Acridotheres tristis*	NL	LC
9	Blue Rock Pigeon	Columbidae	*Columba livia*	Schedule IV	LC
10	Common Coot	Rallidae	*Fulica atra*	Schedule IV	LC
11	Small Sunbird	Nectariniidae	*Nectarinia asiatica*	Schedule IV	LC
12	Shikra	Accipitridae	*Accipiter badius*	NL	LC
13	Common quail	Phasianidae	*Coturnix coturnix*	Schedule IV	LC
14	Small blue Kingfisher	Alcedinidae	*Alcedo atthis*	Schedule IV	LC
15	Rose-ringed parkeet	Psittaculidae	*Psittacula krameri*	NL	LC
16	Grey Francolin	Phasianidae	*Francolinus pondicerianus*	Schedule IV	LC
AMPHIBIANS					
1	Indian Burrowing frog	Dicroglossidae	*Sphaerotheca breviceps*	Schedule IV	LC
2	Green Pond Frog	Ranidae	*Rana hexadactyla*	Schedule IV	LC
3	Tiger Frog	Chordata	*Hoplobatrachus tigerinus (Rana tigerina)*	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*

3.5.6.4 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.,

3.5.7 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 is a measure of an individual's or family's or group of people's economic and social position based on education, income, health, and occupation. Socio-economic most important determinant of livelihoods as levels of knowledge, skill and income conditions which mean for their living. People from one income group to another consumption power is also differ among income groups of population 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 main objectives of the study are as follows:

- To study the demographic conditions by level of income of sample population in the study area.
- To analyze the level of education among different income groups of population.
- To investigate the housing situation by level of income of the sample population in the study unit.

3.6.2 Socio-Economic Status of Study Area

The study area covers 36 villages. Around 5km radius. As **Sirudamur** is the village in which the proposed project site is located, the summary of population facts for the village is exclusively provided in Table 3.33 and for other 35 villages in Tables 3.34-3.36.

Table 3.33 Sirudamur Village Population Facts

Sirudamur Village	
Number of Households	379
Population	1543
Male Population	790
Female Population	753
Children Population	161
Sex-ratio	953
Literacy	56.73%
Male Literacy	67.28%
Female Literacy	45.80%
Scheduled Tribes (ST) %	73
Scheduled Caste (SC) %	517
Total Workers	969
Main Worker	166
Marginal Worker	803

Source: https://www.census2011.co.in/data/village/630125-sirudamur-tamil-nadu.html

Table 3.34 Population and Literacy Data of Study Area

Village	No of Households	Total Population Person	Total Population Male	Total Population Female	Literates Population Person	Literates Population Male	Literates Population Female	Illiterate Persons	Illiterate Male	Illiterate Female
Angambakkam	450	1907	963	944	1167	674	493	740	289	451
Thammanur	526	2116	1088	1028	1231	712	519	885	376	509
Kambarajapuram	380	1527	766	761	944	553	391	583	213	370
Elayanarvelur	299	1079	544	535	643	352	291	436	192	244
Chithaathur	88	322	159	163	161	96	65	161	63	98
Palayaseevaram	1411	5634	2792	2842	3563	2013	1550	2071	779	1292
Vayalakkavoor	341	1429	752	677	890	526	364	539	226	313
Pullampakkam	209	872	424	448	494	269	225	378	155	223
Thirumukkudal	406	1673	850	823	1216	672	544	457	178	279
Pazhaveri	191	727	362	365	477	271	206	250	91	159
Pinayur	255	1068	520	548	759	423	336	309	97	212
Seethananjeri	110	494	247	247	374	204	170	120	43	77
Kurumanjeri	164	666	330	336	451	248	203	215	82	133
Arumbuliyur	402	1618	777	841	1025	546	479	593	231	362

Chitalapakkam	153	592	288	304	344	204	140	248	84	164
Sirumailur	247	1029	510	519	638	364	274	391	146	245
Malayankulam	630	2390	1218	1172	1438	828	610	952	390	562
Thandarai	326	1305	644	661	801	454	347	504	190	314
Kattankulam	258	1028	514	514	606	343	263	422	171	251
Padoor	184	713	365	348	463	262	201	250	103	147
Anambakkam	408	1665	833	832	1150	649	501	515	184	331
Neerkundram	77	314	153	161	225	123	102	89	30	59
Kavanipakkam	190	780	382	398	508	272	236	272	110	162
Karumbakkam	211	850	438	412	518	289	229	332	149	183
Mulaginimeni	90	381	201	180	241	137	104	140	64	76
Mambakkam	156	627	311	316	385	209	176	242	102	140
Peranakkavur	235	926	478	448	586	332	254	340	146	194
Porpandal	253	941	491	450	640	361	279	301	130	171
Edamichi	349	1414	701	713	1021	539	482	393	162	231
Nerkundram	162	624	302	322	341	187	154	283	115	168
Chinnalambadi	110	434	227	207	274	164	110	160	63	97
Mambudur	78	296	164	132	204	119	85	92	45	47
Gindangarai	104	391	192	199	259	139	120	132	53	79
Sithanakavoor	182	789	391	398	472	263	209	317	128	189
Sirupinayur	541	2053	1028	1025	1269	702	567	784	326	458

Table 3.35 Details on Educational Facilities, Water, and Drainage & Health Facilities

Village	Private Primary School (Numbers)	Govt Vocational Training School/ITI (Numbers)	Primary Health Centre (Numbers)	Tap Water Untreated	River/Canal	Is the Area Covered under Total Sanitation Campaign (TSC)?	Telephone (landlines)	Public Bus Service	Gravel (kutcha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres-Anganwadi Centre	Community Centre with/without TV	Power Supply For Domestic Use
Palayaseevaram	1	0	0	1	2	2	1	1	1	1	2	1	1	1	1
Angambakkam	0	0	0	1	2	2	1	2	1	2	2	1	1	1	1
Thammanur	0	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Kambarajapuram	0	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Elayanarvelur	1	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Chithaathur	0	0	0	2	2	2	2	1	1	2	2	1	1	1	1
Vayalakkavoor	0	0	0	1	2	1	1	1	1	2	1	1	1	2	1
Pullampakkam	0	0	0	1	2	1	1	1	1	2	2	1	1	1	1
Thirumukkudal	0	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Pazhaveri	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Seethananjeri	0	0	0	2	2	2	1	1	1	2	2	1	2	1	1
Kurumanjeri	0	0	0	2	2	2	1	1	1	2	2	1	1	2	1

Arumbuliyur	0	0	0	1	2	2	1	1	1	1	1	1	1	2	1
Sirudamur	1	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Chitalapakkam	0	0	0	2	2	2	2	1	1	2	2	1	1	1	1
Sirumailur	0	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Malayankulam	1	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Thandarai	0	0	0	1	2	2	2	1	1	2	2	1	1	1	1
Kattankulam	0	0	0	2	2	2	1	1	1	2	2	1	1	2	1
Padoor	0	0	1	1	2	2	1	1	1	2	1	1	1	2	1
Anambakkam	1	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Neerkundram	0	0	0	1	2	2	2	1	1	2	2	1	1	2	1
Kavanipakkam	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Karumbakkam	1	0	0	2	2	2	1	2	1	2	2	1	1	1	1
Mulaginimeni	0	0	0	1	2	2	2	1	1	2	2	1	2	2	1
Mambakkam	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Peranakkavur	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Porpandal	1	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Edamichi	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1
Nerkundram	0	0	0	1	2	2	1	1	1	2	2	1	1	2	1
Chinnalambadi	0	0	0	1	2	2	2	1	1	2	2	1	1	1	1
Mambudur	1	0	0	1	2	2	1	2	1	2	2	1	2	1	1
Gindangarai	0	0	0	1	2	1	1	1	1	2	2	1	1	2	1
Sithanakavoor	0	0	0	2	2	2	1	1	1	2	2	1	1	1	1
Sirupinayur	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1

Table 3.36 Workers' Profile of Study Area

Village	Total Worker Population Person	Total Worker Population Male	Total Worker Population Female	Main Working Population Person	Main Working Population Male	Main Working Population Female	Main Cultivator Population Person	Main Agricultural Labourers Population Person	Main Other Workers Population Person	Non Working Population Person
Angambakkam	1004	549	455	831	473	358	183	409	233	903
Thammanur	1082	623	459	883	538	345	402	140	340	1034
Kambarajapuram	818	460	358	731	430	301	57	407	259	709
Elayanarvelur	551	349	202	475	336	139	51	202	210	528
Chithaathur	186	107	79	181	105	76	0	130	49	136
Palayaseevaram	2158	1587	571	1753	1360	393	141	273	1318	3476
Vayalakkavoor	663	421	242	625	395	230	140	293	178	766
Pullampakkam	425	246	179	412	238	174	43	250	118	447
Thirumukkudal	540	447	93	527	437	90	25	340	161	1133
Pazhaveri	264	217	47	260	217	43	70	50	139	463
Pinayur	568	342	226	327	266	61	27	121	177	500
Seethananjeri	200	145	55	107	93	14	13	0	93	294
Kurumanjeri	369	201	168	330	183	147	63	156	98	297
Arumbuliyur	657	475	182	583	428	155	95	148	337	961

Sirudamur	1520	936	584	1316	842	474	402	581	319	1577
Chitalapakkam	378	190	188	144	123	21	79	13	48	214
Sirumailur	603	335	268	365	287	78	45	250	60	426
Malayankulam	1152	719	433	1088	692	396	281	637	170	1238
Thandarai	683	409	274	493	325	168	226	96	169	622
Kattankulam	491	317	174	445	292	153	91	301	48	537
Padoor	384	212	172	361	204	157	59	197	104	329
Anambakkam	912	519	393	830	502	328	172	291	352	753
Neerkundram	139	96	43	62	50	12	5	0	47	175
Kavanipakkam	364	239	125	286	213	73	25	122	138	416
Karumbakkam	441	253	188	427	249	178	32	269	125	409
Mulaginimeni	185	116	69	47	42	5	13	3	31	196
Mambakkam	294	173	121	237	147	90	4	153	80	333
Peranakkavur	536	290	246	533	289	244	175	261	93	390
Porpandal	483	294	189	323	220	103	137	61	113	458
Edamichi	637	413	224	490	393	97	350	43	90	777
Nerkundram	337	161	176	213	106	107	202	9	2	287
Chinnalambadi	129	110	19	108	94	14	29	7	62	305
Mambudur	133	92	41	54	41	13	23	2	22	163
Gindangarai	231	119	112	39	27	12	26	0	13	160
Sithanakavoor	345	203	142	339	198	141	16	229	94	444
Sirupinayur	1058	606	452	1036	601	435	195	629	203	995

3.6.3 Recommendation and Suggestion

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

3.6.4 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 Red Soil is proposed to be transported mainly through Village Road and Walajabad – Maduranthakam (SH-789) as shown in Table 3.37 and in Figure 3.28. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Table 3.37 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Road	0.79 Km-E	Village Road
TS2	Walajabad – Maduranthakam (SH-789)	2.59 Km-N	Walajabad – Maduranthakam (SH-789)

Source: On-site monitoring by GTMS FAE & TM

Table 3.38 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	31	93	38	38	65	33	164
TS2	92	276	51	51	94	47	374

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 3.39 Rough stone and Gravel Transportation Requirement

Transportation of Rough stone and Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	90	270

Source: Approved Mining Plan

Table 3.40 Summary of Traffic Volume

Route	Existing traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960guidelines
Village Road	164	270	434	1200
Walajabad – Maduranthakam (SH-789)	374	270	644	1200

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

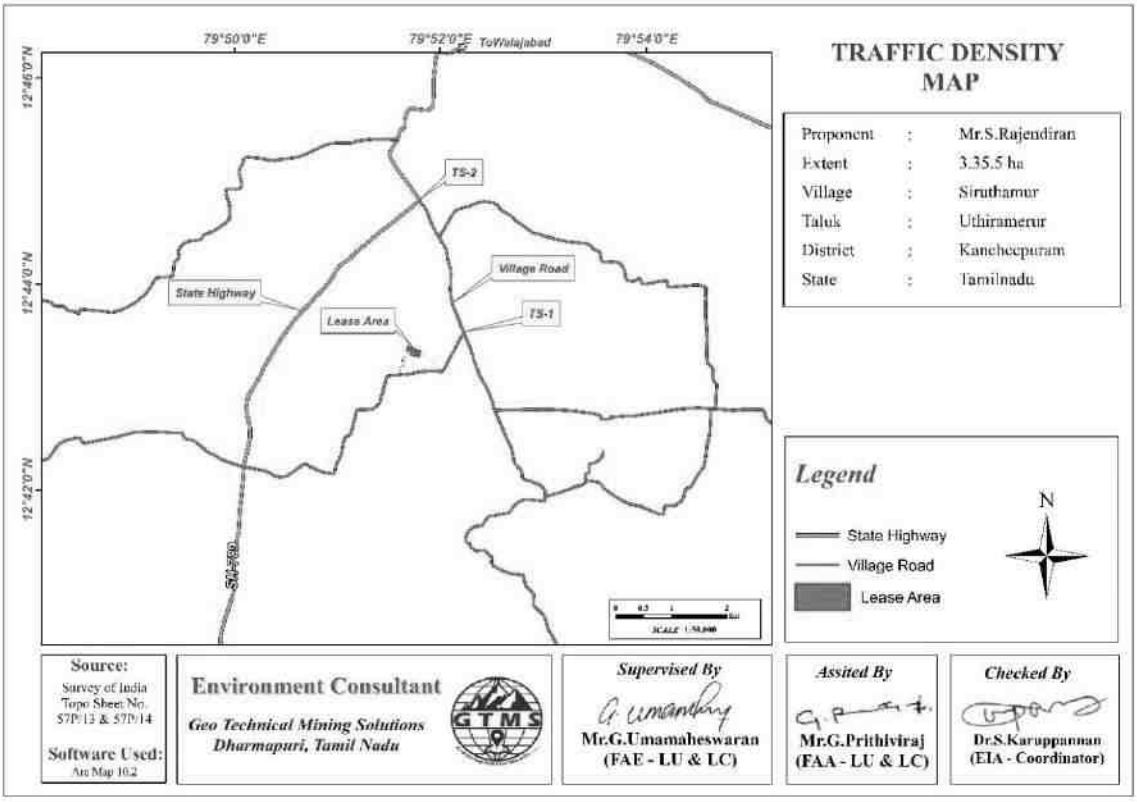


Figure 3.30 Traffic Density Map

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

3.8 SITE SPECIFIC FEATURES

There are no Wildlife Sanctuaries, National Park within the project area. There is no Protected area is found within 10 km radius from the proposed project area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Table 3.41.

Table 3.41 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	None	Nil within 10 km radius
		None	Nil within 10 km radius
2	Reserve Forest	Kavanippakkam R. F	0.83 km E
		Idimichi	2.45 km S
		Marudam RF	7.35 km SW
3	Lakes/Reservoirs/	Pinayur Near Lake	0.72 km North

	Dams/Streams/Rivers	Small Pond	70 m SW
		Sirudamur Near Lake	0.6 km NW
		Lake	0.93 km SE
		Kavanipakkam Lake	2.5 km NE
		Cheyyar River	4.14 km NW
		Palar River	4.39 km North
4	Tiger Reserve/Elephant Reserve/ Biosphere Reserve	None	Nil within 10 km radius
5	Critically Polluted Areas	None	Nil within 10 km radius
6	Mangroves	None	Nil within 10 km radius
7	Mountains/Hills	None	Nil within 10 km radius
8	Notified Archaeological Sites	Thirumukkoodal Sri Appan Prasanna Venkatesa Perumaal Temple	4.31km North
		Kalvettu Kovil Mandapam-Uthiramarur	16.26 km NE
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10 km radius

Source: Survey of India Toposheet

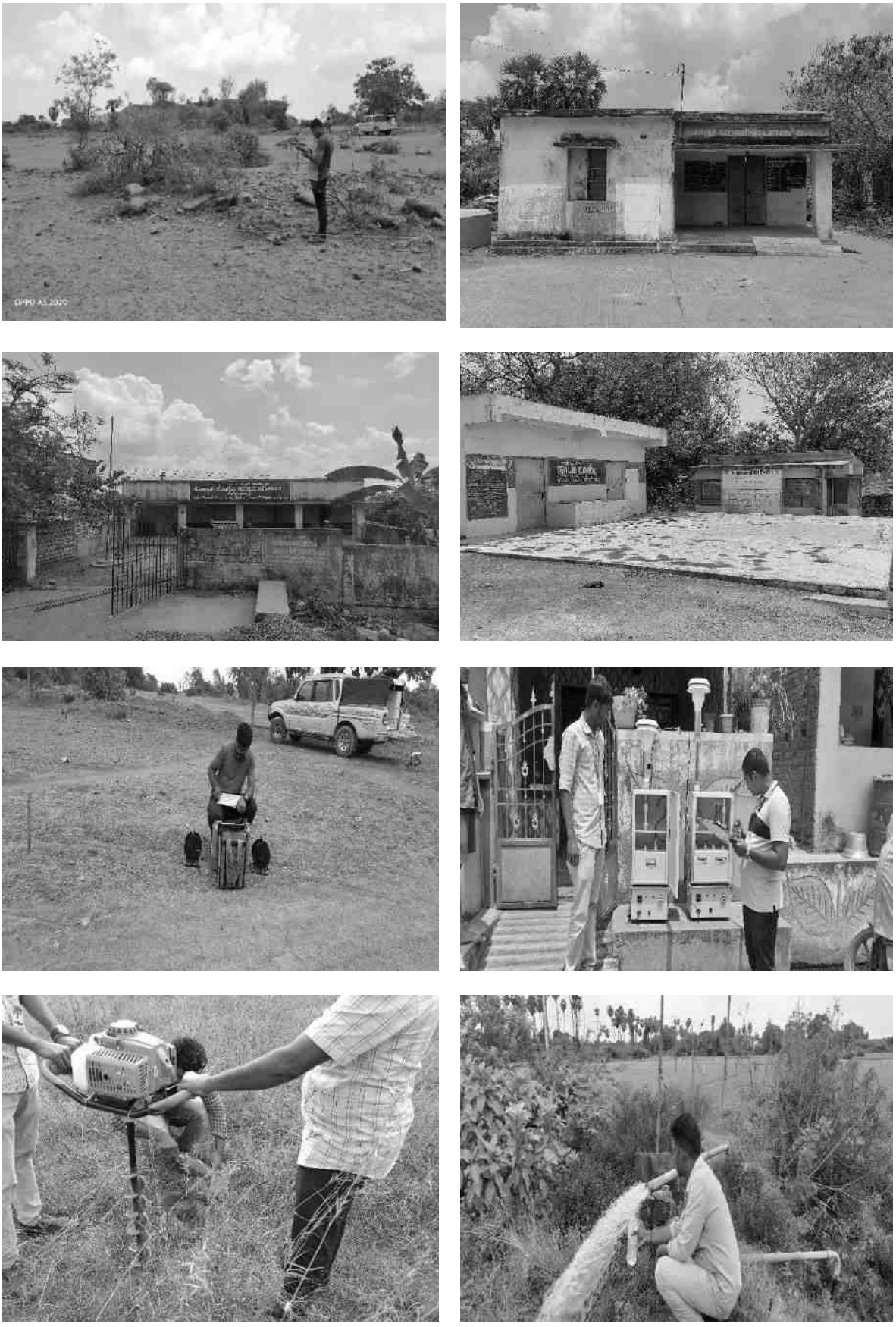


Figure 3.31 Socio Economic and Field Study Photographs

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

Land use pattern study carried out through remote sensing satellite data around the 5 km buffer zone shows that of the total area of 7680.31 ha, cropland occurs predominantly in the study area, accounting for 39.63%. Mining area covers only 2.69 %, of which lease area contributes only about 0.0436%.

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

No top soil will be removed in this project. However, some of the common mitigation measures is discussed in the following sections.

4.2.1 Anticipated Impact on Soil Environment

Following impacts are anticipated due to mining operations:

- Removal of protective vegetation cover
- Exposure of subsurface materials which are unsuitable for vegetation establishment

4.2.2 Common Mitigation Measures from proposed project

- Run-off diversion – Garland drains will be constructed around the project boundary to prevent surface flows from entering the quarry works areas and will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season.

4.3 WATER ENVIRONMENT

The total water requirement for this project will be 5.8 KLD. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose. The domestic effluent to be generated from the project will be collected in septic tank with soak pits arrangements. There are no waste dumps in this quarry. Based on the available information and the geophysical investigations the study concluded that the project area is considered to have poor groundwater potential. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected.

4.3.1 Anticipated Impact

The major sources of water pollution normally associated due to 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

- As the proposed project acquires 5.8 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not deplete aquifer beneath the lease area.

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

4.4 AIR ENVIRONMENT

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

4.4.1 Anticipated Impact from proposed project

- During mining at various stages of activities such as excavation, drilling and transportation of materials, particular matter (PM), gases such as sulphur dioxide, oxides of nitrogen from vehicular exhaust are the main air pollutants
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area

4.4.2 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, SO_2, and NO_X emission estimation have been given in Table 4.1.

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

Mine	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	E= [u0.4a0.2{9.7+ 0.01p+b/(4+0.3b)}]	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm^3/yr); a = Lease area(km^2); E = Emission rate(g/s).
Overall Mine	SO_2	Area	E=a0.14{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=a0.25{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 PM_{10} keeping in mind that

proper control measures are followed. It is important to note that PM_{10} emission rate is derived from the SPM estimation in the background that PM_{10} constitutes 52% of SPM emission. The $PM_{2.5}$, PM_{10}, SO_2 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	$PM_{2.5}$	0.0166658989	33550	4.96748E-07
Overall Mine	PM_{10}	0.0306654889	33550	9.14024E-07
Overall Mine	SO_2	0.0116529645	33550	3.47331E-07
Overall Mine	NO_X	0.0089565556	33550	2.66961E-07

4.4.2.1 Frame work of Computation and Model Details

By using the above-mentioned inputs, Ground Level Concentrations (GLC) due to the quarrying activities have been estimated to know the incremental concentration in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere.

Air quality modelling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by quarrying activities. Suspended Particulate Matter (SPM) is the major pollutant occurred during quarrying activities. The prediction includes the impacts of excavation, drilling, loading and movement of vehicles during transportation and meteorological parameters such as wind speed, wind direction, temperature, rainfall, humidity and cloud cover.

The model was used to predict the impact on the ambient air environment at each receptor at various localities within 10km radius around the project site and the maximum incremental GLC at the project site. All the prediction models in Figures 4.1- 4.4 shows the maximum concentrations of $PM_{2.5}$, PM_{10}, SO_2 and NO_X close to the proposed project site due to low to moderate wind speeds.

4.4.2.2 Modelling of Incremental Concentration

The air borne particulate matter such as PM_{10} and $PM_{2.5}$ generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO_2) and oxides of nitrogen (NOx) 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.

4.4.2.3 Model Results

The post project resultant concentrations of PM_{10}, $PM_{2.5}$, SO_2 & NO_X (GLC) is given in Tables 4.3-4.6.

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

Station ID	Distance to core area (km)	Direction	PM 2.5 concentrations(µg/m³)			Comparison against air quality standard (60 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.12	W	23.1	8.25	31.35	Below standard	35.71	Not significant
AAQ2	1.88	SW	19.7	0.5	20.2		2.54	
AAQ3	4.24	SW	23.9	0	23.9		0.00	
AAQ4	2.94	NE	22.0	0.5	22.5		2.27	
AAQ5	1.87	NNW	21.0	0.5	21.5		2.38	
AAQ6	4.46	NW	19.1	0	19.1		0.00	
AAQ7	3.80	SSE	23.7	0.5	24.2		2.11	
AAQ8	3.87	N	19.9	0	19.9		0.00	

Table 4.4 Incremental & Resultant GLC of PM_{10}

Station ID	Distance to core area (km)	Direction	PM_{10} concentrations (µg/m³)			Comparison against air quality standard (100 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.12	W	45.5	15.2	60.7	Below standard	33.41	Not significant
AAQ2	1.88	SW	34.2	0.5	34.7		1.46	
AAQ3	4.24	SW	43.3	0	43.3		0.00	
AAQ4	2.94	NE	41.0	1	42		2.44	
AAQ5	1.87	NNW	39.2	0.5	39.7		1.28	
AAQ6	4.46	NW	37.0	0	37		0.00	
AAQ7	3.80	SSE	47.4	0.5	47.9		1.05	
AAQ8	3.87	N	36.4	0	36.4		0.00	

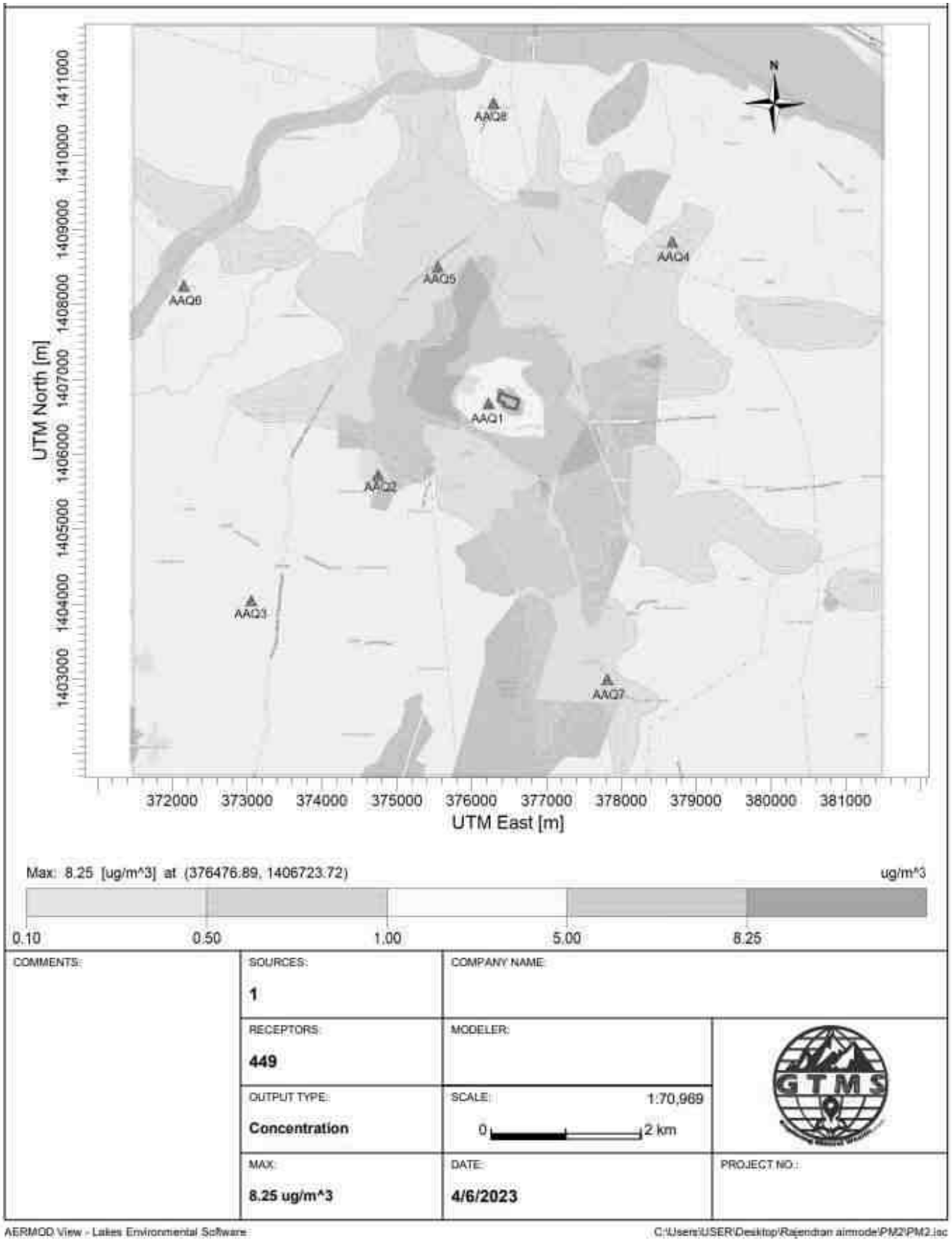


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

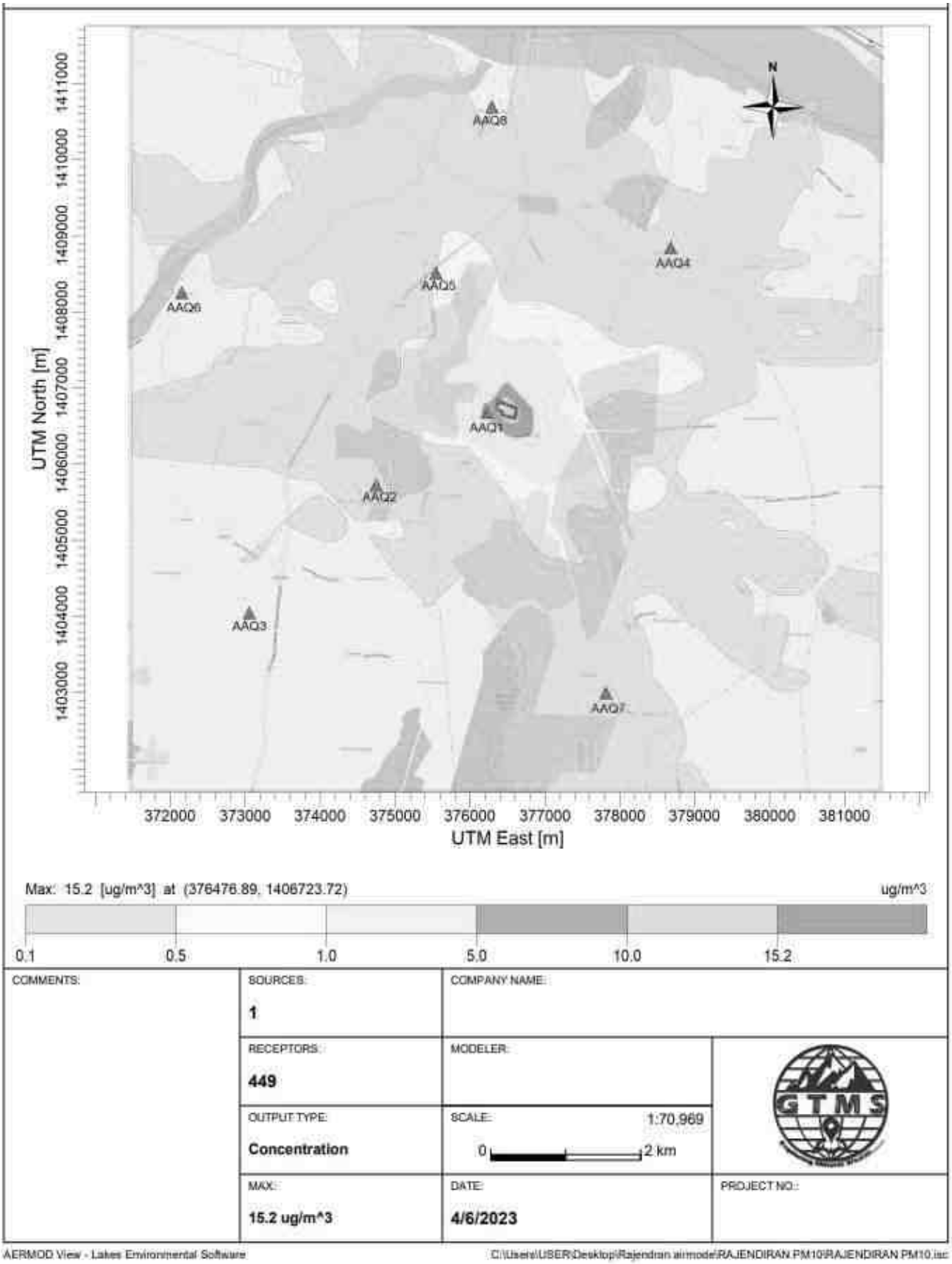


Figure 4.2 Predicted Incremental Concentration of PM_{10}

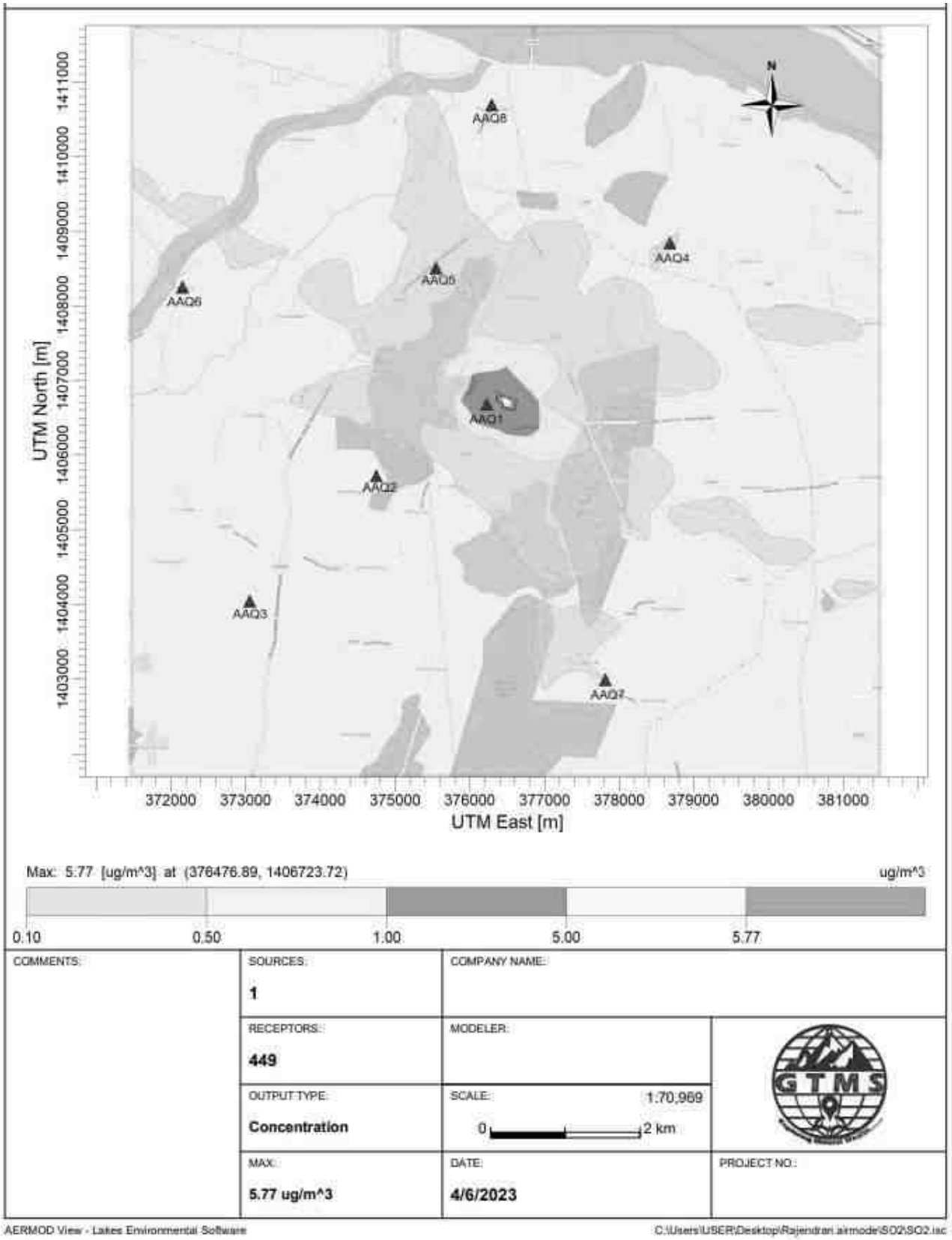


Figure 4.3 Predicted Incremental Concentration of SO_2

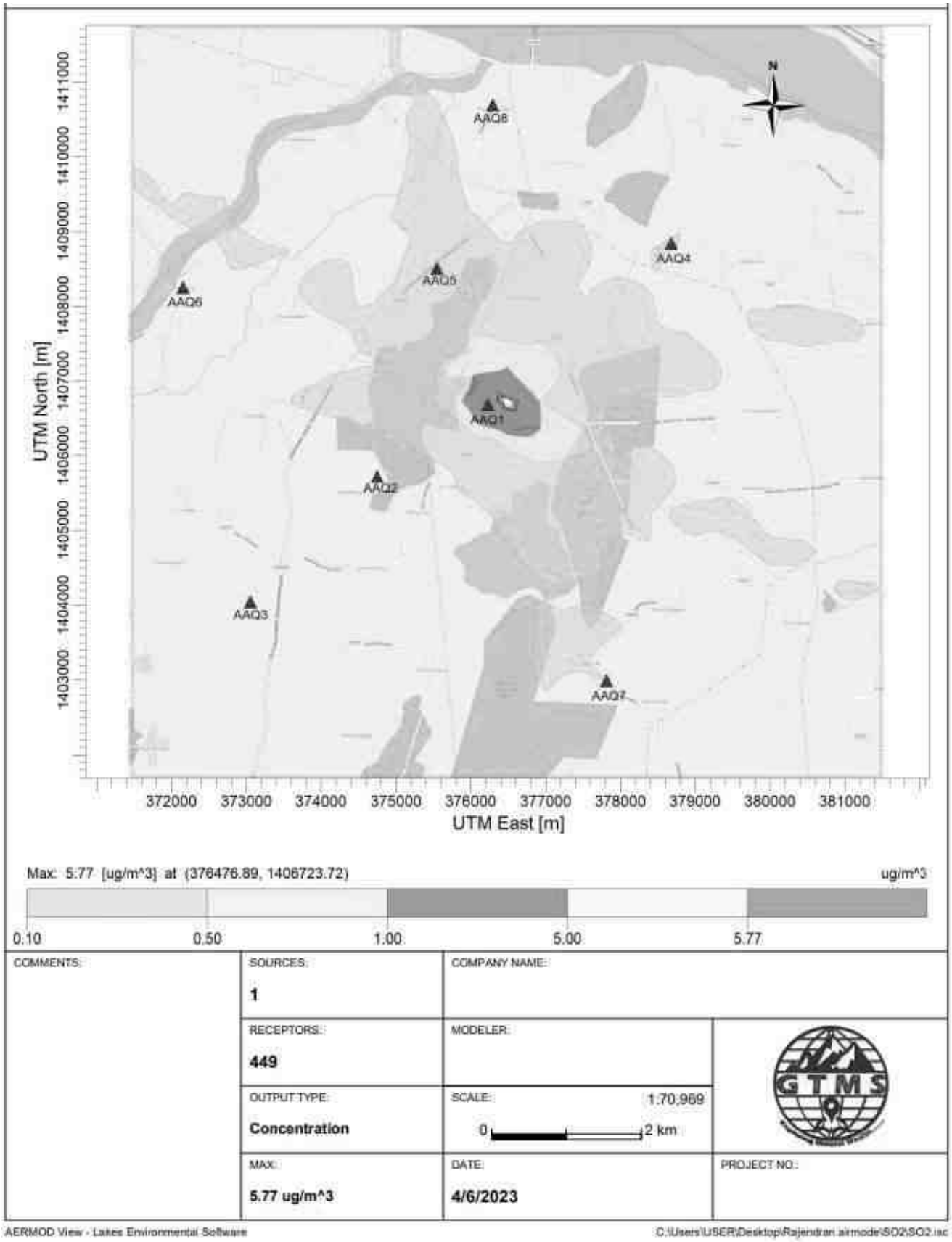


Figure 4.4 Predicted Incremental Concentration of NOx

Table 4.5 Incremental & Resultant GLC of SO_2

Station ID	Distance to core area (km)	Direction	SO_2 concentrations(µg/m³)			Comparison against air quality standard (80 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.12	W	9.43	5.77	15.2	Below standard	61.19	Not significant
AAQ2	1.88	SW	9.08	0	9.08		0.00	
AAQ3	4.24	SW	10.00	0	10		0.00	
AAQ4	2.94	NE	8.71	0.5	9.21		5.74	
AAQ5	1.87	NNW	9.15	0.5	9.65		5.46	
AAQ6	4.46	NW	9.99	0	9.99		0.00	
AAQ7	3.80	SSE	9.03	0.5	9.53		5.54	
AAQ8	3.87	N	9.14	0	9.14		0.00	

Table 4.6 Incremental & Resultant GLC of NO_X

Station ID	Distance to core area (km)	Direction	NO_X concentrations(µg/m³)			Comparison against air quality standard (80 µg/m³)	Magnitude of change (%)	Significance
			Base line	Predicted	Total			
AAQ1	0.12	W	20.0	4.44	24.44	Below standard	22.20	Not significant
AAQ2	1.88	SW	16.8	0.1	16.9		0.60	
AAQ3	4.24	SW	17.9	0	17.9		0.00	
AAQ4	2.94	NE	17.8	0.1	17.9		0.56	
AAQ5	1.87	NNW	18.2	0.5	18.7		2.75	
AAQ6	4.46	NW	19.1	0	19.1		0.00	
AAQ7	3.80	SSE	18.4	0.1	18.5		0.54	
AAQ8	3.87	N	17.0	0	17		0.00	

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

4.4.3 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-metaled haul roads will be compacted weekly before being put into use
- ❖ Overloading of tippers will be avoided to prevent spillage
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials

Green Belt

- ❖ Planting of trees all along 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, 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 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, 100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

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

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

Where,

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.

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

4.5.1 Anticipated Impact

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

- Source data
- Receptor data
- Attenuation factor

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

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 (dBA) m During Day Time	Predicted Noise Level (dBA)	Total (dBA)
Kanniyappan Lease	140	48.6	54.24	55.29
Sirudamur	370	45.6	45.80	48.71

Kattankulam	4190	42.5	24.72	42.57
Pazhaveri	2900	42.9	27.91	43.04
Madhur	1870	40.2	31.72	40.78
Vayalakkavoor	4380	39.8	24.33	39.92
Edamichi	3780	38.0	25.61	38.24
Thirumukkudal	3850	44.9	25.45	44.95
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 54.24 dB (A) in core zone and ranges between 24.33 and 45.80 dB (A) in buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (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 though 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 kutcha 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	Fly rock distance in m	Air Blast	
					Pressure (kpa)	Sound Level (dB)
P1	119	370	1.77	23	0.85	153

Table 4.10 Predicted PPV Values due to Blasting at 100-500 m radius

Location ID	Maximum Charge in kgs	Radial Distance in m	PPV in mm/s	Fly rock distance in m	Air Blast	
					Pressure (kpa)	Sound Level (dB)
P1	119	100	14.43	23	4.06	166
		200	4.76		1.77	159
		300	2.48		1.09	155
		400	1.57		0.77	152
		500	1.09		0.59	149

The peak particle velocity produced by the charge of 119 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 94 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 Impact on Ecology and Biodiversity

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- 75% of Eucalyptus trees in the lease area are artificially planted, and 4 Phoenix sylvestris trees are in the quarry lease area.
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.
- Carbon released from quarrying machineries and tippers during quarrying would be 5942 kg per day, 1604216 kg per year and 8021080 kg over five years, as provided in Table 4.11.

Table 4.11 Carbon Released During Five Years of Rough Stone and Gravel Production

	Per day	**Per year**	**Per five years**
Fuel consumption of excavator	385	104022	520110
Fuel consumption of compressor	119	32076	160380
Fuel consumption of tipper	1713	462490	2312450
Total fuel consumption in liters	2217	598588	2992940
Co_2 emission in kg	5942	1604216	8021080

4.6.2 Mitigation Measures on Flora

- ❖ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ❖ Existing roads will be used; new roads will not be constructed to reduce impact on flora.

Carbon Sequestration

- To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 24 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- 75% of the leased area is covered by eucalyptus trees. It is cultivated trees and 4 Phoenix sylvestris trees. Since the survival rate of uprooting is 30%, 10 seedlings per tree are procured and planted in a safety zone of 7.5 meters and protected.
- As per the greenbelt development plan as recommended by SEAC (Table 4.13), about 2183 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 149 kg of the total carbon, as provided in Table 4.12.

Table 4.12 CO_2 Sequestration

CO_2 sequestration in kg	149	40220	201099
Remaining CO_2 not sequestered in kg	5793	1563996	7819981
Trees required for environmental compensation	65167		
Area required for environmental compensation in hectares	130		

Greenbelt Development

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone. Greenbelt development plan and budget required for green belt development plan are given in Tables 4.14-4.15. For greenbelt development, species are recommended, as shown in Table 4.12 on the basis of:

- 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.

Table 4.13 Recommended Species for Greenbelt Development Plan

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	*Azadirachta indica*	Meliaceae	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	*Techtona grandis*	Lamiaceae	Teak	Tree	
3	*Polyalthia longifolia*	Annonaceae	Nettilingam	Tree	
4	*Albizia lebbeck*	Fabaceae	Vagai	Tree	
5	*Delonix regia*	Fabaceae	Cemmayir-konrai	Tree	
6	*Bauhinia racemosa*	Fabaceae	Aathi	Tree	
7	*Cassia fistula*	Fabaceae	Sarakondrai	Tree	
8	*Aegle marmelos*	Rutaceae	Vilvam	Tree	
9	*Pongamia pinnata*	Fabaceae	Pungam	Tree	
10	*Thespesia populnea*	Malvaceae	Puvarasu	Tree	

Table 4.14 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered(m^2)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	671	537	6039
	Number of plants outside the mine lease area		
	1007	805	9059
Total	**1678**	**1342**	**15098**

Table 4.15 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)	671	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation	134200	20130

		inside the lease area and @ 30 per plant maintenance (recurring))"		
Plantation outside the area	1007	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	301950	30195
Total			436150	50325

Source: EMP budget

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

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 all the proposed mine lease areas will be constructed to restrict the entry of stray animals
- Green belt development will be carried out which will help in minimizing adverse impact on the flora found in the area.

4.6.4 Measures for Protection and Conservation of Wildlife Species

- All the preventive measures will be taken for growth & development of fauna.
- Creating and development awareness for nature and wildlife in the adjoin villages.
- The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.
- Undertaking mitigate measures for conducive environment to the flora and fauna in consultation with Forest Department.
- Dust suppression system will be installed within mine and periphery of mine for proposed project
- Plantation around mine area will help in creating habitats for small faunal species and to

- ❖ create better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

Aquatic Biodiversity

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

Table 4.16 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 sites were identified in the lease area.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species were sighted in core area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	Kavanipakkam R.F 0.83 km east side, idamichi R.F 2.45 km south side, marudam reserve forest is located in R.F 7.35 km south west side. There are no national parks or eco-sensitive zones around 10 km radius.
4	Proposed project restricts access to waterholes for wildlife	No. The proposed project does not restrict access to water holes for wildlife.
5	Proposed mining project impact surface water quality that also provide water to wildlife	No scheduled or threatened wildlife animal were sighted in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management system will be developed properly. So, there will be no siltation in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	Barbed wire fencing will be installed around the lease area. Therefore, wild animals will not fall into the quarry pit.
8	The project release effluents into a water body that also supplies water to a wildlife	No water bodies were found close to core zone so chances of water becoming polluted will be low.

9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	No. The proposed project does not involve any forestland. Therefore, it will not affect the livelihood of people depending the forest product.
10	Project likely to affect migration routes	No migration routes were found crossing the lease area.
11	Project likely to affect flora of an area, which have medicinal value	No flora with medicinal values were found in the study area.
12	Forestland is to be diverted, has carbon high sequestration	As the proposed project does not involve any forestland, there will be no need for diversion.
13	The project likely to affect wetlands, fish breeding grounds, marine ecology	Wetland was not present in and around mining lease area. No fish breeding grounds were present in core area.

Table 4.17 Anticipated Impact of Ecology and Biodiversity

S. No	Aspect Description	Likely Impacts on Ecology and Biodiversity (EB)	Impact Consequence - Probability Description / Justification	Significance	Mitigation Measures
Pre-Mining Phase					
1	Uprooting of vegetation of lease area	Site specific loss of common floral diversity (Direct impact)	Site possesses common floral (not trees) species. Clearance of these species will not result in loss of flora	Less severe	No immediate action required. However, Greenbelt /plantation will be developed in project site and in periphery of the project boundary, which will improve flora
		Site specific loss of associated faunal diversity	Site supports only common species, which use wide variety of habitats of the buffer zone reserve forest area. So, there is no		

		(Partial impact)	threat of faunal diversity.		and fauna diversity of the project area.
		-Loss of Habitat (Direct impact)	Site does not form Unique / critical habitat structure for unique flora or fauna.		
Mining Phase					
2	Excavation of mineral using machine and labours, Transportation activities will generate noise.	Site-specific disturbance to normal faunal movements at the site due to noise. (Partial impact)	Site does not form unique / critical habitat structure for unique flora or fauna.	Less severe	Mining activity should not be operated after 5PM. Excavation of dump and transportation work should stop before 7PM.
3	Vehicular Movement for transportation of materials will result in generation of dust (SPM) due to haul roads and emission of SO_2, NO_2, CO etc.	Impact on surrounding agriculture and associated fauna due to deposition of dust and Emission of CO. (Indirect impact)	Impact is less as the agricultural land far from core area.	Less severe	All vehicles will be certified for appropriate Emission levels. More plantation has been suggested Upgrade the vehicles with alternative fuel such biodiesel, methanol and biofuel around the mining area.

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact from Proposed and Existing Projects

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

4.7.2 Common Mitigation Measures for Proposed Project

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

4.8 OCCUPATIONAL HEALTH AND SAFETY

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

- Respiratory hazards
- Noise
- Physical hazards
- Explosive storage and handling

4.8.1 Respiratory Hazards

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

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

4.8.2 Noise

Workers are likely to get exposed to excessive noise levels during mining activities. The following measures are proposed for implementation

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

4.8.3 Physical Hazards

The following measures are proposed for control of physical hazards

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

4.8.4 Occupational Health Survey

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

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

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

4.9 MINE WASTE MANAGEMENT

No waste is anticipated from any of the proposed quarries.

4.10 MINE CLOSURE

Mine closure plan is the most important environmental requirement in mining project. The mine closure plan should cover technical, environmental, social, legal and financial aspects dealing with

progressive and post closure activities. The closure operation is a continuous series of activities starting from the decommissioning of the project. Therefore, progressive mine closure plan should be specifically dealt with in the mining plan and is to be reviewed along with mining plan. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities to be included in the closure plan. While formulating the closure objectives for the site, it is important to consider the existing or the pre-mining land use of the site; and how the operation will affect this activity.

The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- To create a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies, and the public
- To protect public health and safety of the surrounding habitation
- To minimize environmental damage
- To conserve valuable attributes and aesthetics
- To overcome adverse socio-economic impacts.

4.10.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.10.1.1 Physical Stability

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

4.10.1.2 Chemical Stability

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

4.10.1.3 Biological Stability

The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilizing soil cover, prevention of erosion/wash off, leaching, etc.,

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

- Where the nutrient level of spread topsoil is lower than material in-situ e.g., for development of social forestry
- Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally.
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor. For example, development of green barriers

The Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

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 area.
- Availability of skilled, semi-skilled and unskilled workers in this region.
- All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are well connected and accessible.
- The mining operations will not intersect the ground water level. Hence, no impact on ground water environment.
- As the proposed project area falls in seismic zone 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

Manual Open Cast Semi Mechanized mining method with secondary blasting will be applied to extract rough stone in the area. The proposed mining lease areas have following advantages:

- ❖ As the mineral deposition is homogeneous and batholith formation, 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.
- ❖ Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY

Open cast Semi 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.

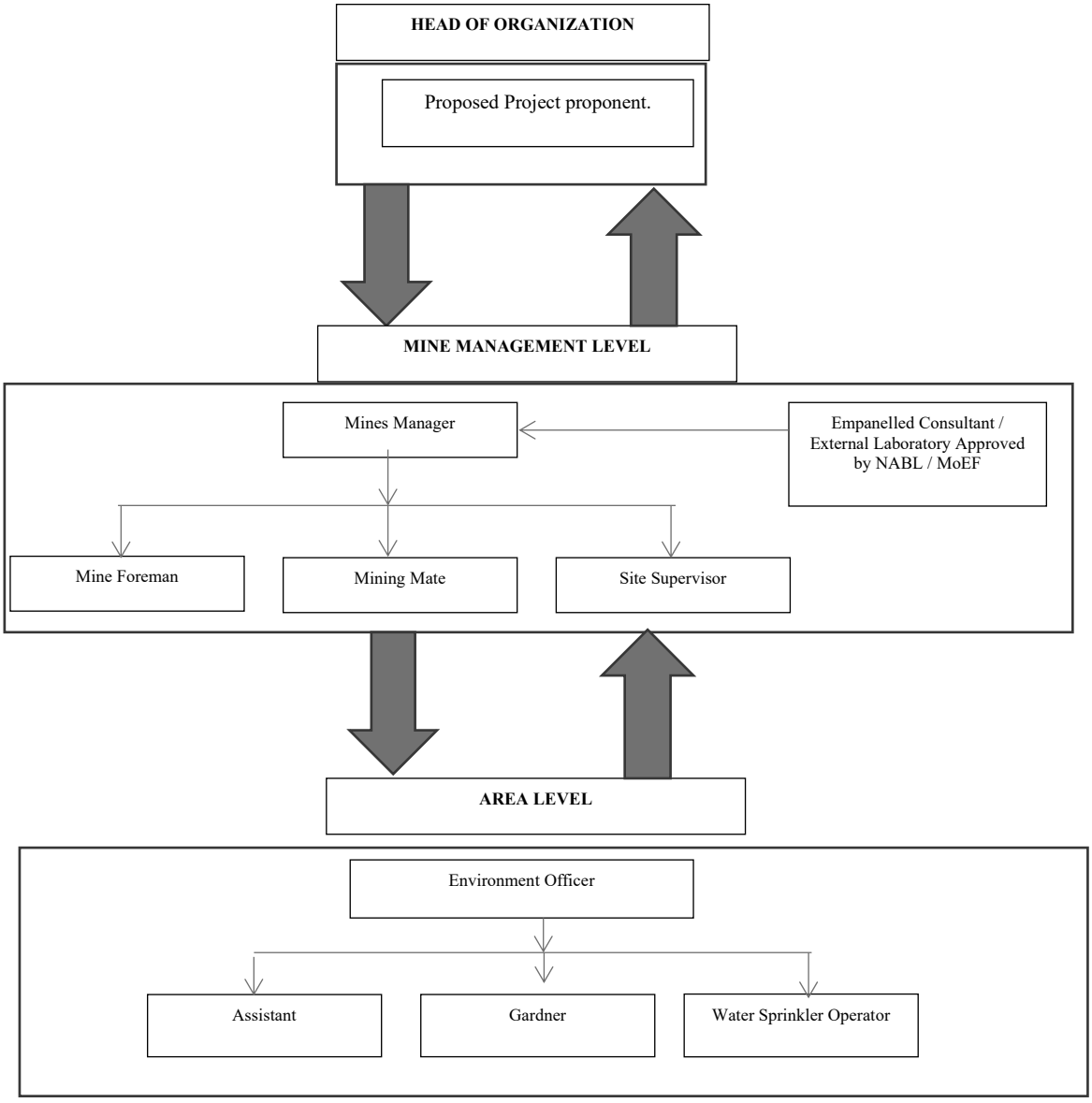


Figure 6.1 Proposed Environmental Monitoring Chart

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 recurring cost for Environmental Monitoring Programme is Rs **2,95,000** /- 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 60,000/-
2	Meteorology	-	Rs 15,000/-
3	Water Quality	-	Rs 20,000/-
4	Water Level Monitoring		Rs 10,000/-
5	Soil Quality	-	Rs 20,000/-
6	Noise Quality	-	Rs 10,000/-
7	Vibration Study	-	Rs 1,50,000/-
8	Greenbelt	-	Rs 10,000/-
Total		**-**	**Rs 2,95,000 /-**

Source: Field Data

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

Additional studies deal with:

- 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 was made and the public opinions on the proposed project will be updated in the final EIA/EMP report.

7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

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

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

Table 7.1 Risk Assessment& Control Measures for Proposed Project

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations; Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited; Fire-fighting and first-aid provisions in the mine office complex and mining area; Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use Working of quarry, as per approved plans and regularly updating the mine plans; Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut; Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager; Maintenance and testing of all mining equipment as per manufacturer ‘s guidelines.
2	Drilling	Improper and unsafe practices Due to high pressure of compressed air, hoses may burst Drill Rod may break	Safe operating procedure established for drilling (SOP) will be strictly followed. Only trained operators will be deployed. 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, Drilling shall not be carried on simultaneously on the benches at places directly one above the other. Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual. All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition. Operator shall regularly use all the personal protective equipment.
4	Blasting	Fly rock, ground	Restrict maximum charge per delay as per regulations and by optimum blast hole pattern,

		vibration, Noise and dust. Improper charging, stemming & Blasting/ fining of blast holes Vibration due to movement of vehicles	vibrations will be controlled within the permissible limit and blasting can be conducted safely. SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation Shots are fired during daytime only. All holes charged on any one day shall be fired on the same day. The danger zone will be distinctly demarcated (by means of red flags)
5	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition. Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle. Concave mirrors should be kept at all corners All vehicles should be fitted with reverse horn with one spotter at every tipping point Loading according to the vehicle capacity Periodical maintenance of vehicles as per operator manual
6	Natural Calamities	Unexpected happenings	Escape Routes will be provided to prevent inundation of storm water Fire Extinguishers & Sand Buckets
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 5m 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. Structure of the team has been shown in Figure 7.1.

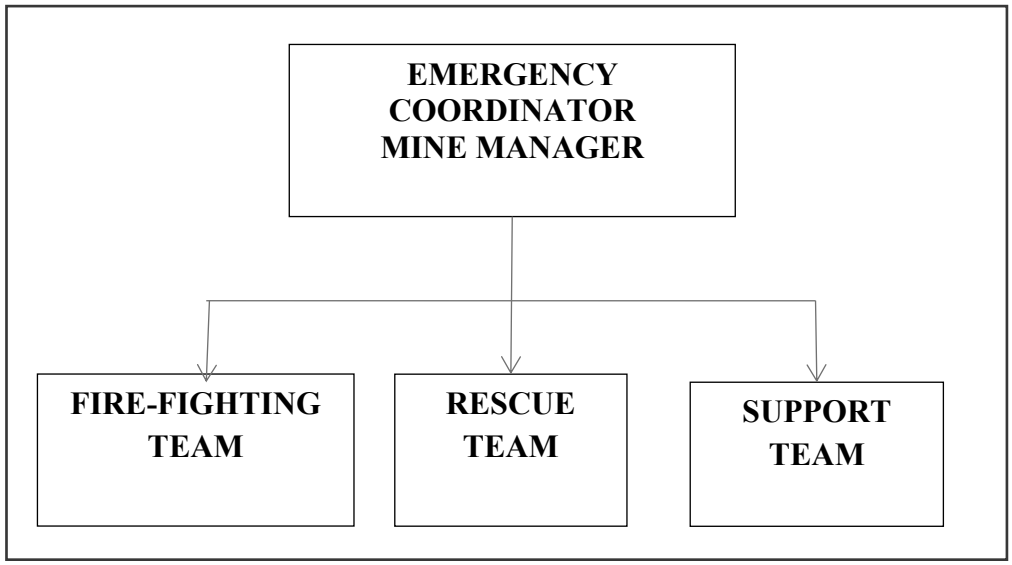


Figure 7.1 Disaster management team layout for proposed project

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

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, as shown in Table 7.3.

Table 7.3 Proposed Fire Extinguishers at Different Locations in P1

Location	Type of Fire Extinguishers
Electrical Equipment	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, 5 proposed projects, known as P1, P2, P3, P4 and P5 are taken into consideration. The details of P1 have been given in Table 1.2 and the details of P2 – P5 given in Table 7.4 – 7.7.

Table 7.4 Salient Features of Proposed Project Site "P2"

Name of the Quarry	**M/s. Blue Stones-** Rough stone Quarry	
S.F. No.	167/1 (Part-1)	
Toposheet No.	57-P/14	
Latitude	12°43'24"N to 12°43'32"N	
Longitude	79°51'33"E to 79°51'42"E	
Highest Elevation	96 m AMSL	
Ultimate depth of Mining as for Tor	22 m BGL	
Geological Resources	Rough Stone in m^3	Top Soil
	1473038	30062
Mineable Reserves	Rough Stone in m^3	Top Soil
	617232	24608
Proposed reserve for five years	Rough Stone in m^3	Top Soil
	309414	24608
Method of Mining	Opencast Semi-Mechanized Mining Method	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	2 Nos
	Compressor	1 Nos
	Hydrualic Excavator	1 Nos
	Tippers	3 Nos

Blasting Method	The massive formation shall be broken into pieces of portable size by drilling and blasting using jack hammers and shot hole blasting. Power factor of explosives for breaking such hard rock shall be in the order of 6 to 7 tones per kg of explosives.
Proposed Manpower Deployment	21 Nos
Project Cost	Rs.5,70,70,000 /-
CER Cost @ 2% of Project Cost	Rs. 5,00,000/-
Proposed Water Requirement	3.0 KLD

Table 7.5 Salient Features of Proposed Project Site "P3"

Name of the Quarry	Thiru. V. Sekar Rough stone Quarry	
S.F.No	167/1 (Part-2)	
Toposheet No	57-P/14	
Latitude	12°43'30"N to 12°43'37"N	
Longitude	79°51'34"E to 79°51'43"E	
Highest Elevation	96 m AMSL	
Ultimate depth of Mining as for Tor	22 m BGL	
Geological Resources	Rough Stone in m^3	Top Soil
	1466962	29938
Mineable Reserves	Rough Stone in m^3	Top Soil
	659050	25125
Proposed reserve for five years	Rough Stone in m^3	Top Soil
	329770	25125
Method of Mining	Opencast Semi-Mechanized Mining Method	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	1 Nos
	Compressor	1 Nos
	Hydrualic Excavator	1 Nos
	Tippers	3 Nos
Blasting Method	The massive formation shall be broken into pieces of portable size by drilling and blasting using jack hammers and shot hole blasting. Power factor of explosives for breaking such hard rock shall be in the order of 6 to 7 tones per kg of explosives.	

Proposed Manpower Deployment	21 Nos
Project Cost	Rs.5,70,70,000 /-
CER Cost @ 2% of Project Cost	Rs. 5,00,000/-
Proposed Water Requirement	3.0 KLD

Table 7.6 Salient Features of Proposed Project Site "P4"

Name of the Quarry	Mr. S. Hemprasath Rough Stone and Gravel Quarry	
S.F.No	170/2, 170/3, 170/4, 236/1B, 236/1C, 236/1D, 220/1A1(P)	
Toposheet No	57-P/14	
Latitude	12°43'32.87"N to 12°43'43.47"N	
Longitude	79°51'46.88"E to 79°51'56.28"E	
Highest elevation	61 m AMSL	
Proposed depth as per ToR	25 m BGL	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	1547025	48865
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	601517	31734
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3
	442582	31734
Method of Mining	Open-Cast Semi Mechanized Method	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	3
	Compressor	1
	Hydraulic Excavator	1
	Tippers	5
Blasting Method	Quarrying Operation is done with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	28 Nos	
Project Cost	Rs.40,90,590/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	4.5 KLD	

Table 7.7 Salient Features of Proposed Project Site "P5"

Name of the Quarry	Mr. N. Kanniyappan Rough Stone and Gravel Quarry	
S.F.No	277/1A, 277/1B, 277/1C, 277/1D, 277/1E, 277/1F, 277/2 & 280/2	
Toposheet No	57-P/14	
Latitude	12°43'17.34"N to 12°43'25.86"N	
Longitude	79°51'33.42"E to 79°51'40.03"E	
Highest elevation	57 m AMSL	
Proposed depth as per ToR	25 m BGL	
Geological Resources	Rough Stone in m^3	Gravel in m^3
	1336784	62176
Mineable Reserves	Rough Stone in m^3	Gravel in m^3
	610354	50456
Proposed reserves for five years	Rough Stone in m^3	Gravel in m^3
	437744	50456
Method of Mining	Open-Cast Semi Mechanized Method	
Topography	Flat Terrain	
Machinery proposed	Jack Hammer	2
	Compressor	1
	Hydraulic Excavator	1
	Tippers	6
Blasting Method	Quarrying Operation is done with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.	
Proposed Manpower Deployment	28 Nos	
Project Cost	Rs.69,50,000/-	
CER Cost	Rs. 5,00,000/-	
Proposed Water Requirement	3.8 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

As the production of rough stone plays a vital role in affecting the air environment. The data on the cumulative production resulting from the five proposed project have been given in Tables 7.8

Table 7.8 Cumulative Production Load of Rough Stone

Proposed Production Details				
Quarry	**5 Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	638665	127733	473	79
P2	309414	61883	229	38
P3	329770	65954	244	41
P4	442582	88516	328	55
P5	437744	87549	324	54
Grand Total	**2158175**	**431635**	**1598**	**267**

Table 7.9 Cumulative Production Load of Gravel

Proposed Production Details				
Quarry	**3/Years in m^3**	**Per Year in m^3**	**Per Day in m^3**	**Number of Lorry Load Per Day**
P1	55070	18357	68	11
P2	--	--	--	--
P3	--	--	--	--
P4	31734	10578	39	7
P5	50456	10091	37	6
Grand Total	**137260**	**39026**	**144**	**24**

The cumulative study shows that the overall production of rough stone from the 5 quarry is 1598 m^3 per day with a capacity of 267 trips per day, gravel from the 5quarry is 144 m^3 per day with a capacity of 24 trips per day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the five proposed project on air environment of the cluster have been provided in Table 7.10. The cumulative values resulting from the five projects for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.10 Cumulative impact results from the five **proposed project**

Pollutants	Baseline Data(µg/m³)	Incremental Values (µg/m³)					Cumulative Value (µg/m³)
		P1	P2	P3	P4	P5	
$PM_{2.5}$	32.40	8.25	4.02	4.41	4.41	5.51	59.0
PM_{10}	52.23	15.20	7.60	7.35	7.35	8.40	98.13
SO_2	11.53	5.77	4.78	5.09	5.09	6.75	39.01
NO_X	23.85	4.44	5.60	5.96	5.96	7.91	53.72

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 7.11 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	370	S	45.6	45.80	48.71	55
Habitation Near P2	530	S	45.6	42.67	47.39	
Habitation Near P3	720	S	45.6	40.01	46.66	
Habitation Near P4	850	S	45.6	38.57	46.39	
Habitation Near P5	350	S	45.6	46.28	48.96	
Cumulative Noise (dB(A))					**53.4**	

Source: Lab Monitoring Data

The cumulative analysis of noise due to 5 proposed project shows that habitation near P1, P2, P3, P4 and P5 will receive about 53.4 dB (A), as shown in Table 7.11. 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 7.12.

Table 7.12 Ground Vibrations at 6 Mines

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in mm/s
P1	119	370	1.77
P2	58	530	0.56
P3	61	720	0.35
P4	82	850	0.34
P5	82	350	1.44
E1	71	660	0.46
Total			**4.92**

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 five proposed projects were calculated and the results are shown in Tables 7.13. The Five project will contribute Rs. 5,00,000 towards CER fund.

Table 7.13 Socio Economic Benefits from five Mines

Location ID	Project Cost (Rs.)	CER as per SEAC Suggestion (Rs.)
P1	44,25,000	5,00,000
P2	5,70,70,000	5,00,000
P3	5,70,70,000	5,00,000
P4	40,90,590	5,00,000
P5	69,50,000	5,00,000
Grand Total	**12,96,05,590**	**25,00,000**

Table 7.14 Employment Benefits from five Mines

Location ID	Employment
P1	29
P2	21
P3	21
P4	28
P5	28
Grand Total	**127**

A total of 127 people will get employment due to 5 proposed mine in cluster

7.4.5 Ecological Environment

Table 7.15 Greenbelt Development Benefits from Five Mines

ID	No of Trees proposed to be planted	Area to be Covered(m^2)	Name of the Species	No. of Trees expected to be grown @ 80% survival rate
P1	1678	15098	Neem, Pongamia, Teak	1342
P2	1500	13500		1200
P3	1500	13500		1200
P4	2440	21960		1952
P5	1558	14018		1246
Total	**8676**	**78076**		**6940**

Cumulative studies show that the two proposed projects will plant about 8676 native tree species like Neem, Teak, etc both inside and outside the lease area. It is expected that 80 % of trees, i.e., 6940 trees will survive in this green belt development program.

7.4.6 Traffic Density

Table 7.8 shows that the 5 proposed projects will add 291 truck load per day, accounting for addition of 873 PCUs to the nearby roads.

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.

A detailed action plan to manage plastic waste has been provided in Table 7.16.

Table 7.16 Action Plan to Manage Plastic Waste

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

Source: Proposed by FAEs and EC

7.6 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 sequalae 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 0_2 < 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 Siruthamur Village aims to produce **638665 m^3** of rough stone and **55070 m^3** 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 29 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 Siruthamur Village, Uthiramerur Taluk and Kancheepuram District is 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 Siruthamur 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 ≤ 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 with reference to 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

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs. 4,78,98,253** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget for Rough stone (Rs.)	Budget for Gravel (Rs.)
CER	5,00,000	-----
Seigniorage @ Rs.59/m^3 of Rough stone Rs.33/m^3 of Gravel	3,76,81,235	18,17,310
District Mineral Foundation Tax @ 10% of Seigniorage	37,68,123	1,81,731
Green Tax @ 10% of Seigniorage	37,68,123	1,81,731
Total	**4,57,17,481**	**21,80,772**

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. S. Rajendiran,** 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 & 100m 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 Harvesting. Remaining area will be converted into greenbelt area.	Mines Manager
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

No top soil will be removed during the mining operation. Therefore, topsoil management plan is not provided here.

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 50 m. The water table in the area is at 60 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 is 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 access 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 access the impact due to the mining activities and the	Mines Manager

efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	
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 and 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

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 is 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(m^2)**
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	671	537	6039
	Number of plants outside the mine lease area		
	1007	805	9059
Total	**1678**	**1342**	**15098**

Source: Proposed by FAEs & EIA Coordinator

About 1678 saplings will be planted in and around the lease area with the survival rate of 80%. A well-planned green belt of trees with long canopy leaves shall be developed with dense plantations around the boundary and along the 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	1st Year	2nd Year	3rd Year	4th Year	5th 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.

Figure 10.1 Personal Protective Equipment to the Mine Workers

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.

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	✓ 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	✓ 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	✓ 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	✓ 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/-	33550	33550
	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	100000	10000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10000

	Enforcing speed limits of 20 km/hr within ML area	Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed	20000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	5000
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare	0	67100
	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	1788262
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	33550	16775
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	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

Occupational Health	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)	116000	29000
and Safety	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	29000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	13420
	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	671000	33550
	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	167750	33550
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000

Development of Green Belt	Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)	Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"	134200	20130
		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	301950	30195
Mine Closure	Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs)		0	114070
Green fund	G.O.(Ms).No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for Roughstone = Rs.59 and for Gravel= Rs.33)	3949855	0
TOTAL			**6507855**	**3061532 (Excl. Mine Closure Cost)**

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

Ist Year	IInd Year	IIIrd Year	IVth Year	Vth Year (Including Mine Closure Cost)	Total
9569387	3214609	3375339	3544106	3835381	**23538821**

In order to implement the environmental protection measures, an amount of Rs. **6507855**as capital cost and recurring cost as Rs. **3061532** 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. **23538821,** 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 was prepared in compliance with ToR obtained vide Letter No. SEIAA-TN/F.No.9689/SEAC/ToR-1387/2023 Dated:07.03.2023 by considering 5 proposed quarry and 1 existing quarry in a cluster with the total extent of **20.27.5** hectares in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District and Tamil Nadu State. Cluster area was calculated as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016. Baseline Monitoring studies were carried out during the period of March-May, 2022.

11.1 PROJECT DESCRIPTION

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 a manual open cast mining method involving formation of benches with 5 m height and 5 m width and secondary blasting. The proposed project area is located between latitudes from 12°43'17.16"N to 12°43'24.52"N and Longitudes from 79°51'39.66"E to 79°51'49.00"E. in Siruthamur Village, Uthiramerur Taluk, Kancheepuram District. The project site is a Patta land with the extent of 3.35.50 ha leased for the project proponent, **Mr. S. Rajendiran**. The proponent had applied for quarry lease on 04.12.2020 to extract rough stone and gravel obtained the precise area communication letter issued by Department of Geology and Mining, Kancheepuram vide Rc.No.302/Q3/2020, dated: 06.09.2021. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Deputy Director of Geology and Mining, Kancheepuram (Rc.No.302/Q3/2020, dated:07.10.2021).

According to the approved mining plan, about 638665 m^3 of rough stone and 55070 m^3 gravel will be mined up to the depth of 50 m BGL in five years. To achieve the estimated production, 4 Jack Hammers, 1 compressor, 1 excavator with bucket/rock breaker, and 4 tippers will be deployed. To operate the machineries and to break the rough stone to preferred dimension, about 29 persons will be employed. At the end of the quarry life, the dimension of the ultimate pit will be 172 m*121 m*50 m and about 3.35.5 ha of land is used for quarrying; about 0.60.0 ha of land is unutilized. Whereas, at the end of the mine life, about 2.63.0 ha of land will have been quarried; about 0.09.5 ha of land will be used for green belt development and the rest will be used for road and infrastructures.

The final mine closure plan shows that about Rs. **1140700** capital cost with the annual recurring cost of Rs. **100650** will be spent towards mine closure.

11.2 DESCRIPTION OF THE ENVIRONMENT

The baseline monitoring studies were carried out during March-May, 2022 to assess the existing environmental conditions in the study area. For the purpose of the EIA studies, project area was considered as the core zone and area outside the project area up to 5 km radius from the periphery of the project site was considered as buffer zone. Baseline Environmental data has been collected for land, water, noise, ecology, socio-economy, and traffic.

11.2.1 Land Environment

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius. Totally, 9 LULC were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 206.43 ha accounting for 2.69 %, of which cluster area of 20.27.5 ha contributes only about 0.0436 %. This small percentage of mining activities shall not have any significant impact on the land environment.

11.2.2 Soil Characteristics

Physical Characteristics

The soil samples in the study area show loamy textures varying between sandy loam, silty loam and silty clay. pH of the soil varies from 6.09 to 7.26 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 58.97 to 120.4 µs/cm. Dry matter content ranges between 64.19 and 94.87 g/cm^3.

Chemical Characteristics

Sodium ranges between 20 and 654 mg/kg. Potassium ranges between 308 and 910 mg/kg. Nitrogen ranges between 75.1 and 150 mg/kg. Phosphorus ranges between 0.84 and 1.9mg/kg. Organic matter content ranges between 0.48 and 1.52%.

11.2.3 Water Environment

Surface Water

Sirudamur Lake, Kattankulam Lake and Edamichi Lake are the three prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. The proposed project area is located 0.4 N of Sirudamur Lake, 4.30 km SW of Kattankulam Lake and 2.40 km S of Edamichi Lake, as shown in Table 3.5 and Figure 3.6. Three surface water samples, known as SW1, SW2 and SW3 were collected from the three surface water bodies to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the three samples.

Results for surface water samples in the Table 3.6 indicate that the physical and chemical parameters, and heavy metals are within permissible limits.

Ground Water

Groundwater in the study area occurs in the crystalline rocks of Archaean age and Recent alluvium. The movement of the groundwater is controlled by the intensity of weathering and fracturing of crystalline rocks. Dug wells and bore wells are the most common ground water abstraction structures in the area. However, in dry season, people in the study area heavily rely on bore wells for their domestic and agriculture purpose. Four groundwater samples, known as GW1, GW2, GW3 and GW4 were collected from bore wells and analyzed for physico-chemical conditions and heavy metals contents in order to assess baseline quality of ground water. Ground water sampling locations and their distance and direction from the lease area are provided in Table 3.5 and the spatial occurrence of water sampling locations is shown in Figure 3.6. Table 3.7 summarizes ground water quality data of the four samples. Results for ground water samples in the Table 3.7 indicate that the physical, chemical, and heavy metals are within permissible limits in comparison with standards of IS10500:2012.

AIR ENVIRONMENT

Site Specific Meteorology

Site specific meteorology during the study period was recorded by an automated weather station. According to the onsite data, the temperature in March, 2022 varied from 18.04 to 31.30^{0}C with the average of 25.56^{0}C; in April, 2022 from 16.88 to 29.97^{0}C with the average of 24.23^{0}C; and in May, 2022 from 17.48 to 29.51^{0}C with the average of 23.71^{0}C. In March, 2022, relative humidity ranged from 30.44 to 95.19 % with the average of 71.17%; in April, 2022, from 36.56 to 92.19 % with the average of 72.22 %; and in May,2022, from 36.19 to 93.19 % with the average of 72.29 %. The wind speed in March, 2022 varied from 0.35 to 8.80 m/s with the average of 3.96 m/s; in April, 2022 from 0.09 to 6.81 m/s with the average of 3.67 m/s; and in May, 2022 from 0.06 to 9.06 m/s with the average of 4.17 m/s. In March,2022, wind direction varied from 2.32 to 359.65^0 with the average of 119.25^0; in April, 2022, from 0.0 to 357.92^0 with the average of149.97 ^{0}; and in May, 2022, from 2.09 to 358.03^0 with the average of 207.43^0. In March,2022, surface pressure varied from 99.94 to 101.17 kPa with the average of 100.56 kPa; in April, 2022, from 99.87 to 101.08 kPa with the average of 100.45 kPa; and in May, 2022, from 99.38 to 100.58 kPa with the average of 100.06 kPa.

Ambient Air Quality Results

As per the monitoring data, $PM_{2.5}$ from 20.10 µg/m^3 to 26.15 µg/m^3, PM_{10} ranges from 40.34 µg/m^3 to 45.84µg/m^3; SO_2 from 6.06µg/m^3 to 9.61 µg/m^3; NO_x from 16.73 µg/m^3 to 23.56µg/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.4 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 locations around the proposed project area. Noise levels recorded in core zone during day time was 48.6 dB (A) Leq and during night time was 36.5 dB (A) Leq. Noise levels recorded in buffer zone during day time varied from 38 to 45.6dB (A) Leq and during night time from 27.6 to 35.6 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.5 BIOLOGICAL ENVIRONMENT

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

11.6 SOCIO-ECONOMIC ENVIRONMENT

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.

11.7 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 11.1 Anticipated Impacts & Mitigation Measures

Impact	Mitigation Measure
Land Environment	
❖ Destruction of natural landscapes ❖ Changes in soil characteristics ❖ Soil erosion and slope instability	❖ 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 ❖ 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	
❖ 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.	❖ 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	

❖ Generation of Fugitive Dust ❖ Dust will be generated mainly during excavation, loading &unloading activities. ❖ Gaseous pollutants will by 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.	❖ Haul roads will be well maintained by sprinkling water twice a day ❖ 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 minimised 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 malfunctions which could lead to abnormal emissions from the quarry operations. ❖ A site speed limit of 20 km/h will be set to minimise the potential for dust generation ❖ Weekly maintenance programme to identify machinery due for maintenance, based on the number of hours it has been in operation. ❖ Air filters are renewed after every 10°0 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	

❖ Annoyance and deterioration of the quality of life; ❖ Propelling of rocks fragments by blasting. ❖ Shaking of buildings and people due to blasting;	❖ 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; ❖ Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise; ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness.
Biological Environment	
❖ 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.	❖ 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	
❖ 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;	❖ The mining activity puts negligible change in the socio-economic profile. ❖ Around 88 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	

❖ Exposure to Dust ❖ Noise and Vibration Exposure ❖ Physical Hazards ❖ Respiratory hazards due to Dust exposure	❖ 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 centre. ❖ 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 mine's manager employed. ❖ Working of mine as per approved mining plan and environmental plans

11.8 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 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 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.

11.9 ENVIRONMENTAL MONITORING PROGRAM

Environmental Monitoring program will be conducted for various environmental components such as air quality, meteorology, water quality, water level monitoring, soil quality, noise level, vibration, and greenbelt as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB. For this environmental monitoring program, Rs **2,95,000** /- per annum will spent by the project proponent. 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 and 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.

11.10 ADDITIONAL STUDIES

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 31st December, 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 time table 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.

Cumulative Studies

- The results on the cumulative impact of the three proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time.
- PPV resulting from five proposed projects is well below the permissible limit of Peak Particle Velocity of 8 mm/s.
- The five proposed projects will allocate Rs. 2500000/- towards CER as recommended by SEAC.
- The five proposed projects will directly provide jobs to 127 local people, in addition to indirect jobs.
- The five proposed project will plant 8676 about trees in and around the lease area.
- The five proposed projects will add 873 PCU per day to the nearby roads.

11.11 PROJECT BENEFITS FOR PROPOSED PROJECT

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

- Direct employment to 29 local people and indirect employment to the people
- 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 Programme
- Skill development & capacity building like vocational training
- Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.,
- CSR activities mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Siruthamur Village. CSR budget is allocated as 2.5% of the profit.
- The project would pay about **Rs. 4,78,98,253** to the state government through various ways including CER of Rs. 5,00,000.

11.12 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of Rs. **6507855**as capital cost and recurring cost as Rs. **3061532** 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. **23538821.**

11.13 CONCLUSION

EIA study was performed as per the approved 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 programme will help in increasing the green cover in the area. Thus, the proposed project is not likely to affect the environment or adjacent ecosystem in an adverse way.

The Mines 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, **Mr. S. Rajendiran** has engaged **Geo Technical Mining Solutions**, a NABET accredited consultancy for carrying out the EIA study as per the ToR Issued.

Address of the consultancy:

No: 1/213B Natesan Complex,
Oddapatti, Dharmapuri – 636705,
Tamil Nadu, India.
Email:info.gtmsdpi@gmail.com
Web: www.gtmsind.com
Phone: 04342 232777.

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

S.No.	Name of the expert	In house/ Empanelled	Sector	Functional Area	Category
Approved Functional Area Experts & EC					
1.	Dr. S. Karuppannan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	B
2.	Dr. M. Vijayprabhu	In-house FAE	1(a)(i)	HG, LU, GEO	B
3.	Dr. J. Rajarajeswari	In-house, FAE	1(a)(i)	EB, SC	B
4.	Dr. G. Prabakaran	In-house, FAE	1(a)(i)	SE	B
5.	Dr. R. Arunbalaji	In-house, FAE	1(a)(i)	AP, AQ, NV	B
6.	J.N. Manikandan	Empanelled FAE	1(a)(i)	RH, SHW, AP	B
7.	Dr. S. Malar	In-house, FAE	1(a)(i)	WP	B
8.	G. Umamaheswaran	In-house, FAE	1(a)(i)	HG, LU, GEO	B

9.	S. Gopalakrishnan	In-house, FAE	1(a)(i)	HG, GEO	B
10.	P. Venkatesh	In-house, FAE	1(a)(i)	AP	B
11.	Dr. D.Kalaimurugan	In-house, FAE	1(a)(i)	SC	B
Approved Functional Area Associates					
12.	G. Prithiviraj	FAA	1(a)(i)	LU, HG	B
13.	C. Kumaresan	FAA	1(a)(i)	NV	B
14.	P. Vellaiyan	FAA	1(a)(i)	HG, GEO	B
15.	S.Vasugi	FAA	1(a)(i)	AQ	B
16.	P.Dhatchayini	FAA	1(a)(i)	AQ	B
17.	V.Malavika	FAA	1(a)(i)	NV, SHW	B

Abbreviations

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

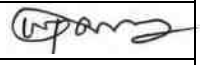
DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

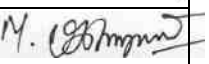
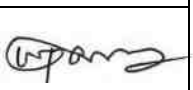
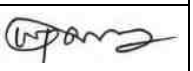
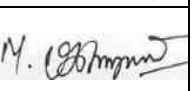
I, hereby, certify that I was a part of the EIA team in the following capacity that developed the EIA & EMP report.

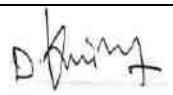
Signature	:	
Date	:	07.04.2023
Name	:	**Dr. S. Karuppannan**
Designation	:	EIA Coordinator
Name of the EIA Consultant Organization	:	Geo Technical Mining Solutions
Period of Involvement	:	Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **Mr. S. Rajendiran** rough stone and gravel quarry project with the extent of 3.35.5 ha situated in the cluster with the extent of **20.27.5** ha in Siruthamur Village of Uthiramerur Taluk, Kancheepuram District of Tamil Nadu is true and correct to the best of our knowledge.

List of Functional Area Experts Engaged in this Project

S. No.	Functional Area	Involvement	Name of the Experts	Signature
1	AP	○ Identification of different sources of air pollution due to the proposed mine activity ○ Prediction of air pollution and propose mitigation measures / control measures	J. N. Manikandan	
			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	
			G. Uma Maheswaran	
			Dr. S. Karuppannan	
4	GEO	○ Field Survey for assessing the regional and local geology of the	G. Gopala Krishnan	

		area. o Preparation of mineral and geological maps. o Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	G. Uma Maheswaran	
			Dr. M. Vijay Prabhu	
			Dr. S. Karuppannan	
5	SE	o Revision in secondary data as per Census of India, 2011. o Impact Assessment & Preventive Management Plan o Corporate Environment Responsibility.	Dr. G. Prabhakaran	
6	EB	o Collection of Baseline data of Flora and Fauna. o Identification of species labelled as Rare, Endangered and threatened as per IUCN list. o Impact of the project on flora and fauna. o Suggesting species for greenbelt development.	Dr.J. Rajarajeshwari	
7	RH	o Identification of hazards and hazardous substances o Risks and consequences analysis o Vulnerability assessment o Preparation of Emergency Preparedness Plan o Management plan for safety.	J.N. Manikandan	
8	LU	o Construction of Land use Map o Impact of project on surrounding land use o Suggesting post closure sustainable land use and mitigative measures.	Dr.S. Karuppannan	
			G.Uma Maheswaran	
			Dr.M. Vijay Prabhu	
9	NV	o Identify impacts due to noise and vibrations o Suggesting appropriate mitigation measures for EMP.	Dr. R. Arun Balaji	
10	AQ	o Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. o Recommending mitigations measures for EMP	Dr. R. Arun Balaji	

11	SC	○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation	Dr. J. Rajarajeshwari	
			Dr. D. Kalaimurugan	
12	SHW	○ Identify source of generation of non-hazardous solid waste and hazardous waste. ○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.	J. N. Manikandan	

List of Functional Area Associate Engaged in this Project

S.No.	Name	Functional Area	Involvement	Signature
1	G. Prithiviraj	LU, HG	○ Site visit with FAE ○ Provide inputs & Assisting FAE for LU and HG	
2	C. Kumaresan	NV	○ Assistance to FAE in both primary and secondary data collection ○ Assistance in noise prediction modelling	
3	P. Vellaiyan	HG & GEO	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
4	S.Vasugi	AQ	○ Field visits along with FAE ○ Assistance to FAE in both primary and secondary data collection	
5	P.Dhatchayini	AQ	○ Site visit with FAE ○ Assistance to FAE in collection of both primary and secondary data	
6	V.Malavika	NV, SHW	○ Site visit along 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 EIA/EMP report for **Mr. S. Rajendiran** rough stone and gravel quarry project with the extent of 3.35.50 ha located within the cluster of **20.27.5** ha in Siruthamur Village of Uthiramerur Taluk, Kancheepuram District of Tamil Nadu is true and correct to the best of my knowledge.

Signature	:	
Date	:	07.04.2023
Name	:	**Dr. S. Karuppannan**
Designation	:	Managing Partner
Name of the EIA Consultant Organization	:	Geo Technical Mining Solutions
NABET Certificate No & Issue Date	:	NABET/EIA/2124/SA 0184
Validity	:	Valid till 31.12.2023

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.9689/SEAC/ToR-1387/2023 Dated:07.03.2023

To

Thiru.S.Rajendiran
S/o Sevagaperumal
2/4 Jothinagarmain Road
Ekkattutahngal
Guindy, Chennai.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough Stone and Gravel Quarry lease over an extent of 3.35.5 Ha at S.F.No. 275/1B, 275/2A,238/1A, 238/1B, 238/1C & 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu by Thiru.S.Rajendiran - 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/412400/2022, dated 28.12.2022.
2. Your application submitted for Terms of Reference dated: 29.12.2022.
3. Minutes of the 354th Meeting of SEAC held on 10.02.2023.
4. Minutes of the 600th SEIAA Meeting held on 07.03.2023.

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

The proponent, Thiru.S.Rajendiran has submitted application for Terms of Reference (ToR) on 29.12.2022, in Form-I, Pre-Feasibility report for the Proposed Rough Stone and Gravel Quarry

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lease over an extent of 3.35.5 Ha at S.F.No. 275/1B, 275/2A,238/1A, 238/1B, 238/1C & 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

Proposed Rough Stone and Gravel Quarrylease over an extent of 3.35.5 Ha at S.F.No. 275/1B, 275/2A,238/1A, 238/1B, 238/1C & 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District,Tamil Nadu by Thiru.S.Rajendiran For Terms of Reference. (SIA/TN/MIN/412400/2022, Dt. 28.12.2022)

Earlier, this proposal was placed in 250thSEAC meeting held on 03.03.2022. The details of the project furnished by the proponent are given in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, Thiru.S.Rajendiran has applied for Terms for Reference for the proposed Rough stone and Grave lquarry lease over an extent of 3.35Ha atS.F.No.275/1B, 275/2A,238/1A, 238/1B, 238/1C & 238/1D of Siruthamur 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 mining plan, the lease period is 5 years. The mining plan for the period of five years & the production should not exceed 63,8665m^3 of Rough Stone & 55,070 m^3 of Gravel. The annual peak production 134159 m^3 of Rough Stone (1styear) &24,336 m^3 of Gravel (1styear) with an ultimate depth of mining 50m BGL (2m Gravel +48m Rough Stone).

Based on the presentation and documents furnished by the project proponent, SEAC noted that in G.O(MS) No. 295 dated 03.11.2021 the Government in Industries Department has notified the following Rules specifying certain conditions for permitting mining activities near ecologically sensitive areas.

" ... No quarrying or mining or crushing activities shall be carried out within one kilometer radial distance or the protective distance as notified by the Ministry of Environment, Forest and Climate Change, Government of India from time to time, whichever is more, from the boundaries of ecologically sensitive areas, environmentally and ecologically sensitive protected areas such as the National parks, Wild life Sanctuaries, Tiger Reserves, Elephant corridors and Reserve Forests".

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SEIAA-TN

The Committee noted that the Kavanippakkam Reserve Forest is located at a distance of 0.88km Eastfrom this project site and the proposal is, therefore, hit by the above G.O. **The Committee, therefore, decided not to recommend the proposal for EC.**

Subsequently, the above rule has been amended vide GO No. 243 Industries, Investment Promotion and Commerce (MMC.1) Department, dated 14.12.2022, as below.

"In the said rules, in rule 36, in Sub-rule (1-A), in Clause(e) for the expression "the National Parks, Wild Life Sanctuaries, Tiger Reserves, Elephant Corridors and Reserve Forests", the expression "National Parks, Wild Life Sanctuaries, Tiger Reserves, Elephant Corridors" shall be substituted".

Consequently, the proponent has re-presented/reapplied the proposal to reconsider the earlier decision based on the above G.O. Now the proposal was placed in 354th Meeting of SEAC held on 10.02.2023.

The proposal is 0.86km from Kavanippakkam Reserve Forest and based on the above said G.O, the Proponent has resubmitted the same proposal with all necessary supporting documents in order to obtain Environmental Clearance.

Description	Old File	New File
File No	8854	9689
Online Proposal No for EC	SIA/TN/MIN/68491/2021, Dated 18.10.2021	SIA/TN/MIN/412400/2022 Dated 08.02.2023

Based on the presentation made by the proponent, **SEAC decided to recommend for grant of Terms of Reference (ToR) with Public Hearing,** subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The proponent is requested to carry out a survey and enumerate on the structures located within 50m, 100m, 150m, 200m, 250m, 300m and 500m from the boundary of the mine lease area.
2. Since the Karikili Bird Sanctuary is located at a distance of 13.6 km south, the PP shall obtain NBWL clearance.
3. The PP shall furnish the exact distance of the project location and Uthiramerur inscription.
4. The PP shall discuss in detail about execution of conditions laid down by PWD.
5. The proponent shall discuss the funds for mitigation measures to be included in the EMP.
6. The proponent shall adhere to the bench height - 5m as stated in the approved mining plan.

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SEIAA-TN

7. The proponent shall obtain Anna University Star rating system.
8. The PP shall leave 60m safety distance for Reserve Forest adjoining the mining lease area as per the revenue records or any other standing orders as applicable.
9. 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. Necessary data and documentation in this regard may be provided.
10. The proponent shall submit the details regarding the nature of blasting activity which will be carried out.
11. The PP shall furnish DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., upto a radius of 25 km from the proposed site.
12. The PP shall provide individual notice regarding the Public Hearing to the nearby house owners located in the vicinity of the project site.
13. In the case of proposed lease in an existing (or old) quarry where the benches are non-existent (or) partially formed critical of the bench geometry approved in the Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the 'highwall' benches to ensure slope stability in the proposed quarry lease which shall be vetted by the concerned Asst. Director of Geology and Mining, during the time of appraisal for obtaining the EC.
14. 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.
15. **Since the quarry lies in a cluster situation, the PP shall furnish a Standard Operating Procedure for carrying out the safe blasting operation while considering the adjacent quarries lies in a radial distance of 500 m from their quarry.**
16. Details of Green belt & fencing shall be included in the EIA Report.
17. 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.

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18. 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,

(i)What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?

(ii)Quantity of minerals mined out.

(iii)Highest production achieved in any one year

(iv)Detail of approved depth of mining.

(v)Actual depth of the mining achieved earlier.

(vi)Name of the person already mined in that leases area.

(vii)If EC and CTO already obtained, the copy of the same shall be submitted.

(viii)Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.

19. 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).
20. The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc.,
21. 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.
22. 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.
23. 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.

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24. 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.
25. 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.
26. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
27. 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.
28. 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.
29. 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.
30. 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.
31. Impact on local transport infrastructure due to the Project should be indicated.
32. 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.
33. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.

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34. 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.
35. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
36. The PP shall produce/display the EIA report, Executive summery and other related information with respect to public hearing in Tamil Language also.
37. 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.
38. 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-Iin 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.
39. 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.
40. 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.
41. 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.
42. 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.

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43. 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.
44. 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.
45. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
46. 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.
47. 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.
48. 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.
49. 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.

Appendix

List of Native Trees Suggested for Planting

1. ***Aegle marmelos*** – Vilvam
2. ***Adenaanthera pavonina*** - Manjadi
3. ***Albizia lebbeck*** – Vaagai
4. ***Albizia amara*** - Usil
5. ***Bauhinia purpurea*** - Mantharai
6. ***Bauhinia racemosa*** - Aathi
7. ***Bauhinia tomentosa*** – Iruvathi
8. ***Buchanania axillaris*** - Kattuma

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9. ***Borassus flabellifer*** - Panai
10. ***Butea monosperma*** - Murukka maram
11. ***Bobax ceiba*** – Ilavu, Sevvilavu
12. ***Calophyllum inophyllum*** - Punnai
13. ***Cassia fistula*** - Sarakondrai
14. ***Cassia roxburghii***- Sengondrai
15. ***Chloroxylon sweitenia*** - Purasa maram
16. ***Cochlospermum religiosum*** – Kongu, Manjal Ilavu
17. ***Cordia dichotoma*** – Mookuchali maram
18. ***Creteva adansonii*** – Mavalingum
19. ***Dillenia indica*** – Uva, Uzha
20. ***Dillenia pentagyna*** – Siru Uva, Sitruzha
21. ***Diospyros ebenum*** - Karungali
22. ***Diospyros chloroxylon*** – Vaganai
23. ***Ficus amplissima*** – Kal Itchi
24. ***Hibiscus tiliaceus*** – Aatru poovarasu
25. ***Hardwickia binata*** – Aacha
26. ***Holoptelia integrifolia*** - Aayili
27. ***Lannea coromandelica*** - Odhiam
28. ***Lagerstroemia speciosa*** - Poo Marudhu
29. ***Lepisanthus tetraphylla*** - Neikottai maram
30. ***Limonia acidissima*** - Vila maram
31. ***Litsea glutinosa*** –Pisin pattai
32. ***Madhuca longifolia*** - Illuppai
33. ***Manilkara hexandra*** – Ulakkai Paalai
34. ***Mimusops elengi*** - Magizha maram
35. ***Mitragyna parvifolia*** - Kadambu
36. ***Morinda pubescens*** – Nuna
37. ***Morinda citrifolia*** – Vellai Nuna
38. ***Phoenix sylvestre*** - Eachai
39. **Pongamia pinnata** – Pungam
40. **Premna mollissima** – Munnai

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41. **Premna serratifolia** – Narumunnai
42. **Premna tomentosa** - Purangai Naari, Pudanga Naari
43. **Prosopis cinerea** - Vanni maram
44. **Pterocarpus marsupium** - Vengai
45. **Pterospermum canescens** – Vennangu, Tada
46. **Pterospermum xylocarpum** - Polavu
47. **Puthranjiva roxburghii** – Puthranjivi
48. **Salvadora persica** – Ugaa Maram
49. **Sapindus emarginatus** - Manipungan, Soapu kai
50. **Saraca asoca** - Asoca
51. **Streblus asper** - Piraya maram
52. **Strychnos nuxvomica** – Yetti
53. **Strychnos potatorum** - Therthang Kottai
54. **Syzygium cumini** - Naval
55. **Terminalia bellerica** - Thandri
56. **Terminalia arjuna** - Ven marudhu
57. **Toona ciliate** – Sandhana vembu
58. **Thespesia populnea** - Puvarasu
59. **Walsuratrifoliata** – valsura
60. **Wrightia tinctoria** – Veppalai
61. **Pithecellobium dulce** – Kodukkapuli

Discussion by SEIAA and the Remarks:-

The proposal was placed in the 600th Authority meeting held on 07.03.2023. The authority noted that this proposal was placed for appraisal in this 354th meeting of SEAC held on 10.02.2023. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the conditions in '**Annexure B**' of this minute.

1. The activity should not result in CO_2 release and temperature rise and add to micro climate alternations.

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2. The proponent shall ensure that the activity does not disturb the water bodies and natural flow of surface and ground water, nor cause any pollution, to water sources in the area.
3. The proponent shall ensure that the activity does not disturb Soil health & bio-diversity, Climate change leading to Droughts, Floods etc.
4. The proponent shall ensure that the activity does not Pollute leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
5. The proponent shall ensure that the activity does not make the Possibilities of water contamination and impact on aquatic ecosystem health.
6. The trees present in the site shall be protected, replanted elsewhere.
7. The PP shall study the impact on Invasive Alien Species (IAP).

Annexure 'B'

Cluster Management Committee

1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.
4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.

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9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.

Impact study of mining

12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
    a) Soil health & soil biological, physical land chemical features .
    b) Climate change leading to Droughts, Floods etc.
    c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
    d) Possibilities of water contamination and impact on aquatic ecosystem health.
    e) Agriculture, Forestry & Traditional practices.
    f) Hydrothermal/Geothermal effect due to destruction in the Environment.
    g) Bio-geochemical processes and its foot prints including environmental stress.
    h) Sediment geochemistry in the surface streams.

Agriculture & Agro-Biodiversity

13. Impact on surrounding agricultural fields around the proposed mining Area.
14. Impact on soil flora & vegetation around the project site.
15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

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Forests

19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.
20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.

Water Environment

23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
24. Erosion Control measures.
25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.
28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.
29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.

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Energy

31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.

Climate Change

32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

Mine Closure Plan

34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

EMP

35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

Risk Assessment

37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.

Disaster Management Plan

38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.

Others

39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.

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40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.
41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

A. STANDARD TERMS OF REFERENCE

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental

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issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other

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protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out

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whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central

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Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

MEMBER SECRETARY
SEIAA-TN

37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) Besides the above, the below mentioned general points are also to be followed:-

a) Executive Summary of the EIA/EMP Report

b) All documents to be properly referenced with index and continuous page numbering.

c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.

d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.

e) Where the documents provided are in a language other than English, an English translation should be provided.

f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I

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and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

i) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.

j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth 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.

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11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should

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

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

a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
b. All documents may be properly referenced with index, page numbers and continuous page numbering.
c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -l1013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

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Copy to:

1. The Additional Chief Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Kancheepuram District.
7. Stock File.

From
K. Vijayaragavan, M.Sc.,
Assistant Director,
Dept. of Geology and Mining,
Kancheepuram.

To
Thiru. S. Rajendiran,
S/o. Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy,
Chennai - 600 032.

Rc.No.302/Q3/2020, Dated.07.10.2021

Sir,

Sub: Mines & Minerals – Minor Mineral – Rough stone and Gravel - Kancheepuram District – Uthiramerur Taluk – Siruthamur Village - S.F.Nos. 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D - over an extent of 3.35.50 Hectares of patta lands – Quarry lease application preferred by Thiru. S. Rajendiran S/o. Sevagaperumal – Details of quarries situated within 500 meter radial distance – furnished - reg.

Ref: 1. Precise are notice issued by the Assistant Director, Geology and Mining, Chengalpattu in Rc.No.302/Q3/2020, dated.06.09.2021.
2. Representation of Thiru. S. Rajendiran, S/o. Sevagaperumal dated.01.10.2021.

****

With reference to your letter in the reference 2nd cited, the details of existing, proposed and abandoned quarries located within 500 meter radius from the proposed Rough Stone and Gravel quarry, over an extent of 3.35.50 Hectares of patta lands in S.F.Nos. 275/1B (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50) and 238/1D (0.36.50) of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District are as follows.

I. Existing quarries:

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Lease period	Remarks
1.	R. Selvendrakumar, S/o. Rajendiran, No.2/4, Jothinagar main road, Ekkattuthangal, Chennai - 32	Roughstone & Gravel	Uthiramerur Sirudhamur	308/1,2 , 3A, 3B, 3C, 3D, 3E, 3F, 5, 6, 7A, 7B, 8, 9, 10A, 10B, 10C, 11	2.92.50	08.11.2018 To 07.11.2023	Operation

II. Proposed Quarries :

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Remarks
1.	S. Rajendiran, S/o. Sevugaperumal, No.2/4, Jothi Nagar Main Road, Ekkattuthangal, Chennai - 32.	Roughstone & Gravel	Uthiramerur Sirudhamur	275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D	3.35.50	Under Processing (Present Application)
2.	M.S. Blue Stones, No.192, 1st Floor, Ambattur Plots, Red Hills Road, Ambattur, Chennai - 600 053.	Roughstone & Gravel	Uthiramerur Sirudhamur	167/1 (Part-1) Govt. Land	3.00.00	Under Processing
3.	V. Sekar, S/o. Vadivel, No.28&29, S1 Dream Homes, Dr.K.V.K. Nagar, Selaiyur, Chennai - 600 073.	Roughstone & Gravel	Uthiramerur Sirudhamur	167/1 (Part-2) Govt. Land	3.00.00	Under Processing
4.	S. Hemprasath S/o. G. Shanmugavel (late), No.97, Rajaveethi, Walajabad Taluk, Kancheepuram District.	Roughstone & Gravel	Uthiramerur Sirudhamur	170/2, 170/3, 170/4, 236/1B, 236/1C, 236/1D and 220/1A1(P)	4.88.00	Under Processing
5.	N. Kanniyappan S/o. Narayanapillai, No.55, Mariyamman Koil Street, Neerkundram Village, Aamambakkam Post, Salavakkam Via, Uthiramerur Taluk, Kancheepuram.	Roughstone & Gravel	Uthiramerur Sirudhamur	277/1A, 277/1C, 277/1E, 277/1F, 277/2, 280/2, 277/1B, 277/1D	3.11.50	Under Processing

III. Abandoned quarries :

Sl. No.	Name of the lessee / permit holder	Name of the Mineral	Taluk & Village	S.F. Nos.	Extent (in hects)	Lease period
1.	M/s. NAPC Mines & Ores Pvt. Ltd., Khivraj Complex- II, 480, Anna Salai, Nandhanam, Chennai - 35.	Roughstone & Gravel	Uthiramerur Sirudhamur	171/1B (Govt. Land)	2.00.00	04.06.2009 To 03.06.2014 Lease Expired

27/5/14

Assistant Director,
Geology and Mining,
Kancheepuram.

7/10/14

MINING PLAN

FOR SIRUTHAMUR ROUGH STONE AND GRAVEL QUARRY LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

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

Lease period 5 Years *(from the date of lease execution)*

(Prepared under rule 41 (3) (i) of Tamil Nadu Minor Mineral Concession Rules, 1959)

LOCATION OF THE APPLIED AREA

STATE	:	TAMILNADU
DISTRICT	:	KANCHEEPURAM
TALUK	:	UTHIRAMERUR
VILLAGE	:	SIRUTHAMUR
S.F.NO'S	:	275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	:	3.35.5HECTARES

ADDRESS OF THE APPLICANT

Mr. S.Rajendiran

S/o. Mr.Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy, Chennai-600 032.Tamil Nadu.
Mobile No: +919444453471.

PREPARED BY

Dr. S.KARUPPANNAN.M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(A NABET Accredited & ISO Certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +917010076633
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CONTENTS

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Precise Area Communication letter	I
2.	Copy of the FMB	II
3.	Copy of PWD letter	III
4.	Copy of Village map	IV
5.	Copy of "A" register	V
6.	Copy of land documents	VI
7.	Photocopy of the Lease area	VII
8.	Copy of agreement from Explosive License holder, Explosive License, Blaster certificate	VIII
9.	Copy of ID Proof authorized signatory	IX
10.	Copy of RQP Certificate	X

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Key Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Topo Sheet Map	I-B	1:1,00,000
4.	Satellite Imaginary Map	I-C	1:5,000
5	Environmental Plan	I-D	1:5,000
6	Mine Lease Plan	II	1:1000
7	Surface, Geological Plan	III	1:1000
8	Geological Sections	IIIA	HOR 1:1000 VER 1:500
9	Year wise Development and Production Plan	IV	1:1000
10	Year wise Development Production sections	IVA	HOR 1:1000 VER 1:500
11	Mine Layout Plan and Land Use Pattern	V	1:1000
12	Conceptual Plan	VI	1:1000
13	Conceptual Sections	VIA	HOR 1:1000 VER 1:500

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Mr. S.Rajendiran
S/o. Mr.Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy, Chennai-600 032.Tamil Nadu.
Mobile No:+919444453471.

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of rough stone and gravel quarry over an extent of 3.35.5hectares of patta Land in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State has been prepared by

Dr. S.KARUPPANNAN.M.Sc., Ph.D., Reg. 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
(A NABET accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +917010076633,
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
(S. RAJENDIRAN)

Mr. S.Rajendiran
S/o. Mr.Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy, Chennai-600 032.Tamil Nadu.
Mobile No:+919444453471.

DECLARATION

The Mining Plan in respect of rough stone and gravel quarry over an extent of 3.35.5 hectares of Patta Land in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State has been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

Place: Kancheepuram, TN

Date:

Signature of the Applicant

(S. RAJENDIRAN)

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(A NABET accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +917010076633,
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

This is to certify that, the provisions of 19(1), 20 and 33 Tamil Nadu Minor Mineral Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease over an extent of 3.35.5hectares of patta land in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State applied by **Mr.S.Rajendiran,** Chennai-600032.

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: 30/09/2021

Signature of the Recognized Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post Office,
Dharmapuri - 636 705. Tamil Nadu, India.
E-mail : info.gtmsdpi@gmail.com
website : www.gtmsind.com

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(A NABET accredited & ISO certified Company)
No: 1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office, Dharmapuri-636705
Ph: +91 9443937841, +917010076633,
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

CERTIFICATE

Certified that, in Preparation of Mining Plan for rough stone and gravel quarry over an extent of 3.35.5hectares of patta land in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State for **Mr.S.Rajendiran,** Chennai-600032 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: 30/09/2021

Signature of the Recognized Qualified Person

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post Office,
Dharmapuri - 636 705. Tamil Nadu, India.
E-mail : info.gtmsdpi@gmail.com
website : www.gtmsind.com

MINING PLAN

FOR SIRUTHAMUR ROUGH STONE AND GRAVEL QUARRY LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

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

Lease period 5 Years ***(from the date of lease execution)***

(Prepared under rule 41 (3) (i) of Tamil Nadu Minor Mineral Concession Rules, 1959)

INTRODUCTORY NOTES:

a). **Introduction:** The Mining Plan with progressive quarry closure plan is prepared for Mr.S.Rajendiran S/o. Mr. Sevagaperumal residing at 2/4, Jothi Nagar Main Road, Ekattuthangal, Guindy, Chennai-600032, TamilNadu and filed with application for new proposals has submitted to Assistant Director of Geology and Mining (ADG & M), Kancheepuram dated 04.12.2020 to grant of quarry lease for rough stone and gravel, over an extent of 3.35.5hectares in S.F.No's. 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State.

b). **Lease area particulars:** The Assistant Director, Department of Geology and Mining, Kancheepuram has directed to the applicant **Mr.S.Rajendiran** through his precise area communication letter Roc.No. 302/Q3/2020 Dated 06.09.2021 before execution of lease deed should submit the mining plan for approval and obtain Environmental Clearance from the competent authority of State Level Environment Impact Assessment Authority-Tamil Nādu (SEIAA-TN) 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 prepared for a grant of quarrying of rough stone and gravel, over an extent of 3.35.5Hectares in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, Tamil Nadu State for a period of 5 years under Rule 19(1), 20 and 33 of Tamil Nadu Minor Mineral Concession Rules, 1959 and granting quarry lease with conditions of safety distance as given below,

1) A safety distance of 7.5metres and 10meters should be provided to the adjacent patta and Government poramboke lands respectively and 300m safety distance should left out for habitation while quarrying.
2) Should not cause any hindrance to the public and public property while quarrying operations.
3) In S.F.No. 275 towards northern drainage is situated as in S.F.No.167, 168 and 237 as respectively and should not occupied. A 10m safety distance left for water drainage in northern side of lease area which is situated in S.F.No's. 167, 168, 237 and all the rules laid down in the Public Works Department should be followed. (Ref. Annexure-III).
4) Accordingly, approved mining plan to grant lease area should be prepared under 41 of Tamilnadu Minor Mineral Concession Rules, 1959 by the applicant
5) In 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-Tamil Nadu (SEIAA).

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. 302/Q3/2020 Dated 06.09.2021.**

d). **Geological resources and Minable Reserves:** Geological resource of rough stone is estimated as **1609056Cbm** and gravel about **67044Cbm**. Minable reserves of rough stone is estimated about **638665Cbm** and gravel is **55070Cbm** up to depth of 50meters (0-2m Gravel + 3-48m rough stone) after leaving necessary safety distance from the lease boundary.

e). **Proposed Production Schedule:** Total Proposed production of rough stone is **638665Cbm** and gravel is **55070Cbm** up to a depth of 50meters (0-2m Gravel + 3-48m rough stone) for the 5 years plan period. Average production shall be **127733Cbm** of rough stone and **18356Cbm** of Gravel per year.

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

a). **Interstate boundary:** There is no interstate boundary found within radius of 10Km.

b). **Wildlife Protection Act, 1972:** There is no wild life animal sanctuary within 10Kms radius from the project site area under the Wildlife (Protection) Act, 1972.

c). **Indian Reserve Forest Act, 1980:** There is no nearest reserve found around 1km radius. The nearest reserve forest is Kavanippakkam RF is about 1.2km and Idumichi RF is situated about 2.5km away on southern side as respectively.

d). **CRZ Notification, 1991/2011:** There is no Sea coastal zone found around 10kms radius and this project site doesn't attract CRZ Notification, 1991/2011.

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

i) Avoid uneven rat hole mining and follow scientific and systematic mining by safe bench system of open cast mining

ii) Unnecessary land degradation should be avoided or damaged land should be reclaimed or rehabilitated.

iii) Dust Control at source while drilling and blasting,

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

v) 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.

vi) Mining near major fracture zones if any should be avoided to control ground water fluctuation in the adjacent agricultural lands.

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

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

1.0	GENERAL:		
a.	**Name of the Applicant**	:	Mr.S.Rajendiran
	Applicant address	:	Mr. S.Rajendiran, S/o. Mr.Sevagaperumal, No.2/4, Jothi Nagar Main Road, Ekattuthangal, Guindy, Chennai-600 032.Tamil Nadu.
	District	:	Chennai
	State	:	Tamil Nadu
	Pin code	:	600032
	Phone	:	+919444453471
	Fax	:	Nil
	Gram	:	Nil
	Telex	:	Nil
	E-mail	:	---
b.	**Status of the Applicant**		
	Private individual	:	Private Individual
	Cooperative Association	:	---
	Private company	:	---
	Public Company	:	---
	Public Sector Undertaking	:	---
	Joint Sector Undertaking	:	---
	Other (pl. specify)	:	---
c.	**Mineral(s) Which are occurring in the area and which the applicant intends to mine**	:	Rough Stone and Gravel quarry
d.	**Period for which the mining lease granted /renewed/ proposed to be applied**	:	Mining plan proposed for the period of five years from the date of lease execution.
e.	**Name of the RQP preparing the Mining Plan**	:	Dr. S.KARUPPANNAN,M.Sc.,Ph.D.,
	Address	:	**GEO TECHNICAL MINING SOLUTIONS** (A NABET accredited & ISO certified Company) No: 1/213-B, Ground Floor, Natesan Complex, Oddapatti, Collectorate Post office, Dharmapuri-636705 Ph: +91 9443937841, +917010076633.

			E-mail: info.gtmsdpi@gmail.com, Website: www.gtmsind.com
	Phone	:	+91 9443937841, 7010076633.
	Fax	:	Nil
	e-mail	:	info.gtmsdpi@gmail.com
	Telex	:	04342-232777
	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 Assistant Director, Department of Geology and Mining, Kancheepuram his precise area communication letter **Roc.No. 302/ Q3/2020 Dated 06.09.2021.**

2.0 LOCATION AND ACCESSIBILITY:

a.	**Details of the Area**	:	Refer plate no: I, IA & IB,
	District & State	:	Kancheepuram, Tamil Nadu
	Taluk	:	Uthiramerur
	Village	:	Siruthamur
	Khasra No./ Plot No./ Block Range/Felling Series etc.	:	275/1B (0.40.5), 275/2A (1.58.0), 238/1A (0.22.0), 238/1B (0.46.0), 238/1C (0.32.5) and 238/1D (0.36.5)
	Lease area (hectares)	:	3.35.5Hect
	Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	The proposed lease area is recorded as patta land (Ref. Annexure No. V)
	Ownership / Occupancy	:	This is a patta land of S.F.No's. 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D is registered on the name of S.Rajendiran S/o Sevagaperumal as vide Patta No. 4271.
	Existence of Public Road / Railway line if any nearby and approximate distance	:	• Exploited materials shall be transported through the approach road is situated on the southwestern side. • The SH-789 road is situated about 2.5 kilometers away on western side which is

			connecting Kancheepuram - Uthiramerur road. * There is no NH-road is situated around 10km radius. * There is no railway line is situated around 5km radius from the lease area.
	Toposheet No. with latitude and longitude	:	Toposheet No. **57 P/14** Latitude : From 12°43'17.16"N to 12°43'24.52"N longitude: From 79°51'39.66"E to 79°51'49.00"E

Geo-Coordinates of the lease boundary

Pillar ID	Latitude (mN)	Longitude (mE)
1	12°43'21.50"N	79°51'49.00"E
2	12°43'17.16"N	79°51'47.98"E
3	12°43'18.01"N	79°51'44.68"E
4	12°43'18.79"N	79°51'42.12"E
5	12°43'20.32"N	79°51'42.61"E
6	12°43'20.69"N	79°51'40.84"E
7	12°43'20.92"N	79°51'39.66"E
8	12°43'24.52"N	79°51'40.78"E
9	12°43'23.97"N	79°51'41.84"E
10	12°43'22.46"N	79°51'45.59"E
11	12°43'21.88"N	79°51'47.10"E
12	12°43'21.57"N	79°51'48.64"E

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

i) INFRASTRUCTURE AND COMMUNICATION:

a.	Nearest post office	:	Post office is available at Madur about 3.0km away from the site towards northwestern side.
b.	Nearest police station	:	Police Station is available at Palur about 8.0km away from the site towards North side.
c.	Nearest fire station	:	Fire Station is available at Uttiramerur about 16km away from the site towards southwestern side.
d.	Nearest Medical facility	:	Primary health center is available at Palur about 8.0km away from the site towards North side.
e.	Nearest school	:	Primary School Education is available at Palur about 8.0km away from the site towards North side.
f.	Nearest Taluk Road	:	The district road-789 is situated about 2.5km away from the western side which is connecting Walajabad-Nelvay
g.	Nearest Rail Head	:	The Nearest Railway junction is available at Kancheepuram about 20.5km away from NW side.
h	Nearest Railway station	:	The Nearest Railway station is available at Palayaseevaram about 7.5km away from North side.
i	Nearest port facility	:	The Nearest Port is available at Chennai about 65km away from Northeastern side.
j	Nearest Airport	:	The Nearest Airport is available at Chennai about 52km away from eastern side
k	Nearest DSP office	:	The Nearest DSP office is available at Kancheepuram about 20.5km away on the NW side.
l	Nearest Villages	:	i. North - Arunkunram - 1.20km ii. South - Anambukkam - 0.390km iii. East - Kurumananjeri - 3.3km iv. West - Siruthamur - 3.0km

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 lease area is flat terrain with little elevated about 1-2meters and altitude of 60m maximum and minimum 58m from the MSL. The area is sloping towards southwestern side and falls in toposheet no. 57 P/14.

(ii) **a) Geology:**

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 of gondwana rocks, the sedimentary rocks, in faulted troughs and in the rugges topography of crystalline rocks took place during jurassic period. The insitu soils laterites and alluvial deposits were deposited along the palar and cheyyar rivers during the quaternary period. The data have been checked by field studies and survey of India topographical maps at the 1: 1,0 0,000 scale. **Order of superposition of the as given below,**

Age	Group	Rock Formation
Recent	Alluvium and beach sands	Sand, gravel, silt and clay
Pleistocene	Laterite, soils,	Laterites, sandy clay, silt

		talus		
		----------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
(iii)	**i) Topography of the proposed lease area:**	:	**i) Topography of the proposed lease area:** The lease area is flat terrain with little elevated about 1-2meters and altitude of 60m maximum and minimum 58m from the MSL. The area is sloping towards southwestern side. Charnockite is applied to any orthopyroxene rock, 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, manufacturing of hollow bricks. In some places, Charnockite is used as grinder stone. Charnockites is exposed as excavated **ii) Mode of origin:** The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. The constituents of the rock suggests of its origin in particularly dry and high temperature conditions which is deduced to have an important bearing in explicating prehistoric crustal development of the earth. **iii) Physiography of the rocks:** General characteristics of the rocks of this series has recorded that the rocks are in general bluish gray or darkish in colour and extremely fresh	

			in appearance with an even grained granular structure. **iv) Chemical composition of rocks:** The compositional characteristics of coexisting orthopyroxene, garnet and biotite have established several petrographic varieties within the charnockites–enderbites such as the granulites and gneisses. The mineral composition shows an unvarying presence of pleochroic rhombic pyroxene. Plagioclase feldspars, alkali feldspars and quartz are the salic minerals present in this series of rocks. **Order of superposition of the proposed lease area,**

Age	Group	Rock Formation
Recent to Sub recent	----	Clay with cotton Soil (2m thick)
Archaean	Charnockite Group	Charnockite.

(iv)	Drainage Pattern	:	There is no major river located within a radius of 500m radius. The Siruthamur periya Eri is situated about 820m away from the southern side 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 5 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:***		
	a. Present status	:	No exploration carried out. 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 with ground level at various places in grid pattern with various lithological considerations of the surface.
(c)	Geological sections	:	Geological plan is prepared as 1: 1000 Scales with

	should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000.		ground level at various places in grid pattern with various lithological factors 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's-III & IIIA.

(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 :-***

Year	No.of borcholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions
First	N.A	---	---	N.A
Second	N.A	---	---	N.A
Third	N.A	---	---	N.A
Fourth	N.A	---	---	N.A
Fifth	N.A	---	---	N.A

No future exploration programme is proposed in this area. It's a massive Charnockites homogeneous parent rock. Hence, exploration proposal is not required to this mining project.

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

The geological resources were computed by drawing two cross sections with respect to the boundaries of the lease area. We divide the lease area into two cross sections by make a regular shape and obtain the maximum volume of material clutched from the quarry. The two cross sections are XY-AB and XY-CD. XY represent the horizontal lines and AB, CD are the vertical lines which finalize the deposits in the irregular shape of the lease area. Geological resource of gravel is estimated as **67044Cbm** and rough stone is estimated as **1609056Cbm** upto a depth of 50m below ground level and its R.L lies between 59-09m. (Refer Plate No's. III & IIIA).

The gravel obtained upto depth of 0-2m average and rough stone signs from 3m to 48m depth below the ground level.

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	90	98	2	17640	.....	17640
	I	90	98	3	26460	26460	.....
	II	90	98	5	44100	44100	.....
	III	90	98	5	44100	44100	.....
	IV	90	98	5	44100	44100	.....
	V	90	98	5	44100	44100	.....
	VI	90	98	5	44100	44100	.....
	VII	90	98	5	44100	44100	.....
	VIII	90	98	5	44100	44100	.....
	IX	90	98	5	44100	44100	.....
	X	90	98	5	44100	44100	.....
				TOTAL	**441000**	**423360**	**17640**
XY-CD	I	179	138	2	49404	.....	49404
	I	179	138	3	74106	74106	.....
	II	179	138	5	123510	123510	.....
	III	179	138	5	123510	123510	.....
	IV	179	138	5	123510	123510	.....
	V	179	138	5	123510	123510	.....
	VI	179	138	5	123510	123510	.....
	VII	179	138	5	123510	123510	.....
	VIII	179	138	5	123510	123510	.....
	IX	179	138	5	123510	123510	.....
	X	179	138	5	123510	123510	.....
				TOTAL	**1235100**	**1185696**	**49404**
				GRAND TOTAL	**1676100**	**1609056**	**67044**

(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 **55070Cbm** and rough stone estimated as **638665Cbm** up to depth of 50m (2m Gravel + 48m 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 and sections are prepared as horizontal axis, 1:500 as vertical axis. It is given as plate no's-VI & VIA.

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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	83	81	2	13446	.....	13446
	I	83	81	3	20169	20169	.....
	II	78	71	5	27690	27690	.....
	III	73	61	5	22265	22265	.....
	IV	68	51	5	17340	17340	.....
	V	63	41	5	12915	12915	.....
	VI	58	31	5	8990	8990	.....
	VII	53	21	5	5565	5565	.....
				TOTAL	**128380**	**114934**	**13446**
XY-CD	I	172	121	2	41624	.....	41624
	I	172	121	3	62436	62436	.....
	II	167	111	5	92685	92685	.....
	III	162	101	5	81810	81810	.....
	IV	157	91	5	71435	71435	.....
	V	152	81	5	61560	61560	.....
	VI	147	71	5	52185	52185	.....
	VII	142	61	5	43310	43310	.....
	VIII	99	51	5	25245	25245	.....
	IX	94	41	5	19270	19270	.....
	X	89	31	5	13795	13795	.....
				TOTAL	**565355**	**523731**	**41624**
				GRAND TOTAL	**693735**	**638665**	**55070**

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 proposed area fresh lease covered with gravel deposit. The mining operation is open-cast, semi-machined mining methods are adopted and on single shift basis only. Under the regulation 106 (2) (b) of the Metalliferous Mines Regulations, 1961 in all open cast 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.

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

Year	Pit No.(s)	Topsoil/ Overburden (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	---	158495	134159	---	---	24336	---
Second	I	---	149850	128070	---	---	21780	---
Third	II	---	136690	127736	---	---	8954	---
Fourth	II	---	126490	126490	---	---	---	---
Fifth	II	---	122210	122210	---	---	---	---
Total	---	---	**693735**	**638665**	---	---	**55070**	---

c.	*Composite plans and Yearwise sections(In case of 'A' class mines):*	:	Not applicable

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

Year	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume In CBM	Production in CBM	Gravel in CBM
I	XY-AB	I	83	81	2	13446	.....	13446
	XY-AB	I	83	81	3	20169	20169	.....
	XY-AB	II	78	71	5	27690	27690	.....
	XY-AB	III	73	61	5	22265	22265	.....
	XY-CD	I	45	121	2	10890	.....	10890
	XY-CD	I	45	121	3	16335	16335	.....
	XY-CD	II	45	111	5	24975	24975	.....
	XY-CD	III	45	101	5	22725	22725	.....
					TOTAL	**158495**	**134159**	**24336**
II	XY-CD	I	90	121	2	21780	.....	21780
	XY-CD	I	90	121	3	32670	32670	.....
	XY-CD	II	90	111	5	49950	49950	.....

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	XY-CD	III	90	101	5	45450	45450	.....
					TOTAL	149850	128070	21780
III	XY-CD	I	37	121	2	8954	.....	8954
	XY-CD	I	37	121	3	13431	13431	.....
	XY-CD	II	32	111	5	17760	17760	.....
	XY-CD	III	27	101	5	13635	13635	.....
	XY-CD	IV	157	91	5	71435	71435	.....
	XY-AB	IV	45	51	5	11475	11475	.....
					TOTAL	136690	127736	8954
IV	XY-AB	IV	23	51	5	5865	5865	.....
	XY-AB	V	63	41	5	12915	12915	.....
	XY-CD	V	152	81	5	61560	61560	.....
	XY-CD	VI	130	71	5	46150	46150	.....
					TOTAL	126490	126490	.....
V	XY-CD	VI	17	71	5	6035	6035	.....
	XY-AB	VI	58	31	5	8990	8990	.....
	XY-AB	VII	53	21	5	5565	5565	.....
	XY-CD	VII	142	61	5	43310	43310	.....
	XY-CD	VIII	99	51	5	25245	25245	.....
	XY-CD	IX	94	41	5	19270	19270	.....
	XY-CD	X	89	31	5	13795	13795	.....
					TOTAL	122210	122210	.....
					GRAND TOTAL	693735	638665	55070

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

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

At this rate of production, the expected life of quarry is calculated for periods and production details are given as below: -

Rough stone:

Mineable reserves of rough stone = **638665Cbm**

Five years production = **638665Cbm**

Monthly production of rough stone = **10644Cbm**

Life of Mine (638665/10644) = 5 years

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.

f. ***Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:***

i) Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame: : Exploration program is not proposed in this area. It's a massive Charnockites homogeneous parent rock. Hence, exploration proposal is not required to this mining project.

ii) Weather ultimate pit limit has been determined and demarcated on surface and geological plan:-

The ultimate pit limit has been determined and demarcated in the conceptual mining plan

ULTIMATE PIT LIMIT XY-AB					
Bench	**Bench R.L**	**Overburden/ Mineral**	**Length (m)**	**Width (m)**	**Depth (m)**
I	R.L.59-57m	Gravel	83	81	2
	R.L.57-54m	Rough stone	83	81	3
II	R.L.54-49m	Rough stone	78	71	5
III	R.L.49-44m	Rough stone	73	61	5
IV	R.L.44-39m	Rough stone	68	51	5
V	R.L.39-34m	Rough stone	63	41	5
VI	R.L.34-29m	Rough stone	58	31	5
VII	R.L.29-24m	Rough stone	53	21	5
				Total	**35m**

ULTIMATE PIT LIMIT XY-CD					
Bench	**Bench R.L**	**Overburden/ Mineral**	**Length (m)**	**Width (m)**	**Depth (m)**
I	R.L.59-57m	Gravel	172	121	2
	R.L.57-54m	Rough stone	172	121	3
II	R.L.54-49m	Rough stone	167	111	5
III	R.L.49-44m	Rough stone	162	101	5
IV	R.L.44-39m	Rough stone	157	91	5

V	R.L.39-34m	Rough stone	152	81	5
VI	R.L.34-29m	Rough stone	147	71	5
VII	R.L.29-24m	Rough stone	142	61	5
VIII	R.L.24-19m	Rough stone	99	51	5
IX	R.L.19-14m	Rough stone	94	41	5
X	R.L.14-09m	Rough stone	89	31	5
				Total	**50m**

	iii) Weather the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity:-	:	There is no mine waste in the form of such as weathered rock or other subgrade mineral will be exploited in the proposed the lease area. If rough stone may be unsold, the materials will be keeping within the lease boundary.
	iv) Weather back filling of pits after recovery of mineral upto techno-economically feasible depth envisaged. If so, describe the broad features of the proposal:-	:	There is no immediate proposal for back filling as the charnockite's deposit is still persists at deeper level.
	v) Weather 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 proposed area fresh lease covered with gravel deposit. The mining operation is open-cost, semi-machined methods of mining are adopted and on single shift basis only. Under the regulation 106 (2) (b) 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 is adopted.
	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. Bench height = 5mts. Bench width = 5mts.
	a. Details of Topsoil/ Overburden	:	No separate of topsoil shall be removed
	b. Rough Stone waste and side burden waste:-	:	There is no mine waste/side burden shall be removed.
h.	***Underground Mines:***	:	It is an open cast quarry operation only.
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	Nos	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P
Jack Hammer	4	32 mm	Hand held	—	Diesel	—
Compressor	1	—	Air	—	Diesel	—

(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	—	Diesel	—

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

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

(b) Transport from mine head to the destination	:	15 M.T capacity of tipper will be use for transport rough stone from the mine head to needy customer.
c. Describe briefly the transport system (please specify)	:	The hired tipper and excavator will be used for carrying out day to day mining activities on the day basis or hourly basis as per market scenario.
d. Ore transported by : own trucks / hired trucks	:	Hired trucks
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	---	Diesel	—

(4).Miscellaneous:

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

(A) Operations	:	The mining operation is open-cost, semi-machined 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 is adapted. (refer Part-A- 4 (i))

5. **BLASTING :**

a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.

Blasting pattern:

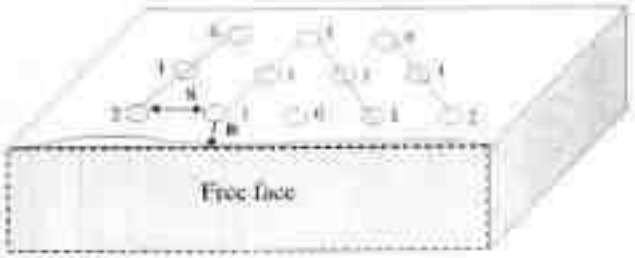
The quarrying operation is proposed to carried out by open cost, semi-mechanized mining in conjunction with conventional method of mining using jack hammer drilling and blasting for shattering effect and loosen the rough stone.

Drilling and Blasting parameters are as follows.

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	:	80^0 from horizontal
Use of delay detonators	:	25 millisecond relay
Detonating fuse	:	" Detonating" cord
Quantity of rock broken per day	:	$426m^3$ x 2.6 = 1193MT
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	:	1193MT per day
Requirement of explosive per day (6M.T per kg of explosives)	:	199 kg per day
Number of holes per day		1193/1.05= 1136 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	=	1136 holes

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 heaving 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 : 1136holes Yield : 1193 tons Powder factor : 6 Tons/Kg of explosives Total explosive required : 199kg-Slurry explosives Charge per hole : 0.5kg Blasting at day time only : 12-1p.m		
	d) Powder factor in ore and overburden / waste / development heading / stope	:	Powder factor is proposed as 6 tonnes per kg of explosives
	e) 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 suitable size for handling by the excavators and crushers.
	f) 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 12.0PM to 1.0PM.
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 55m in rainy season and 60m in summer 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 ultimate depth of mining is 50m bgl. 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 out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things.
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: **No stacking proposed in this mining plan.**		
	b) Land chosen for disposal of waste with proposed justification	:	No separate of topsoil shall be removed.
	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.	:	There is no mine waste/side burden shall be removed in this proposed lease area.
8.	***USE OF MINERAL:***		
	a) Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The excavated stone materials road metal will be supplied to the consumers like road laying, earth filling, building construction, etc
	b) Indicate physical and chemical specifications stipulated by buyers	:	Basically, the materials produced at this quarry are rough stone (Charnockites) and the same are used for building materials and road metal, So there is no chemical specifications are specified. Only physical

			specifications are involved.
	c) Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.	:	Not blending process is involved, after blasting the rough stone boulders will be directly loaded to the needy customer.
9.	***OTHERS***		
	Describe briefly the following a) Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and booth rooms have been provide as per the Metalliferous Mines Rules, 1961 as a welfare amenities for mine laborers.

b) Employment potential :

As per Mines safety under the provisions of 116 (3) (a) Metalliferous Mines Rules, 1961, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate and Geologist to keep all the production workers directly under his control and supervision.

The following man power is proposed for quarrying rough stone 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 as per the norms.

1.	Highly Skilled	Quarry Manger	1No.
		Mines Forman	—
		Mechanical Engineer	—
		Account cum & admin	1No.
2.	Skilled	Earth moving Operator	4 Nos.
		Driver	4 Nos.
		Mechanic	—
		Blaster/Mat	1 No.
3.	Semi – skilled	Helpers, Greaser's	3 Nos
4.	Unskilled	Musdoor / Labours	12Nos
		Cleaners	2Nos
		Attendant's	1No
		Total =	**29Nos**

10	**MINERAL PROCESSING/BENEFICIATIONS:**		
	a) If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent	:	Excavated rough stone materials shall be directly sale to the needy customer.

	to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.		Also can be used by the applicant in his own crusher for required size (i.e 1/4", 1/2", 1/3" and 1") The recovery of rough stone in this quarry is 100%.
	b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailing dam).	:	No 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.
	c) A flow sheet or schematic diagram of the processing procedure should be attached.	:	Not applicable.
	d) Specify quantity and type of chemicals to be used in the processing plant.	:	Not applicable
	e) Specify quantity and type of chemicals to be stored on site / plant.	:	Not applicable
	f) Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.	:	Drinking is 0.300KLD, Utilized water is 1.5KLD, Dust suppression is 2.0KLD and Green Belt is 2.0KLD. Minimum quantity of water 5.8KLD per day has to be maintained. It is proposed to make an own borehole for providing uninterrupted supply of RO drinking water, dust suppression and Green belt development.

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.

S.No	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Area Under Quarrying	Nil	2.63.0
2.	Infrastructure	Nil	0.01.0
3.	Site Road	Nil	0.02.0
4.	Unutilized	3.35.5	0.09.5
5.	Safety & Green Belt	Nil	0.60.0
	Total	**3.35.5**	**3.35.5**

11.2	Water Regime	:	Water table in this area is noticed at a depth of 55m in rainy and 60m in summer season from general ground level and presently the quarrying of Rough Stone is proposed up to a depth of 50m. Hence, it will not affect the ground water depletion of this area. It is proposed to make an own borehole 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. 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 suppressed by periodical wetting of land by water

			spraying. Quarrying of Rough Stone 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.
11.5	Climatic conditions	:	A tropical climate prevails in the region and the annual rainfall varies between 700 and 1600 mm. The northeast monsoon offers the major share of the rainfall when compared to the southwest monsoon. The temperature in the study area varies between 13°C and 43°C with a relative humidity range between 65% and 85%.
11.6	Human Settlement: The nearest villages are found in the buffer zone with population as per 2011 census. The Sirathamur village as 207 houses of 1543 peoples both Male (790) and Female (753).		
11.7	Public buildings, places of worship and monuments	:	No infrastructure like residential building, places of special interest like archeological monuments, etc., are found around 300m radius.
11.8	Attach plans showing the locations of sampling stations	:	The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification

S.No	Village	Direction	Distance in Kms	Population
1	Arunkunram	North	1.20km	1094
2	Anambakkam	South	0.390km	1380
3	Kurumananjeri	East	3.3km	1210
4	Sirathamur	West	3.0km	1543

			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, 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:

S.No	Land Use	Present Area (Hect)	Area in use during the quarrying period (Hect)
1.	Area Under Quarrying	Nil	2.63.0
2.	Infrastructure	Nil	0.01.0
3.	Site Road	Nil	0.02.0
4.	Unutilized	3.35.5	0.09.5
5.	Safety & Green Belt	Nil	0.60.0
	Total	**3.35.5**	**3.35.5**

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 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.
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		No major river is found around 50m radius.
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 found around 10kms radius.

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

i).	Temporary storage and utilization of topsoil	:	No separate of topsoil 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 quarries / pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water is given.	:	The present mining is proposed to an ultimate depth of 50m 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.

iii). ***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.***

Year	Place	Type of trees	No.of plants	Rate of survival
First	Lease boundary and Village Road	Neem, Pungan, Casuarinas and other regional trees	150	80%
Second	Lease boundary and Village Road	Neem, Pungan, Casuarinas and other regional trees	150	80%
Third	Lease boundary and Village Road	Neem, Pungan, Casuarinas and other regional trees	150	80%
fourth	Lease boundary and Village Road	Neem, Pungan, Casuarinas and other regional trees	150	80%
Fifth	Lease boundary and Village Road	Neem, Pungan, Casuarinas and other regional trees	150	80%

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).	:	There is no other mine waste shall be proposed.
v).	Measures to control erosion / sedimentation of water courses	:	There is no dump are proposed.
vi).	Treatment and disposal of water from mine.	:	It will not be harmful and it does not require any treatment before discharging into the natural courses
vii).	Measures for minimizing adverse effects on water regime.	:	There is no water to be pumped out, mine water will be very pure and portable hence it will not affect any water regime surrounding the quarry. Periodical water analysis will be carryout for water quality monitoring.
viii) .	Protective measures for ground vibrations / air blast caused by blasting.	:	It is a 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 QUARRY CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The present mining is proposed to an average depth of 50m bgl. 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 150 trees per year will be proposed. No immediate proposals for closure of pit as the 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 renewed mining lease
12.4	Mine closure activity	:	The present mining is proposed to an average depth of 50m bgl 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.
12.5	Safety and security	:	Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine rules, 1961, 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	:	Open cast, semi-mechanized method of mining is adopted in this quarry. If the benches are made with proposed height and with 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 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 man power entrenchments	:	During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 29 labors will be improved.

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

A.	**Fixed Asset Cost/Investment:**		
	1. Capital Cost	:	Rs. 20,00,000/-
	2. Infrastructure (Labour Shed)	:	Rs. 1,00,000/-
	3. Sanitary Facility	:	Rs. 75,000/-
	4. Fencing	:	Rs. 2,00,000/-
	5. Others	:	Rs 1,50,000/-
	Total	:	**Rs. 25,25,000/-**
B.	**Operational cost**		
	1. Machinery's	:	Rs. 10,00,000/-
C.	**EMP Cost: per year** (Minimum 2 station * 2 season):		
	1. Air quality test	:	Rs. 30,000/-
	2. Water quality sampling (2 Nos)	:	Rs. 25,000/-
	3. Noise test	:	Rs. 25,000/-
	4. Soil analysis	:	Rs. 25,000/-
	Total cost	:	**Rs. 1,05,000/- per year**
	Total cost for 5 Years	:	**Rs. 5,25,000**
D.	**Expenditure cost** (for five years)		
	1. Drinking Water Facility	:	Rs. 1,00,000/-
	2. Sanitary Maintenance	:	Rs. 75,000/-
	3. Water Sprinkling	:	----
	4. Afforestation and maintained	:	Rs. 1,00,000/-
	5. Safety Kits	:	Rs. 1,00,000/-
	Total	:	**Rs. 3,75,000/-**
E.	**Total Project Cost(A+B+C+D)**	:	**Rs. 44,25,000/-**

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 rough stone 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, Kancheepuram his letter Roc.No. **302/Q3/2020 Dated 06.09.2021.**

(iv) The proposed production of Rough Stone is **638665Cbm** and gravel is **55070Cbm** for the five years Mining Plan period up to a depth of 50m (0-2m Gravel + 3-48m Rough stone) from below the ground level.

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: 30/09/2021

Signature of Recognized Qualified Person.

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
1213-B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post Office,
Dharmapuri - 636 705. Tamil Nadu, India.
E-mail : info.gtmsdpi@gmail.com
website : www.gtmsind.com

This Mining Plan is approved subject to the conditions / stipulations indicated in the Mining Plan approval Letter No. RC.No. 302/Q2/2020.
Dated. 1-10-2021

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

9/10/2021

ANNEXURE - I

நக.எண். 302/கூபு3/2020
நாள்:06.09.2021

உதவி இயக்குநர் அலுவலகம்,
புவியியல் மற்றும் சுரங்கத்துறை,
காஞ்சிபுரம்.

அறிவிக்கை

பொருள் : கனிமங்களும் குவாரிகளும் – சாதாரண கற்கள் மற்றும் கிராவல் மண் – காஞ்சிபுரம் மாவட்டம் – உத்திரமேரூர் வட்டம் – சிறுதாமூர் கிராமம் – புல எண்கள். 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D-ல் மொத்த பரப்பு 3.35.50 ஹெக்டேர் – புன்செய் பட்டா நிலம் – சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டி எடுக்க திரு.S. ராஜேந்திரன் த/பெ திரு. சேவுகப்பெருமாள் என்பவர் தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.19(1)-ன்கீழ் மனு செய்தது - தகுதி வாய்ந்த நிலப்பரப்பாக தெரிவித்தல் – தொடர்பாக.

பார்வை : 1. திரு.S. ராஜேந்திரன் த/பெ திரு. சேவுகப்பெருமாள், எண்.2/4, ஜோதி நகர் மெயின்ரோடு, ஈக்காட்டுத்தாங்கல், சென்னை 32 என்பவரின் விண்ணப்பம் பெறப்பட்ட நாள். 04.12.2020.

2. காஞ்சிபுரம் வருவாய் கோட்டாட்சியர் அறிக்கை எண். ந.க.3922/2020/அ1, நாள் 02.02.2021

3. செயற்பொறியாளர், நீ.ஆ.து., கீழ்பாலாறு வடிநிலக்கோட்டம், காஞ்சிபுரம் அவர்களின் கடித எண். இ.ஆ(5)/கோ.28 (NOC - சிறுதாமூர்)/ 2021/ நாள்.08.06.2021

4. காஞ்சிபுரம், புவியியல் மற்றும் சுரங்கத்துறை உதவி இயக்குனர் மற்றும் உதவி புவியியலாளர் அவர்களின் புலத்தணிக்கை அறிக்கை, நாள்:02.09.2021.

5. மற்றும் தொடர்புடைய ஆவணங்கள்

காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராம விண்ணப்பப் புல எண்கள்.275/1(P) (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50), 238/1D (0.36.50)-ல் மொத்த பரப்பு 3.35.50 ஹெக்டேர் பட்டா நிலத்தில் சாதாரண கற்கள் மற்றும் கிராவல்மண் வெட்டியக்க திரு. S.ராஜேந்திரன் த/பெ திரு. சேவுகப்பெருமாள் என்பவர் குவாரி குத்தகை உரிமம் கோரி விண்ணப்பித்துள்ளார்.

மேற்படி விண்ணப்பம் தொடர்பாக காஞ்சிபுரம் வருவாய் கோட்டாட்சியர், காஞ்சிபுரம் கீழ்பாலாறு வடிநிலக்கோட்டம், நீ.ஆ.து., செயற்பொறியாளர், காஞ்சிபுரம் புவியியல் மற்றும் சுரங்கத்துறை, உதவி இயக்குநர் மற்றும் உதவி புவியியலாளர் ஆகியோர் மேற்காணும் விண்ணப்ப புலத்தில் தணிக்கை மேற்கொண்டு, உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராம விண்ணப்பப் புல எண்கள். 275/1B (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50), 238/1D (0.35.50)-ல் மொத்த பரப்பு 3.35.50 ஹெக்டேர் பரப்பளவில் குவாரி அனுமதி வழங்க கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு பரிந்துரை செய்துள்ளனர்.

1. விண்ணப்பப் புலங்களுக்கு அருகிலுள்ள அரசு புறம்போக்கு மற்றும் பட்டா நிலங்களுக்கு முறையே 10 மீட்டர் மற்றும் 7.5 மீட்டர் மற்றும் குடியிருப்பு பகுதிகளுக்கு 300 மீட்டர் பாதுகாப்பு இடைவெளிவிட்டு குவாரிப்பணி செய்யப்பட வேண்டும்.
2. பொதுமக்களுக்கோ, பொது சொத்துக்களுக்கோ யாதொரு சேதமும் இன்றி பாதுகாப்பான முறையில் குவாரிப்பணி செய்ய வேண்டும்.
3. விண்ணப்பப் புல எண்.275க்கு வடக்கே வாய்க்கால் புல எண்.167, 168, 237-ல் எவ்வித ஆக்ரமணமும் செய்யக்கூடாது. மேலும் வாய்க்கால் புல எண்.167, 168, 237-க்கு பொதுப்பணித்துறையினரால் விதிக்கப்பட்ட நிபந்தனைகளுக்குட்பட்டு பரிந்துரைக்கப்பட்ட பாதுகாப்பு இடைவெளி 10 மீட்டர் விட்டுவிட்டு குவாரிப்பணி செய்யப்பட வேண்டும்.
4. தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண்.41-ன்படி விண்ணப்ப புலங்களுக்கு வரைவு சுரங்கத்திட்டம் (Mining Plan) ஒப்புதல் பெற சமர்ப்பிக்கப்பட வேண்டும்.
5. 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 காஞ்சிபுரம் வருவாய் கோட்டாட்சியர், காஞ்சிபுரம் கிழ்வானூறு வடிநிலக்கோட்டம், நீ.ஆ.து., செயற்பொறியாளர், காஞ்சிபுரம் புவியியல் மற்றும் சுரங்கத்துறை, உதவி இயக்குநர் மற்றும் உதவி புவியியலாளர் ஆகியோரின் பரிந்துரையின் அடிப்படையில் காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராம விண்ணப்ப் புல எண்கள் 275/1B (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50), 238/1D (0.36.50)-ல் மொத்த பரப்பு 3.35.50 ஹெக்டேரில் சாதாரண கற்கள் மற்றும் கிராவல்மண் வெட்டியெடுக்க ஐந்து வருட காலத்திற்கு குத்தகை உரிமம் வழங்க தகுதி வாய்ந்த நிலப்பரப்பாக திரு. S.ராஜேந்திரன் த/பெ. திரு.சேவுகப்பெருமாள் என்பவருக்கு தெரிவிக்கப்படுகிறது. மேலும் குவாரி அனுமதி வழங்குவது தொடர்பாக வரைவு சுரங்கத் திட்டத்தை (Mining Plan) மூன்று மாத காலத்திற்குள் உதவி இயக்குநர் முன்பு சமர்ப்பித்து ஒப்புதல் பெறவும் குவாரி உரிமம் பெறுவது தொடர்பாக மாநில சுற்றுச் சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (SEIAA) இசைவினை பெற்று சமர்ப்பிக்கவும் அறிவுறுத்தப்படுகிறது.

உதவி இயக்குநர்
புவியியல் மற்றும் சுரங்கத்துறை,
காஞ்சிபுரம்.

பெறுநர்
திரு.S. ராஜேந்திரன்
த/பெ திரு. சேவுகப்பெருமாள்,
எண்.2/4, ஜோதி நகர் மெயின்ரோடு,
எக்காட்டுத்தாங்கல், சென்னை 32.

நகல்:-
1) தலைவர், மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம், சென்னை.
2) இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, சென்னை 600 032

ANNEXURE - II

வரைபடம்

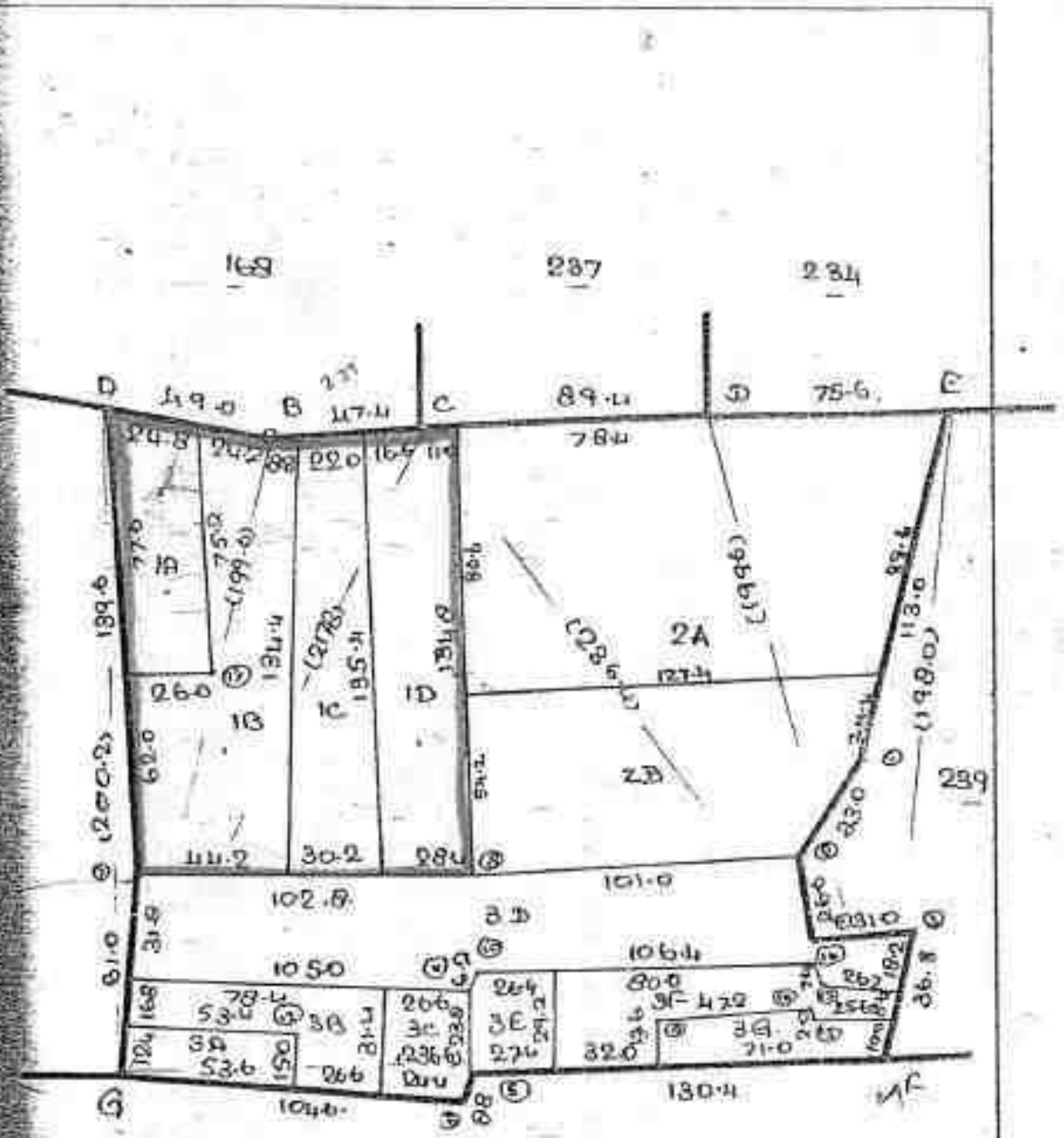
தீர்த்தமலை

எண்: 83

கிராமம் { பெயர் தெரிவிக்கவும்

பிளாக் 239

பரப்பு: மொத்தம் 53.5 ஏ



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

அளவு 270 2000

தலைமை

அளவைப்படிவ எண் 23

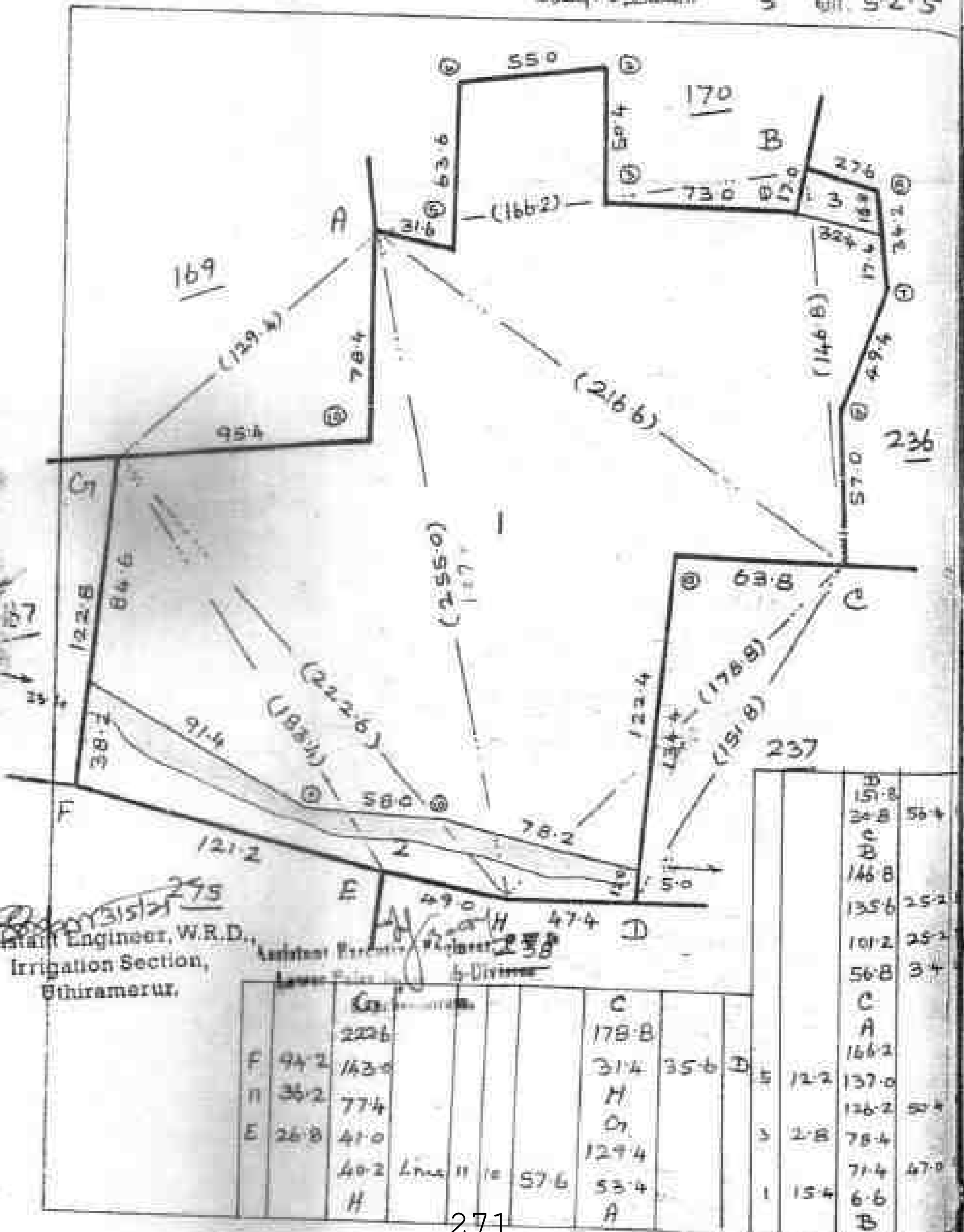
மாவட்டம்: செங்கற்பட்டு

வட்டம்: உத்திரமேரூர்

புல எண்: 168

கிராமம் { எண்: 83; பெயர்: இருதாமூர்

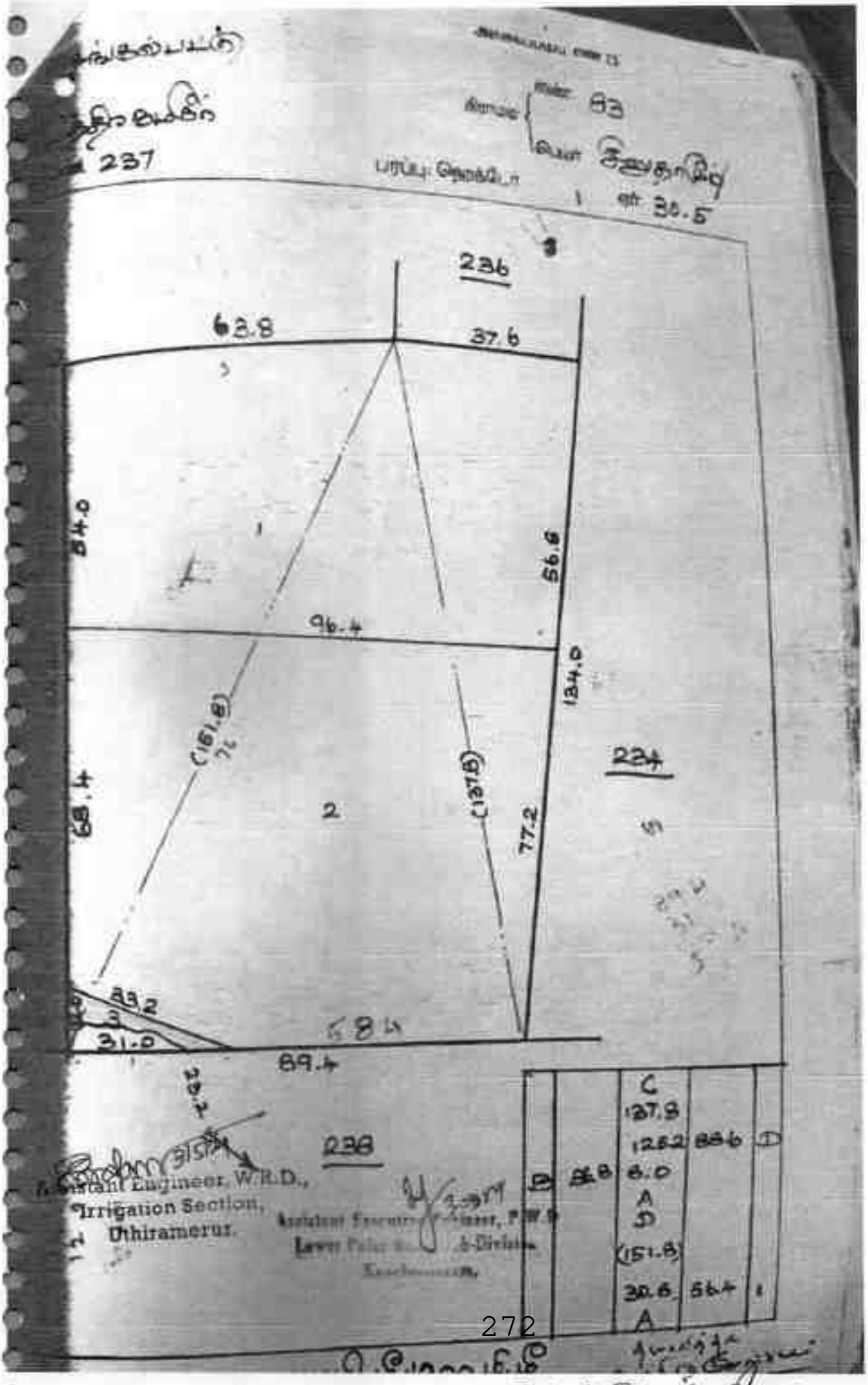
பரப்பு: ஹெக்டேர் 5 ஏ. 52·5



Assistant Engineer, W.R.D.,
Irrigation Section,
Uthiramerur.

Assistant Executive Engineer,
Lower Palar ... Sub-Division

அளவு: 1:2000


237
236
63.8
37.6
84.0
56.6
96.4
134.0
(161.8)
(137.8)
68.4
77.2
224
89.2
31.0
89.4
238
30.5
C
137.8
125.2
886
D
8.8
6.0
A
D
(151.8)
20.6
564
A
Assistant Engineer, W.R.D.,
Irrigation Section,
Uthiramerur.

ANNEXURE-III

"நீரின்றி அமையாது உலகு"
"நீர் நிலைகளை பாதுகாப்போம்"

நீர்வள ஆதாரத்துறை

அனுப்புநர்

பொறி. R.ரமேஷ், B.E.,
செயற்பொறியாளர், நீ.ஆ.து.,
கீழ்பாலாறு வடிநில கோட்டம்,
காஞ்சிபுரம்.
தொலைபேசி – 044-27237907
மின்னஞ்சல் - eelpbkpm@gmail.com

பெறுநர்

துணை இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
காஞ்சிபுரம்.

கடித எண்: இவ.அ 5 / கோ.28(NOC- சிறுதாமூர்)/ 2021 / — /நாள்: 08.06.2021.

அய்யா,

பொருள் :- கனிமங்களும் குவாரிகளும் - சாதாரண கற்கள் மற்றும் கிராவல் மண் - காஞ்சிபுரம் மாவட்டம் - உத்திரமேரூர் வட்டம் - சிறுதாமூர் கிராமம் - புல எண்.275/1(P), 275/2A, 238/1A, 238/1B, 238/1C & 238/1D-ல் – மொத்த பரப்பு 3.35.50 ஹெக்டேர்ஸ் பட்டா நிலம் - சாதாரண கற்கள் / கிராவல் வெட்டி எடுக்க திரு. S. ராஜேந்திரன் த/பெ. சேவுகப்பெருமாள் என்பவர் அனுமதி கோரியது – பட்டா நிலத்தில் செல்லும் வாய்க்கால் புலத்திற்கு விடப்பட வேண்டிய – பாதுகாப்பு இடைவெளி – கருத்துரு சமர்ப்பித்தல் – குறித்து.

பார்வை :- துணை இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, காஞ்சிபுரம் அவர்களின் ந.க.எண்.302/கயு3/2020/நாள். 21.04.2021.

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பார்வையில் காணும் துணை இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, காஞ்சிபுரம் அவர்களின் கடிதத்தில் காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராமத்தில் திரு.S.ராஜேந்திரன் த/பெ.சேவுகப்பெருமாள் என்பவர் அமைக்கவுள்ள கல்குவாரிக்கு அருகே புல எண்.168-ல் செல்லும் வாய்க்காலுக்கு விடப்பட வேண்டிய பாதுகாப்பு இடைவெளி குறித்த கருத்துரு கோரியதற்கு கீழ்கண்டவாறு கருத்துரு பரிந்துரை செய்து சமர்ப்பிக்கப்படுகிறது.

காஞ்சிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சிறுதாமூர் கிராமம் காஞ்சிபுரத்திலிருந்து சாலவாக்கம் செல்லும் சாலையில் சுமார் 32 கி.மீ தொலைவில் அமைந்துள்ளது. மேற்கே சிறுதாமூர் - பழூர் செல்லும் சாலையில் வடக்குப் பகுதியில் 0.50 கி.மீ தொலைவில் மனுதாரரின் புல எண். 275/1(P), 275/2A, 238/1A, 238/1B, 238/1C & 238/1D-ல் ஆகியவற்றில் மொத்த பரப்பு 3.35.50 ஹெக்டேர்ஸ் பரப்பளவு கொண்ட நிலங்களை நான் ஆய்வு செய்யப்பட்டது. மேற்படி புல எண்களின் அருகாமையிலுள்ள புல எண் விவரம் கீழ்கண்டவாறு அட்டவணையிடப்படுகிறது.

வ.எண்	புல எண்	வகைப்பாடு	மனுதாரரின் புல எண் உட்பிரிவு	திசை	குறிப்பு
1	168	வாய்க்கால்	275/1(P) & 275/2A	வடக்கு	
2	168	வாய்க்கால்	238/1A, 238/1B, 238/1C & 238/1D	வடக்கு	

மேற்படி மனுதாரரின் புல எண்களுக்கு வடக்கு திசையில் புல எண்கள்.167, 168, மற்றும் 237-ல் செல்லும் வாய்க்கால் அருங்குன்றம் ஏரிக்கு செல்லும் வரவு கால்வாய் ஆகும். இக்கால்வாய் நீர்குன்றம் ஏரியின் உபரி நீர் கால்வாய் ஆகும்.

எனவே, மேற்படி மனுதாரரின் புல எண்கள்.275 மற்றும் 238ல் குவாரி பணியில் வெடி வெடிப்பதனால் அருங்குன்றம் ஏரியின் வரத்துக்கால்வாய் புல எண்கள். 167, 168 மற்றும் 237-க்கு எவ்வித பாதிப்பும் ஏற்படாத வகையில் புல எண்.275-க்கு வடக்கு திசையில், வாய்க்காலின் புல எண்கள். 167, 168 மற்றும் 237-க்கு வடக்கு திசையில் 313.00 மீ நிளத்திற்கு 10 மீ இடைவெளியில் **(Set Back)** முள்வேலி கம்பியிலான வேலி அமைக்கப்பட வேண்டும். மனுதாரரின் மேலே குறிப்பிட்ட புல எண்களுக்கு அருங்குன்றம் வரவுக்கால்வாய் (புல எண்கள்.167, 168 மற்றும் 237-க்கு)-ன் குறுக்கே சிறுபாலம் அமைத்திட இத்துறையிடம் தடையில்லா சான்றுக்கு விண்ணப்பிக்கும்படி மனுதாரர் கேட்டுக்கொள்ளப்படுகிறார். எனவே கீழ்கண்ட நிபந்தனைகளின் அடிப்படையில் வாய்காலுக்கு பாதுகாப்பு இடைவெளி கருத்துரு சான்று அளிக்கப்படுகிறது.

நிபந்தனைகள் :

1. மனுதாரர் அருங்குன்றம் ஏரி வரவு கால்வாயின் இடது கரையிலிருந்து வடக்குப் பகுதியில் சரியாக 10.00 மீட்டர் தொலைவில் 0.15 x 0.15 x 1.50 மீ அளவுள்ள கல் நடப்பட வேண்டும்.

2. மனுதாரர் வரவு கால்வாய் புல எண்கள்.167, 168 மற்றும் 237-ன் வடக்குப் பகுதியில் (மனுதாரரின் புல எண்கள் 275 மற்றும் 238ன் மேற்குப் பகுதியில்) தமிழ்நாடு ஏரிகள் பாதுகாப்பு மற்றும் ஆக்கிரமிப்பு அகற்றும் சட்டம் 2007ன் படி 30 மீட்டர் இடைவெளியிலும் ஒவ்வொரு வளைவு பகுதியிலும் ஒரு கல் வீதம் 0.15 x 0.15 x 1.50 மீ அளவுள்ள கல் நடப்பட வேண்டும்.

3. மனுதாரர் வரவு கால்வாயின் பகுதியில் நடப்பட்ட கல் பகுதியிலிருந்து மேலே குறிப்பிட்டபடி 10 மீட்டர் தொலைவில் தன்னுடைய பட்டா நிலத்தில் கல் நட்டு முள்வேலி கம்பியிலான வேலி அமைத்து வரவு கால்வாய் பகுதியை சேதப்படுத்தாதவாறு பார்த்துக் கொள்ள வேண்டும்.

4. வரவு கால்வாய் பகுதிகளில் கல்குவாரியில் பணியாற்றும் பணியாளர்கள் திடக்கழிவு, திரவக்கழிவு மற்றும் குப்பை கூளங்களை கொட்டாமல் பார்த்துக் கொள்ள வேண்டும்.

5. அனுகு சாலை தவிர்த்து வரவு கால்வாய் பகுதிகளில் மண் கொண்டு நிரப்பியோ குழாய்களை (Pipes) பதித்தோ தடம் ஏதும் ஏற்படுத்தக்கூடாது.

6. குவாரி பணியின் போது வெடி வெடிப்பதனால் வரவு கால்வாய்க்கு எந்த வித பாதிப்பும் ஏற்படாதவாறு பார்த்துக் கொள்ள வேண்டும்.

7. குவாரி பணியில் விபத்து ஏதும் ஏற்படாதவாறு முன்னெச்சரிக்கை நடவடிக்கை மேற்கொள்ளப்பட வேண்டும். அவ்வாறு விபத்துக்கள் ஏற்படின் அதற்கு பொறுப்பணித்துறை எந்தவிதத்திலும் பொறுப்பேற்காது.

8. குவாரியிலிருந்து உட்சென்று வெளியேறும் டிப்பர், லாரிகள் மற்றும் இதர வாகனங்கள் கால்வாயின் பகுதியில் செல்லக்கூடாது.

9. குவாரி பணிகள் மேற்கொள்ள பயன்படுத்தப்படும் கனரக வாகனங்களினால் (டிப்பர், பொக்லைன் மற்றும் ஜே.சி.பி) வரவு கால்வாய் பகுதிக்கு எந்தவித பாதிப்பும் ஏற்படுத்தக்கூடாது. மேலும் மனுதாரர் பாதுகாப்பு தொகையாக ரூ.2,00,000/- (ரூபாய் இரண்டு இலட்சம்) க்கான வங்கி காசோலை செயற் பொறியாளர், நீ.ஆ.து., கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் அவர்களின் பெயரில் காஞ்சிபுரத்தில் தொகையை எடுக்கும் வண்ணம் எடுத்து இவ்வலுவலகத்திற்கு செலுத்த வேண்டும். இந்த தொகை, குவாரி பணி முடிந்தவுடன் வரவு கால்வாய் பகுதிகளுக்கு எந்தவித பாதிப்பும் இல்லை என துறை அலுவலர்களிடமிருந்து அறிக்கை கிடைக்கப்பெற்ற பின்னரே பாதுகாப்பு தொகையினை திரும்ப வழங்கப்படும்.

10. மனுதாரர் கால்வாயினை கடக்க சிறுபாலம் அமைக்க இத்துறையிடம் முறையாக விண்ணப்பம் செய்து அனுமதி பெற்று சிறுபாலம் அமைத்துக்கொள்ள வேண்டும்.

11. நீர்வள ஆதாரத்துறை அலுவலர்கள் ஆய்வு செய்ய வரும்போது தாங்கள் தடையேதும் செய்திடல் கூடாது.

12. அரசால் அவ்வப்போது நிர்ணயிக்கப்படும் வரன்முறை மற்றும் விதிமுறைகளுக்கு தாங்கள் கட்டுப்பட வேண்டும்.

13. மேற்கண்ட நிபந்தனைகளை மீறும் பட்சத்தில் தங்களுக்கு வழங்கப்பட்ட அனுமதியை இரத்து செய்து மாநில சுற்றுச் சூழல் தாக்க மதிப்பீட்டுக் குழுவிற்கு (SEIAA) க்கு பரிந்துரை செய்யப்படும் என தெரிவித்துக் கொள்ளப்படுகிறது.

இணைப்பு

கிராம வரைபடம் (ம)
ஆவணங்கள்

செயற்பொறியாளர், நீ.ஆ.து.,
கீழ்பாலாறு வடிநிலக் கோட்டம்,
காஞ்சிபுரம்.

08/06/21

[illegible] Quarry NOC

ANNEXURE - IV

KAVANiPAKKAM RESERVED FOREST

Perumal Malai

Meykkai Malai

Periya Eri

Ottaiyanangundru

Palaveri 2 $\frac{1}{2}$ Miles

Palaveri 2 Miles

Thirudankulam

Thirudankulam

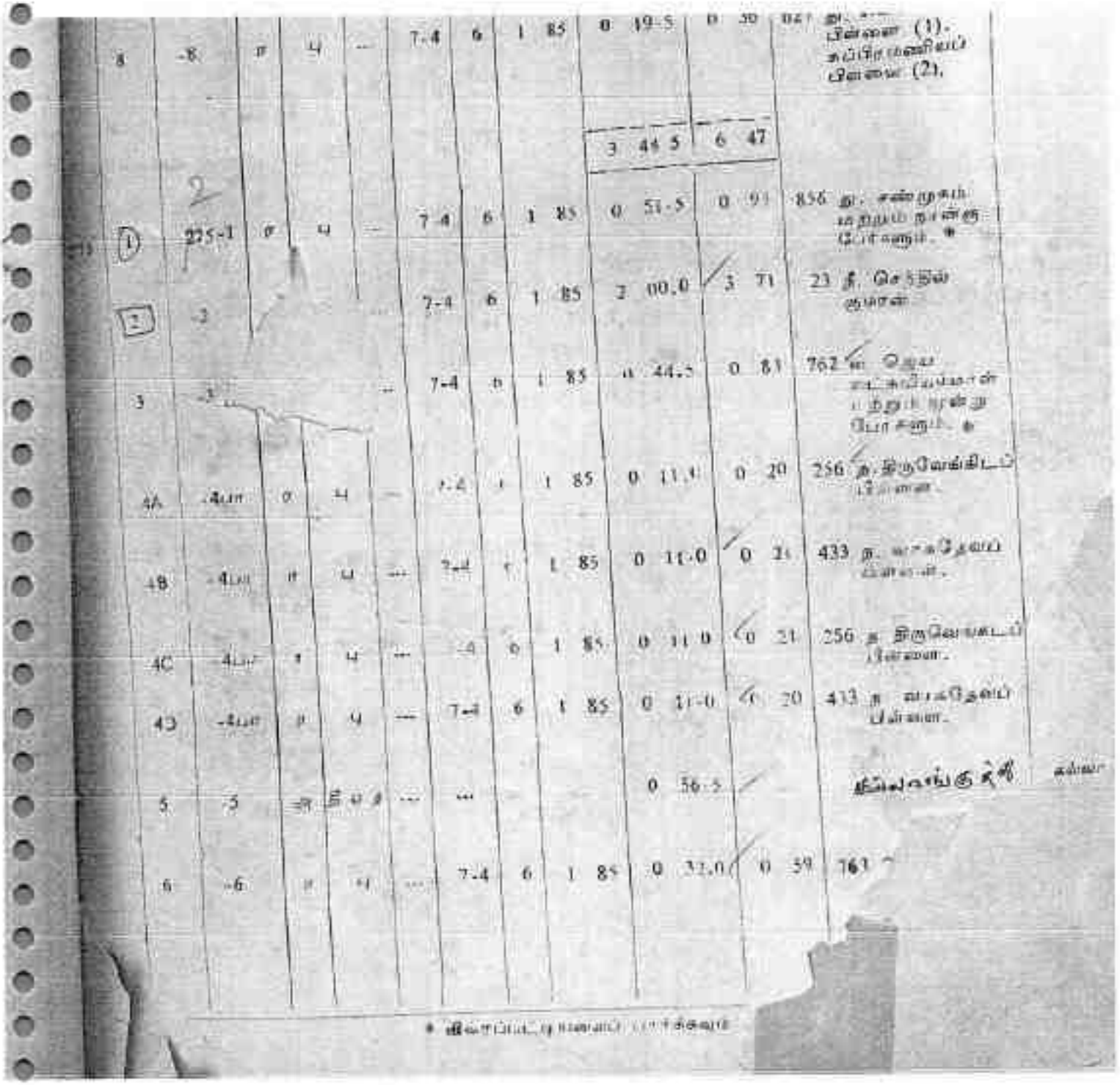
Palaveri 2 $\frac{1}{4}$ Mile

LEASE APPLIED AREA

Survey Nos.	Names
24	Valamaduvu
31	Ponniamman Kulam
"	Ponniamman Kovil
39	Madur
a &	Pillayar Kovil
" b	Mariamman Kovil
a c	Perumal Kovil
48	Madur Eri
51 & 57	Thamarai Kuttai
52	Perumal Kuttai
53	Kadappa Kuttai
66	Kala Kuttai
99	Kadapperi Thangal
109 & 310	Pappathi Kattai
133	Kaliamman Kovil
175	Arungavaram Periya Eri

Dr. S. KARUPPANNAN, M.Sc., Ph.D.
RDP/MAS/283/2014/A

ANNEXURE - V



அ. எண் 83 விருதுகாரன்

1	2	3	4	5	6	7	8	9	10	11
							ரு. பை.	ஹெக்டேர்	ரு. பை.	
3	237-3	ந	புஞ்	...	...	...	...	0 02.0	...	...
								1 10.5	2 38	
1A	238-1A	ச	பு		7-2	6	1 85	0 22.0	0 40	141 க. குப்பக் மாள்
1B	-1B	ச	பு	...	7-2	6	1 85	0 46.0	0 85	402 தி. செந்தில் குமார்.
1C	-1C	ச	பு	...	7-2	6	1 85	0 32-5	0 62	377 க. மணி கிராமணி
1D	-1D	ச	பு	...	7-2	6	1 85	0 36-5	0 67	106 ரா. கந்தசாமி கிராமணி.
2	-2	ச	பு	...	7-2	6	1 85	1 72.0	3 19	759 செள. திருமலை (1), ஆர்க்கண்ணன் (2), மாயக் கண்ணன் (3).
3A	-3A	ச	பு	...	7-2	6	1 85	0 08.0	0 15	418 செள. மோகன்.
3B	-3B	ச	பு	...	7-2	6	1 85	0 18.0	0 33	107 செள. கண்ணம் மாள்.
3C	-3C	ச	பு	...	7-2	6	1 85	0 08.0	0 15	418 செள. மோகன்.
3D	-3D	ச	பு	...	7-2	6	1 85	0 74.5	1 38	418 செள. மோகன்.
3E	-3E	ச	பு	...	7-2	6	1 85	0 08.0	0 15	107 செள. கண்ணம் மாள்.
3F	-3F	ச	பு	...	7-2	6	1 85	0 18.5	0 35	418 செள. கோபால்.
3G	-3G	ச	பு	...	7-2	6	1 85	0 09.5	0 18	107 செள. கண்ணம் மாள்.
								4 53.5	8 42	
	239-1	ச	பு	...	8-2	5	3 09	0 23.5	0 74	406 தி. முத்துசாமி பிள்ளை.
	-2	ச	பு	...	8-2	5	3 09	0 16.0	0 49	225 த. தேவேந்திரன்.
	-3	ச	பு	...	8-2	5	3 09	0 09.0	0 28	225 த. தேவேந்திரன்.

ANNEXURE

1504/2020

भारतीय गैर न्यायिक INDIA NON JUDICIAL

भारत

INDIA

रु.5000

पाँच हजार रुपये

Rs.5000

FIVE THOUSAND RUPEES

தமிழ்நாடு तमिलनाडु TAMILNADU

784619

P. VIMALA
Stamp Vendor
L.C. No. 10/CH (S) 2006
1/35, Mettu Street,
PADAPPAI - 601 301

சுத்த விக்கிரையப் பத்திரம்

2020 ஆம் ஆண்டு டிசம்பர் மாதம் 02 ஆம் தேதி, சென்னை-600032, தொழிற்பேட்டை, கிண்டி, ஈக்காட்டுதாங்கல், ஜோதி நகர், பிரதான சாலை, எண்.2/4 என்ற விலாசத்தில் வசிக்கும் திரு.செவுகப்பெருமாள் அவர்களின் குமாரர் திரு.S.ராஜேந்திரன் அவர்களுக்கு (ஆதார் அட்டை எண்.3131 2553 9636)

காஞ்சிபுரம் மாவட்டம், பெருங்குடி, காமராஜர் நகர், எண்.41 என்ற விலாசத்தில் வசிக்கும் திரு.துரைசாமி அவர்களின் குமாரர் திரு.D.சண்முகம் (ஆதார் அட்டை எண்.7[illegible]2 2415 9771) ஆகிய நான் சம்மதித்து எழுதிக் கொடுத்த புன்செய் நிலங்கள் சுத்த விக்கிரைய பத்திரம் என்னவென்றால்,

பக்கத்தில் 1504/2020ம் வரிசை எண்ணுள்ள ஆவணம்
19 தாள்களைக் கொண்டது.
1 வது தாள்
பதிவு அலுவலர்

भारतीय गैर न्यायिक INDIA NON JUDICIAL

रु.5000 Rs.5000

पाँच हजार रुपये FIVE THOUSAND RUPEES

தமிழ்நாடு தமிழ்நாடு TAMILNADU

P. VIMALA
Stamp Vendor
LC. No 10/CH (S) 2008
1/38, Mettu Street,

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வாஞ்சியூர் மாவட்டம், உத்திரமேரூர் வட்டம், சாலவாக்கம் சார்பதிவகத்தைச் சேர்ந்த 83 ஆம் எண் சிறுதாமூர் கிராமத்தில் புன்செய் சர்வே எண் 275/1, ஏக்கர் 0.25 சென்ட் நிலமானது சிறுதாமூர் கிராமத்தில் வசிக்கும் திரு.ஜெகநாதப்பிள்ளை அவர்களின் குமார் திருவீராசாமிபிள்ளை அவர்களிடமிருந்து எம் கலாச்சித்ர பணத்தைக் கொண்டு சென்ற 24.11.1971 ஆம் தேதி அன்று என் பெயரில் கிரய உத்தரவு பெற்று அந்தப்பத்திரமானது வாஞ்சியூர் சார்பதிவகத்தில் தாக்கல் செய்யப்பட்டு 1 புத்தகம் 1971-ஆம் ஆண்டின் 2878 ஆம் எண்ணாகப் பதிவு செய்யப்பட்டும், என் பெயரில் பட்டா எண் 856 ஆக தாக்கலாகி உள்ளதும்.

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भारतीय गैर न्यायिक INDIA NON JUDICIAL

भारत

रु.5000 Rs.5000

पाँच हजार रुपये FIVE THOUSAND RUPEES

INDIA

தமிழ்நாடு तमिलनाडु TAMILNADU

W 784621

P. VIMALA
Stamp Vendor

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புன்செய் சர்வே எண் 275/1, ஏக்கர் 0.25 செண்ட் நிலமானது சிறுதாமூர் கிராமத்தில் வசிக்கும் திரு.ஜெகநாதப்பிள்ளை அவர்களின் குமாரர் திரு.ராஜீபிள்ளை அவர்களிடமிருந்து என் சுயார்ஜிதப் பணத்தைக் கொண்டு சென்ற 24.11.1971 ஆம் தேதி அன்று என் பெயரில் சுத்தக் கிரயம் பெற்று அத்தப்பத்திரமானது வாலாஜாபாத் சார்பதிவகத்தில் தாக்கல் செய்யப்பட்டு 1 புத்தகம் 833 தொகுதி 1 முதல் 4 வரை பக்கங்களில் 1971-ஆம் ஆண்டின் 2871 ஆம் எண்ணாகப் பதிவு செய்யப்பட்டும், என் பெயரில் பட்டா எண் 856 ஆக தாக்கலாகி உள்ளதும்,

भारतीय गैर न्यायिक INDIA NON JUDICIAL

एक हजार रुपये ONE THOUSAND RUPEES

रु.1000 Rs.1000

INDIA

தமிழ்நாடு तमिलनाडु TAMILNADU

AT 362127

P. VIMALA
Stamp Vendor
LC No 10/CH (S) 2008
1/38, Mettu Street
PADAPPAI - 601 301

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புன்செய் சர்வே எண் 275/1, ஏக்கர் 0.25 செண்ட் நிலமானது அருங்குன்றம் கிராமத்தில் வசிக்கும் காலஞ்சென்ற திரு.வெங்கடாஜலம் அவர்களின் குமாரத்தி திருமதி.லோகநாயகி அவர்களிடமிருந்து என் சுயார்ஜிதப் பணத்தைக் கொண்டு சென்ற 09.07.2007 ஆம் தேதி அன்று என் பெயரில் சுத்தக் கிரயம் பெற்று அந்தப்பத்திரமானது வாலாஜாபாத் சார்பதிவகத்தில் தாக்கல் செய்யப்பட்டு 1 புத்தகம் 2007-ஆம் ஆண்டின் 9195 ஆம் எண்ணாகப் பதிவு செய்யப்பட்டும், என் பெயரில் பட்டா எண் 856 ஆக தாக்கலாகி உள்ளதும், நான் சர்வசுதந்திரமாய் சகலவித அதிகாரங்களுடன் ஆண்டு அனுபவித்து வருகின்றதும் எனது சுவாதீனத்திலும் அனுபவத்திலும் இருந்து வருகின்ற சொத்துக்களாகும்.

புத்தகம் ... ம் வருடத்திய ... ம் ஆவணம்
... தாள்களைக் கொண்டது.
... வது தாள்
பதிவு அலுவலர்

भारतीय गैर न्यायिक
भारत INDIA
रु. 500 FIVE HUNDRED RUPEES
पाँच सौ रुपये Rs. 500
INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU

AD 691934

P. VIMALA
Stamp Vendor

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இந்த சொத்து விவரத்தில் கண்ட சொத்துக்களை நான் தங்களுக்கு கிரயம் கொடுப்பதாக கிரயத் தொகை நிச்சயித்து ரொக்கம் ரூபாய் 2,51,250/- (எழுத்தால் ரூபாய் இரண்டு இலட்சத்து ஐம்பத்தி ஒரு ஆயிரத்து இரண்டு நூற்று ஐம்பது) மட்டும். கிரயமாக நிர்ணயித்து அந்த கிரய தொகை ரூபாய் 2,51,250/-ம் நான் இன்று ரொக்கமாக பெற்றுக் கொண்டு இந்த கிரைய பத்திரத்தினை எழுதிக் கொடுக்கின்றேன். இந்த சொத்தினை இன்றே எவ்விதபற்றி சகலவித பாத்தியங்களுடன் பட்டா, சிட்டா மற்றும் அனைத்துவிதமான வருவாய் துறை ஆவணங்களையும் தங்கள் பெயருக்கு மாற்றி சர்வசுதந்திர பாத்தியங்களுடன் ஆண்டு அனுபவித்து கொள்ள வேண்டியது.

1 புத்தகம் ம் வருஷத்திய ம் ஆவணம்
தாள் கொண்டது.
வது தாள் பதிவு அலுவலர்

भारतीय गैर न्यायिक

भारत INDIA

रु. 500 FIVE HUNDRED RUPEES

पाँच सौ रुपये Rs. 500

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU

AD 691935

01.12.2020

P. VIMALA
Stamp Vendor
LC No: 10/CH (S) 2006
/3 M... Street
PADA PA... 601 30

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இந்த கிரையச்சொத்தின் பேரில் யாதொரு விதமான முன் கலன் அக்கு வில்லங்க தகாதாக்கள், வங்கி கடன்கள், பிறகடன்கள், டைட்டில் வாரிக தகராறுகள், கோர்ட் அட்டாச்மெண்ட், நீதிமன்ற உறுத்துக்கட்டளைகள், ஐப்தி நடவடிக்கைகள், முன்கிரைய உடன்படிக்கைகள், மூல ஆவண வைப்பு உடன்படிக்கைகள், போன்ற எந்தவிதமான வில்லங்க தகாதாக்களும் இல்லை எனவும், அப்படி யாதாகிலும் இருப்பதாக பின்னிட்டு தெரிந்திடினும் அவைகளை நானே முன்னின்று எனது சொந்த செலவில் வில்லங்கத்தை தீர்த்துத் தருகிறேன்.

भारतीय गैर न्यायिक

भारत INDIA

रु. 500 FIVE HUNDRED RUPEES

पाँच सौ रुपये Rs. 500

INDIA NON JUDICIAL

தமிழ்நாடு தமிலநாடு TAMILNADU

AD 691936

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இது முதற்கொண்டு இந்த சொத்து விவரத்தில் காண்ட சொத்துக்கள் மீது எனக்கோ, என்னுடைய வாரிசுதாரர்களுக்கோ எவ்வித உரிமையும் பாத்தியதையும், பின்தொடர்ச்சியும் கிடையாது என்று உறுதி கூறுகிறேன்.

भारतीय गैर न्यायिक

पचास रुपये

FIFTY RUPEES

रु.50

Rs.50

INDIA

INDIA NON JUDICIAL

தமிழ்நாடு தமிழ்நாடு TAMILNADU

BB 018155

P VIMALA
Stamp Vendor
LC No 10/CH/[illegible]/208
1/35, Mettu [illegible]
PADAPPAI 601 301

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இந்த சொத்துக்கள் சம்பந்தமாக பிற்காலத்தில் நான் ஆவணங்கள் ஏதேனும் எழுதிக் கொடுக்க வேண்டியிருந்தால் அவற்றையும் எவ்வித பிரதிபலனும் எதிர்பாராமல் எழுதிக் கொடுக்க சம்மதிக்கிறேன். இந்தப்படிக்கு நான் சம்மதித்து எழுதிக் கொடுக்கும் பணம்செய் நிலங்கள் சுத்த விக்கிரையப்பத்திரம்.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

भारतीय गैर न्यायिक

पचास रुपये

FIFTY RUPEES

रु.50

Rs.50

INDIA NON JUDICIAL

தமிழ்நாடு TAMILNADU

BB 018156

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கொத்து விவரம்

வடக்கிபுரம் மாவட்டம், உத்திரமேரூர் வட்டம், சாலவாக்கம் சார்பதிவகத்தைச் சேர்ந்த 83 ஆம் எண் சிறுதாமூர் கிராமத்தில் கூட்டு பட்டா எண் 856-ல் அடங்கிய

புன்செய் சர்வே எண் 275/1 எக்டர் 0.51.5 ஏர்ஸ் அல்லது ஏக்கர் 1.27 சென்டில் 0.75 சென்ட்.

நிகழ்ந்த ஒருங்குமுறி விவரம்

வடக்கு பக்கம் - சர்வே எண் 168/-

தெற்கு பக்கம் - சர்வே எண் 275/4A திரு. மாகதேவபெருமாள்

கிழக்கு பக்கம் - ராஜேந்திரன் நிலம்

மேற்கு பக்கம் - சாலவாக்குளம், மோதாசெல்லம்மாள் நிலம்

இதனை மத்தியில் மேற்படி விலைநிரணம் அமைந்துள்ளது

288

-10-

மேற்படி சொத்துக்களானது உத்திரமேரூர் ஊராட்சி ஒன்றியத்தை சேர்ந்த சிறுதாவூர் ஊராட்சி மன்ற எல்லைக்குட்பட்டது.

மேற்படி சொத்துக்களின் தற்கால சந்தை மதிப்பு ரூபாய்.2,51,250/- ஆகக்கூடியது.

கிரையம் பெறுபவர்

கிரையம் கொடுப்பவர்

சாட்சிகள்:-

(குட்டியப்பன்) த/பெ கோபால், பிள்ளையார் கோயில் தெரு, அருங்குன்றம் கிராமம், 631606, (ஆதார் அட்டை எண்.8865 8245 3911) (வயது.51)

(செந்தில்குமார்) த/பெ ராஜேந்திரன், எண்.2/4, பிரதான சாலை, ஜோதிநகர், ஈக்காட்டுத்தாங்கல், தொழிற்பேட்டைகிண்டி, சென்னை-600032 (ஆதார் அட்டை எண்.2841 2783 0878)

S. SURESH KUMAR

பக்கம் ... எண் ... ஆவணம்
... தாள்களைக்கொண்டது.
... வது தாள் — பதிவு அலுவலர்

தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : காஞ்சிபுரம் — வட்டம் : உத்திரமேரூர்

வருவாய் கிராமம் : சிறுதாமூர் — பட்டா எண் : 856

உரிமையாளர்கள் பெயர்

1.	துரைசாமி	மகன்	சண்முகம்	-
2.	ஜெயராம பிள்ளை	மகன்	வேதாச்சல பிள்ளை	-
3.	ஜெகந்நாதன்	மகன்	வெங்கடாச்சலம்	-
4.	புருஷோத்தமன்	மகன்	குமார்	-
5.	புருஷோத்தமன்	மகன்	சரவணன்	-
6.	சேவுகப்பெருமாள்	மகன்	ராஜேந்திரன்	-

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
275	1	0 - 51.50	0.95	--	--	--	--	2020/0103 /03/200102--- -- 22-10-2020
		0 - 51.50	0.95					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை இவற்றை தாங்கள் https://eservices.tn.gov.in என்ற இணைய தளத்தில் 03/03/083/00856/80399 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 23-11-2020 அன்று 02:59:59 PM நேரத்தில் அச்சடிக்கப்பட்டது
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

23-Nov-20, 3:01 PM

POLICE DEPARTMENT

Office of Inspector of Police,
J-13 Taramani Police Station (Crime)
Taramani,
Chennai -113.

CERTIFICATE.

This is to certify that TR. D.Shunmugam M/A 65 residing at No.41, Perunthalaivar Kamaraj Nagar, 4 th cross street, Perungudi, Chennai has lodged a written complaint on 26.09.2020 for loss of his **Original Sale deed document No. 2878/1971 survey no. 275/1 (25 Cent) of Siruthamur village, Uthiramerur taluk, Kancheepuram District. Register at Sub Registrar office Valajabath** while he travelling from Taramani MGR Main road, Vivekananthar Street to Kandhanchavadi on 04.09.2020.

All efforts were taken to trace out the lost item and ended in vain and the same was forwarded to CRB and published in the C&O sheet in 305/2020 and RC NO.923/PUB/CRB/2020, on 31.10.2020.

All possible efforts have been taken to trace the above **Original Sale deed document No. 2878/1971 survey no. 275/1 (25 Cent)** Hence, this certificate is issued for applying duplicate.

12/11/20
Inspector of Police
Crime
J-13, Taramani Police Station,
Chennai - 113.

தினகரன்

மாதனூர் மேற்கு ஒன்றிய செயலாளர் பொறுப்பு வகிக்கும் மகாராஜபுரத்தில் உள்ள அலுவலக கிளைக்கு மாலை அணிவித்து இனிப்புகள் மற்றும் நோட்டுப் புத்தகங்களை வழங்கினார். பேச்சுவார்த்தையில் ஒன்றிய கழக செயலாளர் ஆ.பிரபாகரன், மாவட்ட மீனவர் பிரிவு செயலாளர் கே.எம். சங்கர், மாவட்ட நிலவகுப்பு அணி செயலாளர் முகமது சிராஜ், தகவல் தொழில்நுட்ப பிரிவு மதிவு உள்பட பலர் கலந்து கொண்டனர்.

மித்துன்தாஸ் டோல் ஆபிஸர் லிமிடெட்

பொது அறிவிப்பு

R/சாலவாக்கம்/புத்தகம்-1/1504/2020

2020 ஆம் ஆண்டு டிசம்பர் மாதம் ..ம் தேதி ... மணியளவில் சாலவாக்கம் சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ரூ ... செலுத்தியவர்

இடது பெருவிரல்

9444453477

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்

கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி

இன்னாரென்று நிரூபித்தவர்கள்

1. திரு செந்தில்குமார் த/பெ ராஜேந்திரன் சென்னை-600032 தொழிற்பேட்டை கிண்டி ஈக்காட்டுதாங்கல் ஜோதிநகர் பிரதான சாலை எண் 24 சென்னை தமிழ்நாடு இந்தியா 600032

திரு ... த/பெ கோபால் பிள்ளையார் கோயில் தெரு அருங்குன்றம் கிராமம் உத்திரமேரூர் காஞ்சிபுரம் தமிழ்நாடு இந்தியா 631606

2020 ஆம் ஆண்டு டிசம்பர் மாதம் ..ம் நாள்

புத்தகம் ... வது ... தாள்களைக் கொண்டது.
... பதிவு அலுவலர்

பாலகிருஷ்ணன் ராமச்சந்திரன்
சார்பதிவாளர்
சாலவாக்கம்

R/சாலவாக்கம்/புத்தகம்-1/1504/2020 [illegible]

நாள் [illegible]
சாலவாக்கம்

புத்தகம் [illegible] ம் வருடத்தில் [illegible] ம் ஆவணம்
[illegible] தாள்களைக்கொண்டது.
[illegible] வது தாள்

பதிவு அலுவலர்

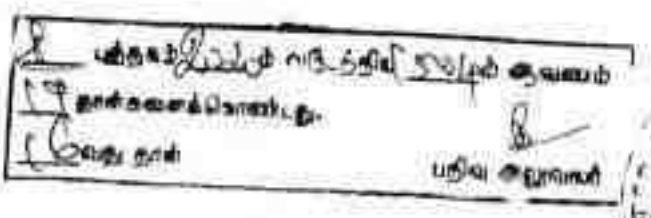
Government of India

3131 2553 9636

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

Unique Identification Authority of India

3131 2553 9636




Government of India
7192 2415 9771
ஆதார் - சாதாரண மனிதனின் அதிகாரம்


Unique Identification Authority of India
Address:
S/O Duraisamy (Late)
PERUNTHALAIYAR
KAMARAJAR NAGAR
PERUMBUDI Perungudi
Perungudi, Kancheepuram, Tamil Nadu, 600096
7192 2415 9771

ASSISTANT DIRECTOR

இந்திய அரசாங்கம்
Government of India

Male

8865 8245 3911

சாதாரண மனிதனின் அதிகாரம்

Unique Identification Authority of India

8865 8245 3911

புத்தகம் 1 எண் ... பக்கங்களைக் கொண்டது.
... வது தாள்

பதிவு அலுவலர்

11/24/2020 RAC-20201123-WA0009.jpg

R. Ahmed

298

Dr. S. KARUPPANNAN, M.Sc., Ph.D.
RQP/MAS/253/2014/A

ANNEXURE -VII

PHOTOCOPY OF THE APPLIED LEASE AREA

Field photos in respect of rough stone and gravel lease for patta land, over an extent of 3.35.5hectares in S.F.No's: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C and 238/1D of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District, TamilNadu State belongs to Mr.S.Rajendiran, Chennai-600032.

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

Amendment Covering Letter

ANNEXURE - VIII

GOVERNMENT OF INDIA
MINISTRY OF COMMERCE & INDUSTRY
PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION(PESO)
(Formerly Department of Explosives)
A & D - Wing, Block 1-8, IInd Floor, Shastri Bhavan
26 Haddows Road, Nungambakkam Chennai 600006
Tele: 28281023 Fax: 28284848
Email: jcecchennai@explosives.gov.in

No.: E/SC/TN/25/1425(E113631)

Dated:02/07/2019

10 JUL 2019

To
Udayam Explosives,
J Sivakumar, Proprietor/Occupier, M/s Udayam Explosives No. 8/22, Ramani Nagar, 2nd Street, Madichur Road,
West Tambaram, Town/Village - West Tambaram
District-KANCHIPURAM, State-Tamil Nadu, Pincode - 600045

Subject: **Road Van for transport of Explosives by Vehicle Reg. No. : TN-11/AJ-2653 Licence No.: E/SC/TN/25/1425(E113631) granted in Form LE-7 of Explosives Rules, 2008 - Change in Postal Address .**

Sir(s),

Please refer to your letter No. 16722 dated 19/05/2019 on the subject cited above.

The Licence No.: E/SC/TN/25/1425(E113631) is forwarded herewith duly amended in respect of followings :

Change in Postal Address as above

This Licence shall remain valid till **31st day of March 2023.**

For further renewal of licence, please follow the procedure under Rule 112 of Explosives Rules, 2008.
Receipt of this letter may please be acknowledged.

Enclosures :

Yours faithfully,

(Dr. A SHEIK HUSSAIN)
Dy. Controller of Explosives
For Joint Chief Controller of Explosives
South Circle, Chennai

Copy Forwarded to:

1. District Magistrate, KANCHIPURAM, Tamil Nadu with reference to his Nov No: R.C. No.4861/2014/MJ Dated: 27/08/2014.
2. Superintendent of Police, KANCHIPURAM, Tamil Nadu

For Joint Chief Controller of Explosives

अनुज्ञप्ति प्ररूप एलई – 7 LICENCE FORM LE-7
(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 का अनुच्छेद 7 देखें)
(See article no 7 of Part 1 of Schedule IV of Explosives Rules, 2008)

अनुज्ञप्ति : सड़क वैन में विस्फोटकों के परिवहन के लिए
Licence to : transport explosives in a road van

अनुज्ञप्ति संख्या / Licence No. : P/SC/TN/25/14(P)[illegible]
[illegible] फीस रुपए / Actual Fee Rs. 2800/-

अनुज्ञप्ति एतद्द्वारा जारी की जाती है
Licence is hereby granted to: Udayam Explosives (Occupier : J. Sivakumar)
J. Sivakumar, Proprietor/Occupier, M/s Udayam Explosives No. 6/22, Ramani Nagar, 2nd Street, Mudichur Road, West Tambaram,
District-KANCHIPURAM, State-Tamil Nadu, Pincode-600045

अनुज्ञप्तिधारी की प्रास्थिति / Status of licensee : Proprietorship Firm
सड़क वैन की विशिष्टियाँ / Particulars of the road van:

पंजीकरण संख्या / Registration No.	TN-11/AJ-2653
यान का मेक एवं मॉडल / Make and model of vehicle	Mahindra and Mahindra Ltd. Bolero Maxi truck Plus CBC 1.2 T BS IV PS
लदान रहित वज़न / Unladen weight	1500 Kg(s)
लदान सहित अधिकतम वज़न / Maximum laden weight	2670 Kg(s)
परिवहन के लिए अनुज्ञेय विस्फोटकों की अधिकतम मात्रा Maximum quantity of explosives permitted for transport	1170 Kg(s)
इंजिन संख्या / Engine No.	[illegible]04E58090
चेसिस संख्या / Chassis No.	MA1ZP2TBKJ2E77841
अन्य फिटिंग्स का विवरण / Description of Other Fittings	As per approved plan attached
वहन के लिए अनुज्ञात विस्फोटकों की मात्रा / Quantity of Explosives permitted to carry	1170 Kg(s)

अनुज्ञप्त परिसर निम्नलिखित आरेखण (आरेखणों) के अनुरूप होगी / The licensed premises shall conform to the following drawing(s):
आरेखण संख्या / Drawing No. : P/SC/TN/25/14(P)[illegible] दिनांक / dated [illegible]

[illegible] विस्फोटक अधिनियम, 1884 और उसके अधीन बनाए गए विस्फोटक नियम, 2008 के उपबन्धों और शर्तों एवं निम्नलिखित अनुलग्नकों के अधीन अनुज्ञप्ति प्रदान की जाती है [illegible]
The licence is granted subject to the provisions of Explosives Act, 1884 as amended from time to time and the Explosives Rules, 2008 framed thereunder and the conditions and the following enclosures:
(क) उपर्युक्त क्रम संख्या 4 में यथाकथित सड़क वैन का आरेखण / (a) Drawings of the road van mentioned in serial no 4 above.
(ख) अनुज्ञापन प्राधिकारी द्वारा हस्ताक्षरित [illegible] / (b) [illegible] signed by the licensing authority.

यह अनुज्ञप्ति तारीख 31 मार्च 2023 तक विधिमान्य रहेगी / This licence shall remain valid till 31st day of March 2023

यह अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या इस अनुज्ञप्ति की शर्तों के उल्लंघन, अनुसूची 5 के भाग 4 में यथाविनिर्दिष्ट जहाँ भी लागू हो या यदि अनुज्ञप्त परिसर आरेखण या उससे संलग्न [illegible] में दर्शाए गए विवरण के अनुरूप नहीं पाए जाते तो निलंबित या प्रतिसंहृत की जा सकती 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, 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 / Date: 27/11/2018

संयुक्त मुख्य विस्फोटक नियंत्रक / Joint Chief Controller of Explosives
दक्षिण अंचल, चेन्नई / South Circle, Chennai

[illegible]
[illegible]
अनुज्ञप्ति के नवीनीकरण हेतु पृष्ठांकन / Endorsement for renewal of licence:

नवीनीकरण की तिथि Date of Renewal	समाप्ति की तिथि Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर Signature of licensing authority

वैधानिक चेतावनी : विस्फोटकों का अपप्रयोग [illegible] गंभीर संज्ञेय अपराध [illegible]
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

भारत सरकार | Government of India
वाणिज्य और उद्योग मंत्रालय | Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) | Petroleum & Explosives Safety Organisation (PESO)
पूर्व नाम विस्फोटक विभाग | Formerly- Department of Explosives
A और D - विंग, ब्लॉक 1-8, दूसरा तल, शास्त्री भवन | A & D - Wing, Block 1-8, IInd Floor, Shastri Bhavan
26 हैडोज़ रोड, नुंगम्बाक्कम चेन्नई | 26 Haddows Road, Nungambakkam Chennai 600006
फ़ोन (Phone) - 28281817 | फ़ैक्स (Fax) - 28284810

संख्या (No.) : E/SC/TN/22/184(E30462)

दिनांक (Date) : [illegible]

सेवा में | To,

M/s.UDAYAM EXPLOSIVES Proprietor J.Sivakumar,
NO 6/22, Hemanth Nagar, 2nd Street, [illegible] Road, West Tambaram, Chennai, Town/Village - Chennai
District CHENNAI, State Tamil Nadu, Pincode - 600045

विषय : Survey No(s).1/41, ग्राम Nattarasampattu, जिला KANCHIPURAM, राज्य Tamil Nadu में स्थित M/s.UDAYAM EXPLOSIVES Proprietor J.Sivakumar द्वारा विस्फोटक के मैगज़ीन से उपयोग के लिए कब्ज़ा हेतु विस्फोटक नियम, 2008 के अंतर्गत LE-3 में जारी अनुज्ञप्ति सं E/SC/TN/22/184(E30462) के संशोधन संबंधी में। ([illegible])

Subject : Possession for Use of of Explosives from magazine situated at Survey No(s).1/41, Nattarasampattu, Dist. KANCHIPURAM, Tamil Nadu - Licence No.: E/SC/TN/22/184(E30462) granted in Form LE-3 of Explosives Rules, 2008 - (Change in Postal Address).

महोदय | Sir,

आपका उपर्युक्त विषय पर पत्र संख्या 17203 दिनांक 12/06/2019 का संदर्भ ग्रहण करें।
Please refer to your letter no. 17203 dated 12/06/2019

अनुज्ञप्ति संख्या E/SC/TN/22/184(E30462) [illegible]
The Licence No. E/SC/TN/22/184(E30462) is forwarded herewith duly amended in respect of following :
Change in Postal Address as above

[illegible]
The licence capacity at any one time shall not exceed the kinds and quantities mentioned below :

संख्या No.	विस्फोटक Explosive(s)	वर्ग Class	प्रभाग Div	उप प्रभाग Sub Div	क्षमता Capacity	इकाई Unit
1	Nitrate Mixture	2	0	0	1800	Kg
2	Safety Fuse	6	1	0	5000	Mtrs
3	Detonating Fuse	6	2	0	20000	Mtrs
4	Detonators	6	3	0	40000	Nos

[illegible] 25 गुना
Quantity of explosives to be purchased in a calendar month (applicable for licence under article 7(a) and (c)) : 25 times as above.

यह अनुज्ञप्ति दिनांक 31 मार्च 2023 तक चालू रहेगी।
This Licence shall remain valid till 31st day of March 2023.

~~[illegible]~~
~~An amount of Rs. [illegible] balance is in your credit, which may be utilised for future transaction by quoting this reference.~~

[illegible]
For further renewal (if required), please follow the procedure under Rule 112 of Explosives Rules, 2008. Receipt of this letter may please be acknowledged.

भवदीय | Yours faithfully

(टी.सी.पांडे) | (T.C.PANDEY)
विस्फोटक नियंत्रक | Controller of Explosives
कृते संयुक्त मुख्य विस्फोटक नियंत्रक | For Joint Chief Controller of Explosives
दक्षिण अंचल, चेन्नई | South Circle, Chennai

प्रतिलिपि प्रेषित | Copy forwarded to:

1. District Magistrate, KANCHIPURAM, Tamil Nadu with reference to his/her No. ROC [illegible] Dated [illegible]
2. Superintendent of Police, KANCHIPURAM, Tamil Nadu

कृते संयुक्त मुख्य विस्फोटक नियंत्रक | For Joint Chief Controller of Explosives
दक्षिण अंचल, चेन्नई | South Circle, Chennai

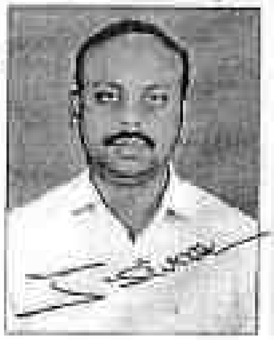
(अधिक जानकारी जैसे आवेदन की स्थिति, शुल्क आदि के लिए हमारी वेबसाइट http://peso.gov.in देखें।)
(For more information regarding status, fees and other details please visit our website http://peso.gov.in)

अनुज्ञप्ति प्रपत्र एल.ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) में (ग) देखिये)
[See article 3(a) and (ii) of Part I of Schedule IV of Explosives Rules, 2008]

(ग) उपयोग के लिए एक समय पर वर्ग 1,2,3,4,5 या वर्ग 7 के विस्फोटक का किसी मैगज़ीन में वर्ग 6 के विस्फोटक

Licence to possess : (c) for use explosives of class 1, 2,3,4,5,6 or 7 in a magazine



अनुज्ञप्ति सं. (Licence No.) : E/SC/TN/22/164(E10462)
वार्षिक फीस रुपया (Annual Fee Rs.) : 6700/-

1. Licence is hereby granted to
M/s.UDAYAM EXPLOSIVES Proprietor J.Sivakumar (अधिभोगी / Occupier : J.SIVAKUMAR), NO.6/22, Ramani Nagar, 2nd Street, Mudichur Road, West Tambaram, Chennai, Town/Village - Chennai, District CHENNAI, State Tamil Nadu, Pincode - 600045
को अनुज्ञप्ति अनुदत्त की जाती है।

2. अनुज्ञप्तिधारी की कोटिस्थिति | Status of licensee : Individual

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमान्य है। possess for use of Nitrate Mixture, Safety Fuse, Detonating Fuse, Detonators, के उपयोग के लिए
Licence is valid only for the following purpose

4. अनुज्ञप्ति विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमान्य है।
Licence is valid for the following kinds and quantity of explosives : - (क) (a)

क्र. Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1.	Nitrate Mixture	2,0	0	1500 Kg
2.	Safety Fuse	6,1	0	5000 Mtrs
3.	Detonating Fuse	6,2	0	30000 Mtrs
4.	Detonators	6,3	0	40000 Nos

(ख) किसी एक कलैंडर मास में क्रय किए जाने वाले विस्फोटक की मात्रा (अनुच्छेद 3(क) और (ग) के अधीन अनुज्ञप्ति के लिए)
(b) Quantity of explosives to be purchased in a calendar month(applicable for licence under article 3(a) and (c)): 25 times as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञप्त परिसर की पुष्टि होती है।
The licensed premises shall conform to the following drawing(s) : रेखाचित्र सं. (Drawing No.) E/SC/TN/22/164(E10462) दिनांक (Dated) 20/08/1998

6. अनुज्ञप्ति परिसर निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:
Survey No(s). 4/1 , ग्राम (Town/Village) : Nattarasanpattu
जिला (District) KANCHIPURAM
राज्य (State) Tamil Nadu
पुलिस थाना (Police Station) : MANIMANGALAM
पिनकोड (Pincode)
दूरभाष (Phone)
ई-मेल (E-Mail)
फैक्स (Fax)

7. अनुज्ञप्ति परिसर में निम्नलिखित सुविधाएं अंतर्विष्ट हैं।
The licensed premises consist of following facilities : Main room, Lobby and Detonators room

8. अनुज्ञप्ति समय - समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उसके अधीन विरचित विस्फोटक नियम, 2008 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपाबन्धों के अधीन रहते हुए अनुदत्त की जाती है।
The licence is granted subject to the provisions 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. अनुमोदित क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण, संरचना और अन्य विवरण दर्शित करते हुए)।
Drawings (showing site, construction and other details) as stated in serial No.5 above.
2. अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तें और अतिरिक्त शर्तें।
Conditions and Additional Conditions of this licence signed by the licensing authority.
3. दूरी प्रपत्र (DU-2) Distance Form DU-2

9. यह अनुज्ञप्ति तारीख 31 मार्च 2008 तक विधिमान्य रहेगी। This licence shall remain valid till 31st day of March 2008.

यह अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 में यथा निर्दिष्ट सेट-VIII के अधीन तथा उपवर्णित इस अनुज्ञप्ति की शर्तों का अतिक्रमण करने या यदि अनुज्ञप्त परिसर यहां संलग्न रेखांक और उपाबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिसंहृत की जा सकती है, जहां यह लागू हो।
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 at the plans and Annexure attached hereto.

तारीख | The Date - 20/08/1998

संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives
South Circle, Chennai

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 09/08/2012
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 04/09/2012
- Change in Postal Address dated : 04/09/2012
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 08/02/2013
- Change in Postal Address dated : 28/06/2019

नवीनीकरण के पृष्ठांकन के लिए स्थान
Space for Endorsement of Renewal

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
23/04/2019	31/03/2023	Sd/- Jt. Chief Controller of Explosives, South Circle, Chennai

सांविधिक चेतावनी : विस्फोटकों को गलत ढंग से संभालने या उनका दुरुपयोग विधि के अधीन गंभीर दांडिक अपराध होगा।
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

GST No.: 33AUZPS6311B1ZI

Mobile : 94440 66373
9080119881

UDAYAM EXPLOSIVES

No. 6/22, Ramani Nagar, 2nd Street, Krishna Nagar,
West Tambaram, Chennai - 600 045

Proprietor
J. SIVAKUMAR

Date 13.10.2021

To
Thiru.S.Rajendiran,
S/o.Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy,
Chennai-600 032.

Sub: Regarding blasting work using explosive in your proposed quarry

Sir,

We are having explosive license in Form 22 holding no. **E/SC/TN/22/164 (E10462)** situate in survey no.4/1, Nattarasampattu Village, SriperumbudhurTaluk, Kanchipuram District, our office functioning at address 6/22, Ramani Nagar, 2nd Street, Mudichur Road, West Tambaram, Chennai 600 045.

We are enacting explosive vans for transporting detonators and class:2 separately for our magazine to our work site. We are well experienced with licensed blasters and shot fired for safe blasting work since 5 years without untoward incident.

We are willing to undertake blasting work on contract basis at your proposed quarry at SF. Nos. **275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D**-over an extent of 3.35.50 hecters. Sirudamur village, Uthiramerur Taluk, Kanchipuram District.

Thank You,

For UDAYAM EXPLOSIVES

Proprietor

Signature
(For Udayam Explosives)

Enclosure: 1. License copies
2. E-Van license copies

ANNEXURE - IX

ASSISTANT DIRECTOR • P.G.R.M. KANCHEEPURAM

Dr. S. KARUPPANNAN, M.Sc., Ph.D.,
RQP/MAS/283/2014/A

ANNEXURE – X

भारत सरकार / GOVERNMENT OF INDIA
खान मंत्रालय / MINISTRY OF MINES
भारतीय खान ब्यूरो / INDIAN BUREAU OF MINES

अर्हता प्राप्त व्यक्ति के रुप मेंमान्यता 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. करुपण्णण, मॉग्गनीकाडु, मुत्तमंपटटी पोस्ट, बोम्मीडी वाया , ओमलूर तालुक, सेलम डीस्टीक्ट, तमिलनाडु – 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 मे 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.

उनकी पंजीयन 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 : 15.12.2014.

क्षेत्रीय खननियंत्रक / Regional Controller of Mines
भारतीय खानब्यूरो/ Indian Bureau of Mines
चेन्नई क्षेत्र / Chennai Region

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

KEY MAP

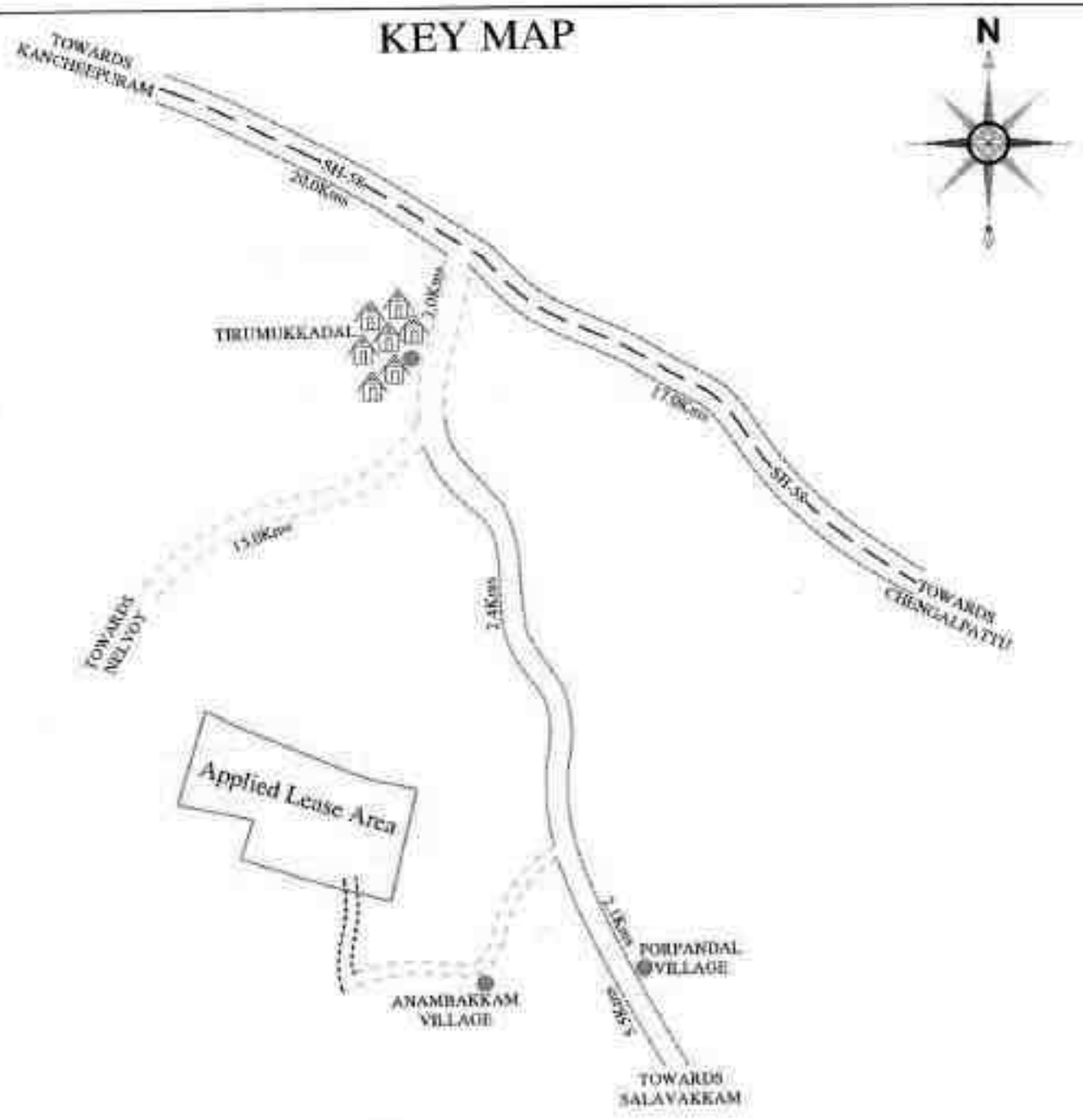


PLATE NO-I

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN R.D.
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

INDEX

- MINE LEASE AREA
- APPROACH ROAD
- CART ROAD
- VILLAGE ROAD
- MAJOR DISTRICT ROAD
- SH-58 ROAD

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

307

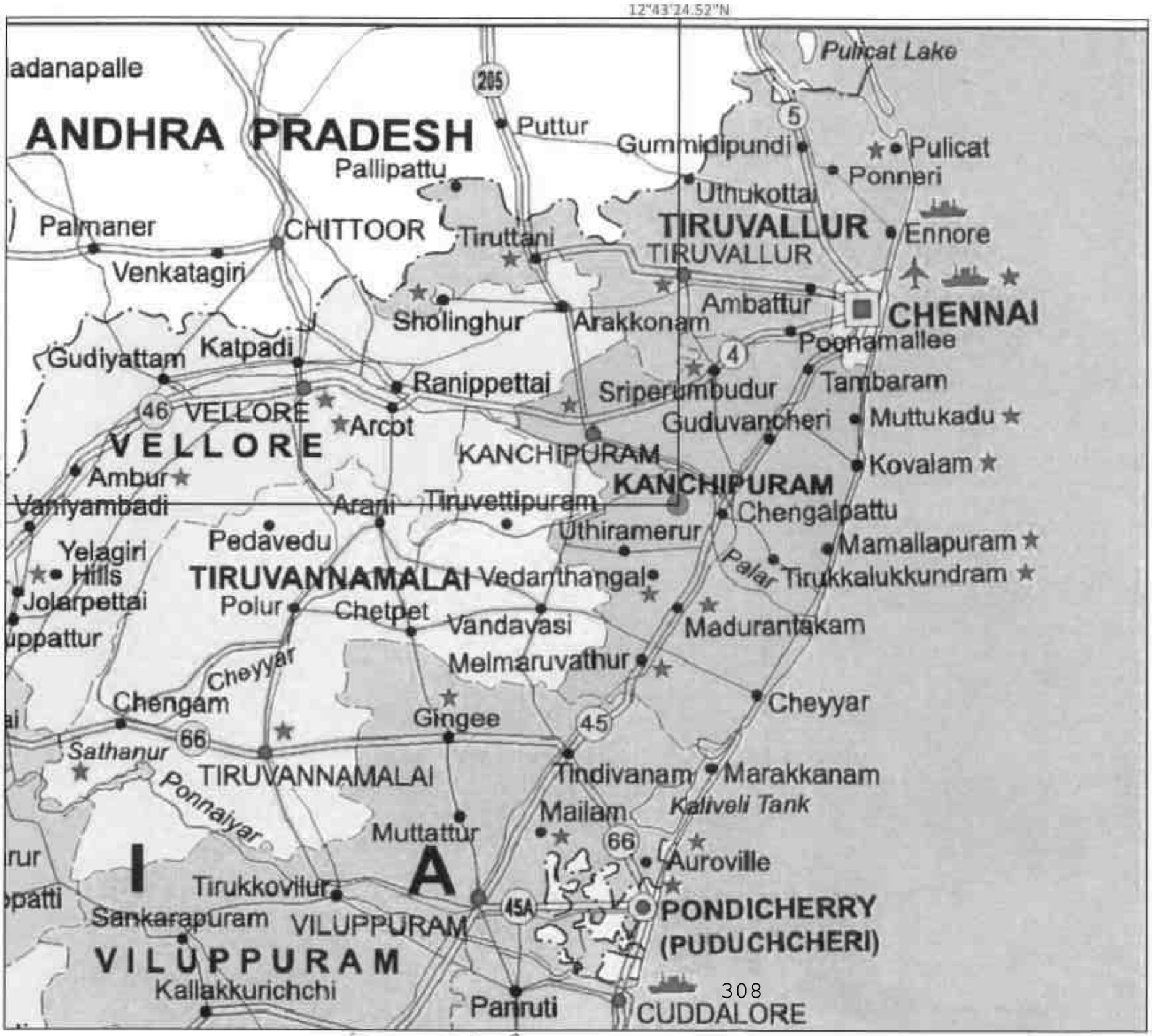


PLATE NO-IA

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect,
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

INDEX

MINE LEASE AREA:

TOPO SHEET NO : 57-P/ 14

LATITUDE : 12°43'17.16"N to 12°43'24.52"N

LONGITUDE: 79°51'39.66"E to 79°51'49.00"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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

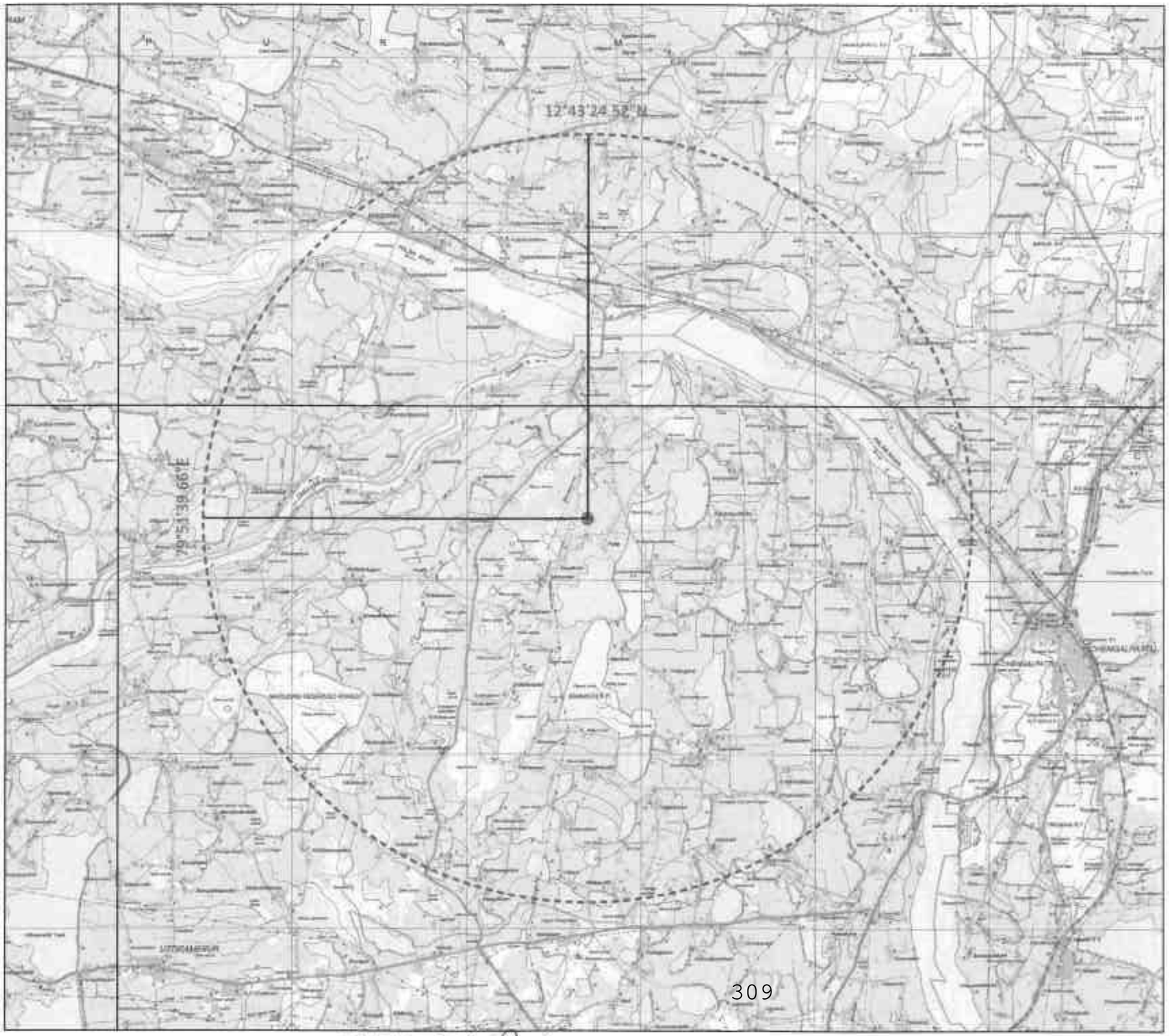


PLATE NO-IB

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032.

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect,
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

TOPO SHEET NO : 57-P/ 14

LATITUDE : 12°43'17.16"N to 12°43'24.52"N

LONGITUDE: 79°51'39.66"E to 79°51'49.00"E

MINE LEASE AREA

10KM RADIUS

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

TOWARDS SALAVAKKAM

N

PLATE NO-IC

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM

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- MINE LEASE AREA
- APPROACH ROAD
- CART TRACK
- VILLAGE ROAD
- PROPOSED HIGHWAY ROAD
- 300m RADIUS
- 500m RADIUS
- EXISTING QUARRY PIT
- ODAI

TOPO SHEET NO : 57-P/ 14

LATITUDE : 12°43'17.16"N to 12°43'24.52"N

LONGITUDE: 79°51'39.66"E to 79°51'49.00"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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

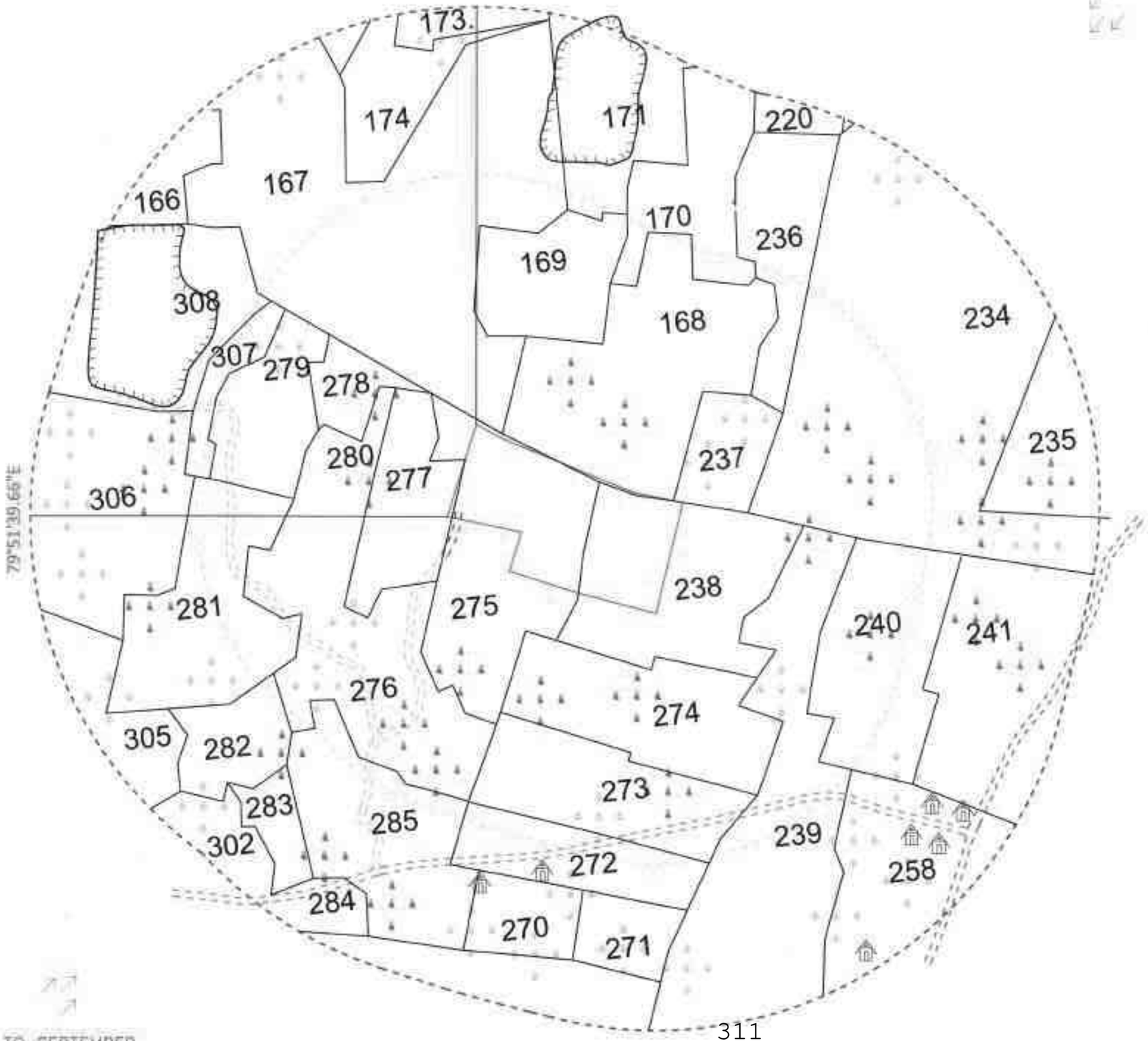
OCTOBER TO DECEMBER

12°43'24.52"N

79°51'39.66"E

79°51'49.00"E

12°43'17.16"N



JULY TO SEPTEMBER

311

N

PLATE NO-ID

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032.

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

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- MINE LEASE AREA
- APPROACH ROAD
- CART TRACK
- VILLAGE ROAD
- PROPOSED HIGHWAY ROAD
- 300m RADIUS
- 500m RADIUS
- ODAI
- EXISTING QUARRY PIT

TOPO SHEET NO : 57-P/ 14

LATITUDE : 12°43'17.16"N to 12°43'24.52"N

LONGITUDE: 79°51'39.66"E to 79°51'49.00"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

PILLAR ID	LATITUDE	LONGITUDE
1	12°43'21.50"N	79°51'49.00"E
2	12°43'17.16"N	79°51'47.98"E
3	12°43'18.01"N	79°51'44.68"E
4	12°43'18.79"N	79°51'42.12"E
5	12°43'20.32"N	79°51'42.61"E
6	12°43'20.69"N	79°51'40.84"E
7	12°43'20.92"N	79°51'39.66"E
8	12°43'24.52"N	79°51'40.78"E
9	12°43'23.97"N	79°51'41.84"E
10	12°43'22.46"N	79°51'45.59"E
11	12°43'21.88"N	79°51'47.10"E
12	12°43'21.57"N	79°51'48.64"E

PLATE NO-II

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect,
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

INDEX

- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- PILLAR STONES
- ODAI

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

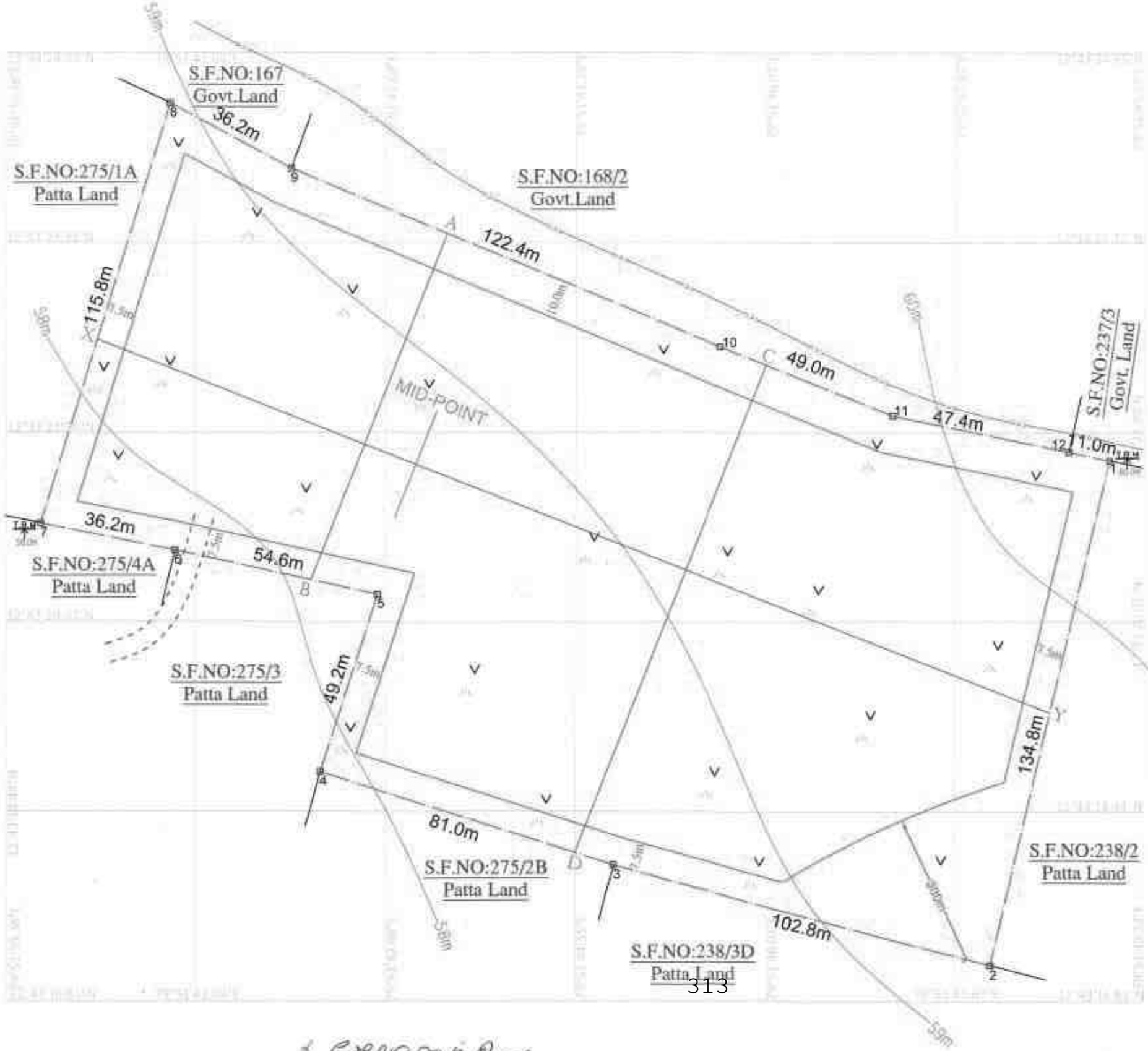


PLATE NO-III

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD.
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

INDEX

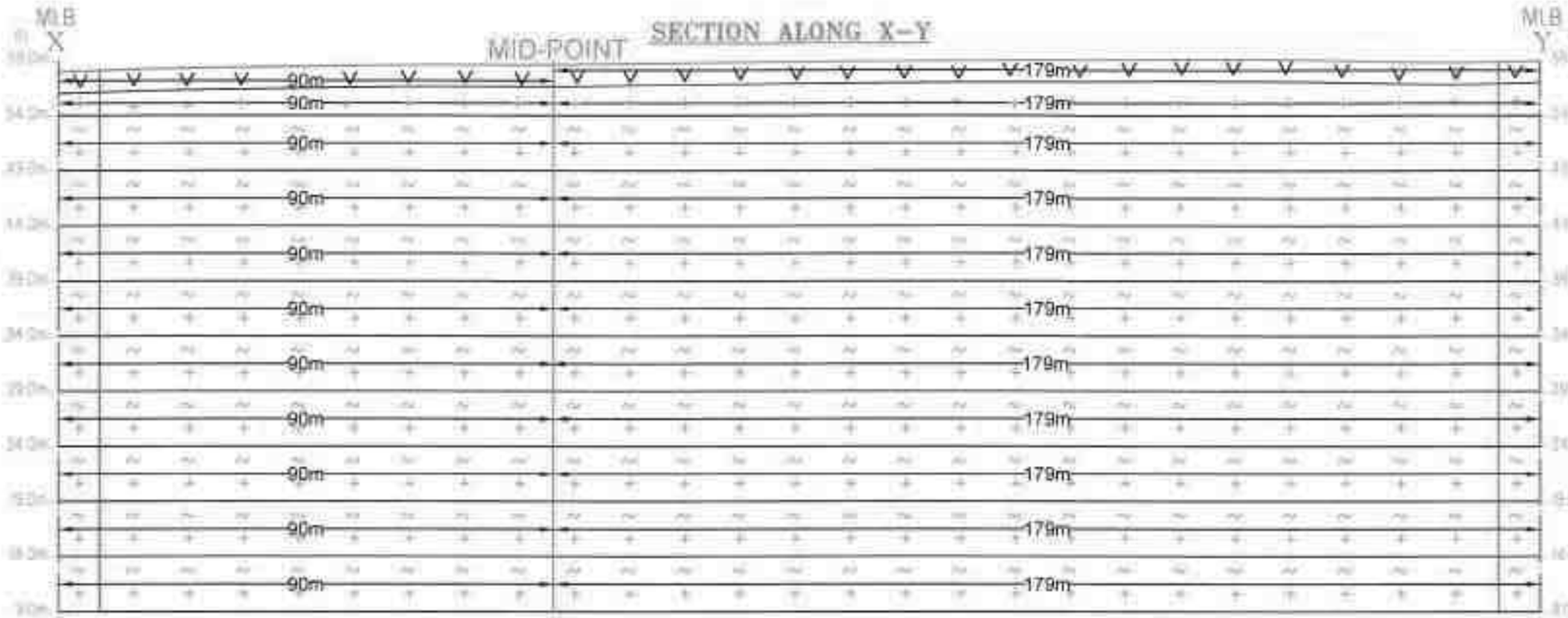
- MINE LEASE AREA
- SAFETY BOUNDARY
- APPROACH ROAD
- ODAI
- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARKS
- GRAVEL
- SHRUBS

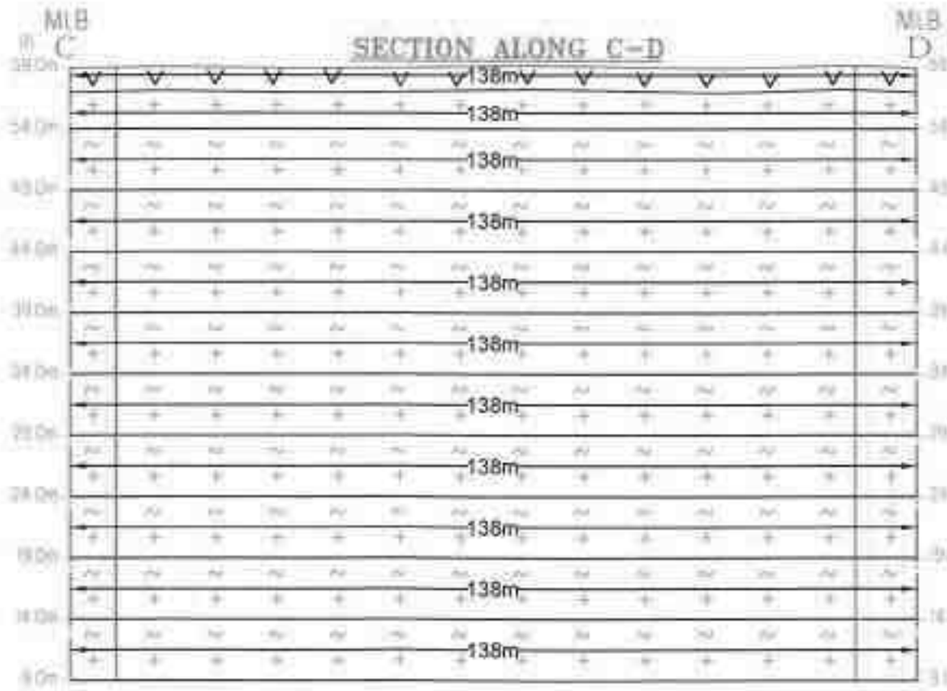
SURFACE, GEOLOGICAL PLAN
SCALE 1: 1000

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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A





GEOLOGICAL RESOURCES							
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume in CBM	Geological Resources in CBM	Loss in CBM
XY-AB	I	90	98	2	17640	----	17640
	I	90	98	3	26460	26460	----
	II	90	98	5	44100	44100	----
	III	90	98	5	44100	44100	----
	IV	90	98	5	44100	44100	----
	V	90	98	5	44100	44100	----
	VI	90	98	5	44100	44100	----
	VII	90	98	5	44100	44100	----
	VIII	90	98	5	44100	44100	----
	IX	90	98	5	44100	44100	----
	X	90	98	5	44100	44100	----
TOTAL					441000	423360	17640
XY-CD	I	179	138	2	49404	----	49404
	I	179	138	3	74106	74106	----
	II	179	138	5	123510	123510	----
	III	179	138	5	123510	123510	----
	IV	179	138	5	123510	123510	----
	V	179	138	5	123510	123510	----
	VI	179	138	5	123510	123510	----
	VII	179	138	5	123510	123510	----
	VIII	179	138	5	123510	123510	----
	IX	179	138	5	123510	123510	----
	X	179	138	5	123510	123510	----
TOTAL					1235100	1185696	49404
GRAND TOTAL					1676100	1609056	67044

PLATE NO-III A

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:
S.F.NO : 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT : 3.35.5Hect.
VILLAGE : SIRUTHAMUR,
TALUK : UTHIRAMERUR,
DISTRICT : KANCHEEPURAM

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MINE LEASE AREA

SAFETY BOUNDARY

GRAVEL

ROUGH STONE

SURFACE, GEOLOGICAL SECTIONS
SECTION HOR 1 :1000 & VER 1 :500

Prepared By:

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

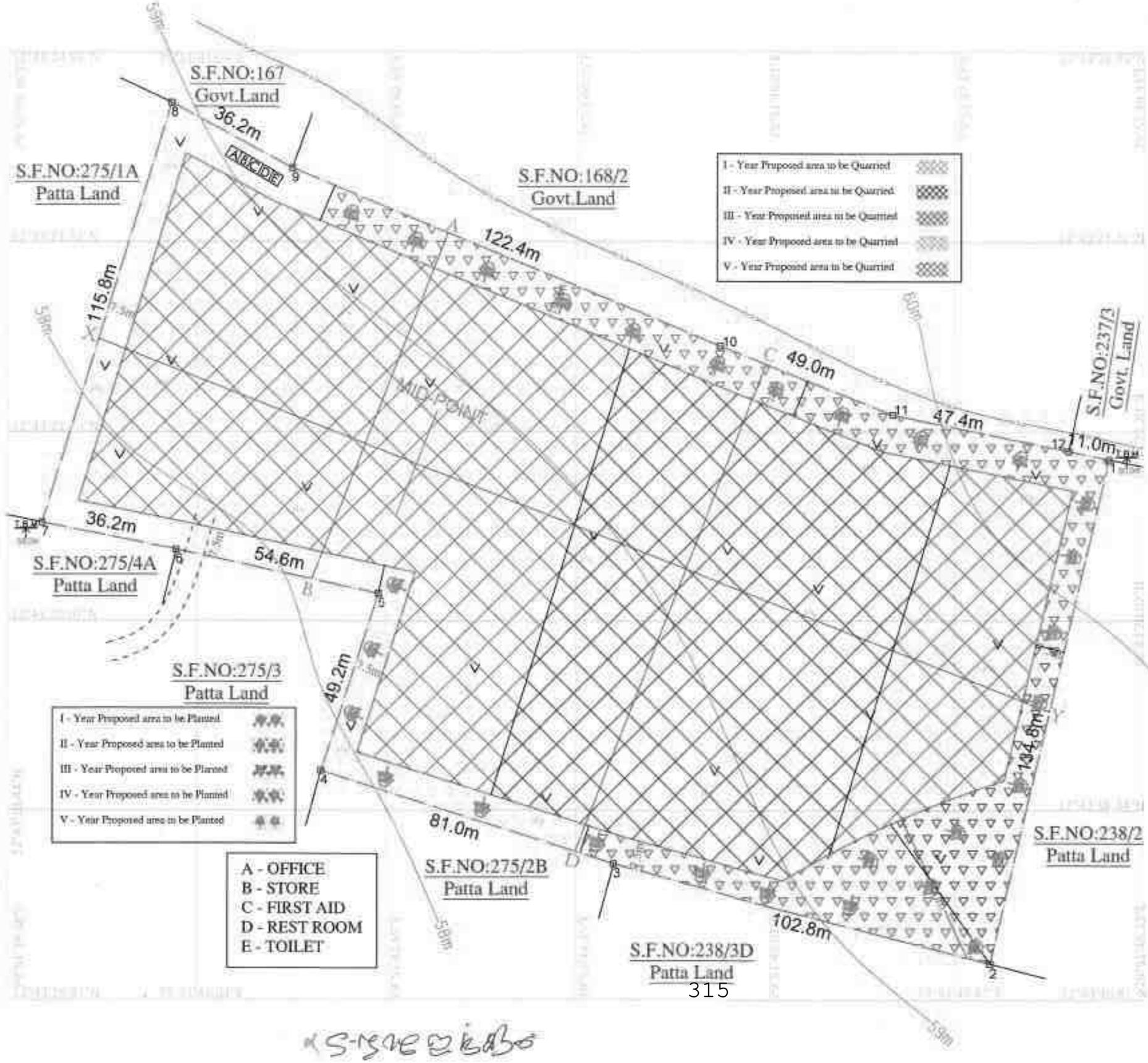

PLATE NO-IV

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 5.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM

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- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARKS
- GRAVEL
- SHRUBS

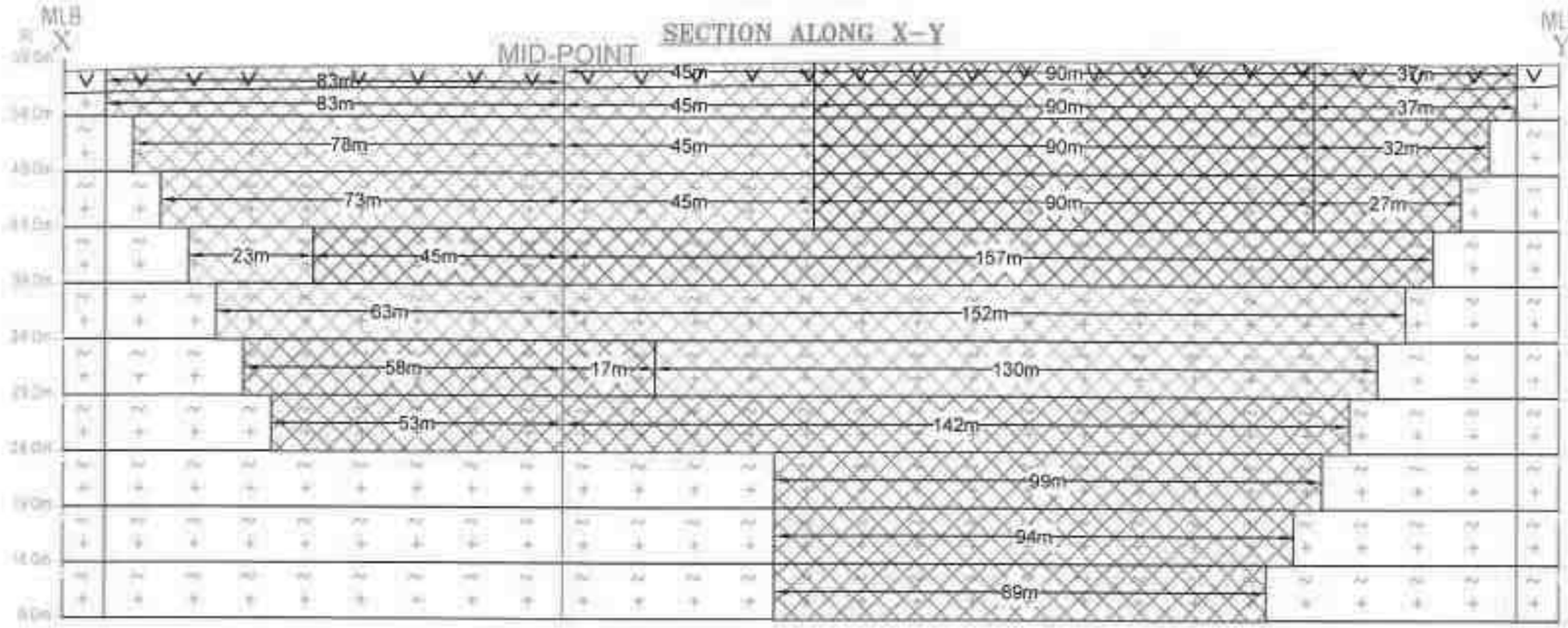
YEARWISE PRODUCTION & DEVELOPMENT PLAN
SCALE 1: 1000

Prepared By:

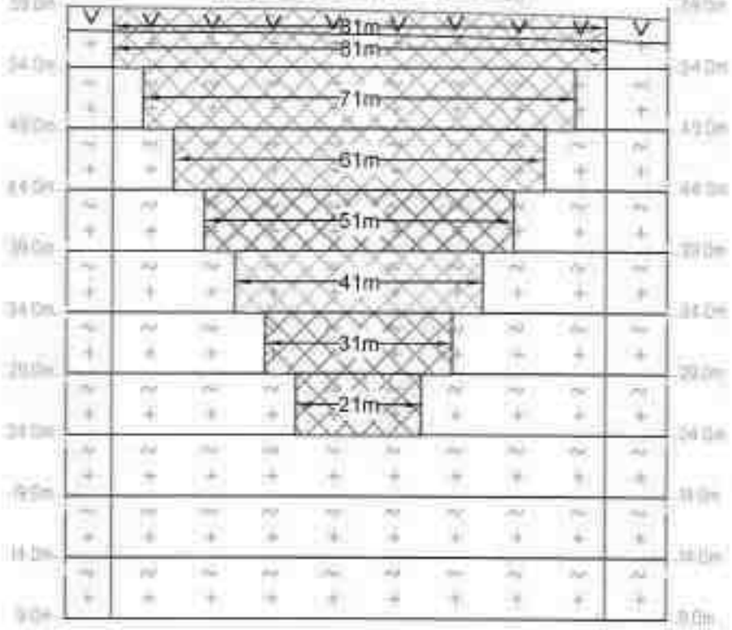
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

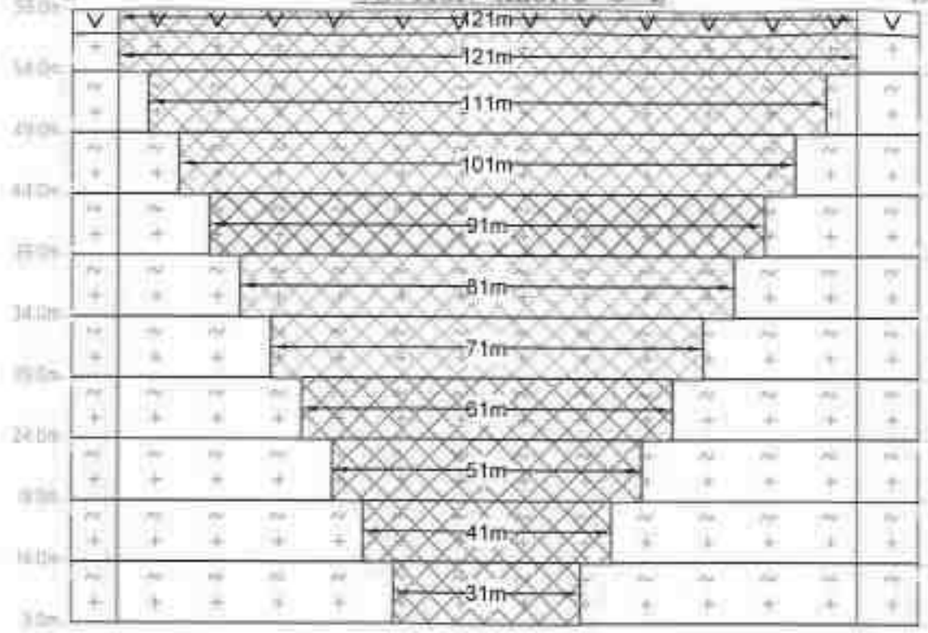
SECTION ALONG X–Y



SECTION ALONG A–B



SECTION ALONG C–D



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

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YEARWISE PRODUCTION

Year	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Volume in CBM	Production in CBM	Gravel in CBM
I	XY-AB	I	89	81	2	13440	—	13440
	XY-AB	I	89	41	5	20160	20160	—
	XY-AB	II	78	71	5	27690	27690	—
	XY-AB	III	73	61	5	22265	22265	—
	XY-CD	I	45	121	2	10890	—	10890
	XY-CD	I	45	121	5	16335	16335	—
	XY-CD	II	45	111	5	24975	24975	—
	XY-CD	III	45	101	5	22725	22725	—
TOTAL						158495	134859	24636
II	XY-CD	I	90	121	2	21780	—	21780
	XY-CD	I	90	121	5	32670	32670	—
	XY-CD	II	90	111	5	49950	49950	—
	XY-CD	III	90	101	5	45450	45450	—
TOTAL						149850	128070	21780
III	XY-CD	I	37	121	2	8954	—	8954
	XY-CD	I	37	121	5	13431	13431	—
	XY-CD	II	52	111	5	17760	17760	—
	XY-CD	III	27	101	5	13635	13635	—
	XY-CD	IV	137	91	5	71435	71435	—
	XY-AB	IV	45	51	5	11475	11475	—
TOTAL						136690	127736	8954
IV	XY-AB	IV	29	51	5	5865	5865	—
	XY-AB	V	63	41	5	12915	12915	—
	XY-CD	V	152	81	5	61560	61560	—
	XY-CD	VI	130	71	5	46150	46150	—
TOTAL						126490	126490	—
V	XY-CD	VI	17	71	5	6035	6035	—
	XY-AB	VI	59	31	5	8995	8995	—
	XY-AB	VII	33	21	5	3465	3465	—
	XY-CD	VII	182	61	5	43310	43310	—
	XY-CD	VIII	99	51	5	25245	25245	—
	XY-CD	IX	94	41	5	19270	19270	—
	XY-CD	X	89	51	5	13795	13795	—
TOTAL						122210	122210	—
GRAND TOTAL						693735	638665	55070

PLATE NO-IV A

APPLICANT:
Mr.S.RAJENDRAN
S/o Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD.
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:
S.F.NO : 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT : 3.35.5Hect,
VILLAGE : SIRUTHAMUR,
TALUK : UTHIRAMERUR,
DISTRICT : KANCHEEPURAM

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MINE LEASE AREA

SAFETY BOUNDARY

GRAVEL

ROUGH STONE

BENCH

YEARWISR PRODUCTION & DEVELOPMENT SECTIONS
SECTION HOE 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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

S.F.NO:167
Govt.Land

S.F.NO:275/1A
Patta Land

S.F.NO:168/2
Govt.Land

S.F.NO:237/3
Govt. Land

S.F.NO:275/4A
Patta Land

S.F.NO:275/3
Patta Land

S.F.NO:275/2B
Patta Land

S.F.NO:238/3D
Patta Land

S.F.NO:238/2
Patta Land

36.2m
122.4m
115.8m
49.0m
47.4m
11.0m
54.6m
49.2m
81.0m
134.6m
102.8m
60m
59m
55m
MIDPOINT

MINE LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Hect)	AREA IN USE DURING THE QUARRYING PERIOD(Hect)	COLOR CODE
AREA UNDER QUARRYING	NIL	2.63.0	
INFRASTRUCTURE	NIL	0.01.0	
ROADS	NIL	0.02.0	
UN-UTILIZED AREA	2.35.5	0.09.5	
GREEN BELT	NIL	0.60.0	
GRAND TOTAL	2.35.5Hect	2.35.5Hect	

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

N

PLATE NO-V

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD,
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 2.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM

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- CONTOUR LINES
- TEMPORARY BENCH MARKS
- GRAVEL
- SHRUBS
- BENCH

MINE LAYOUT PLAN AND LAND USE PATTERN
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.
RECOGNIZED QUALIFIED PERSON
RQP/MAS/283/2014/A

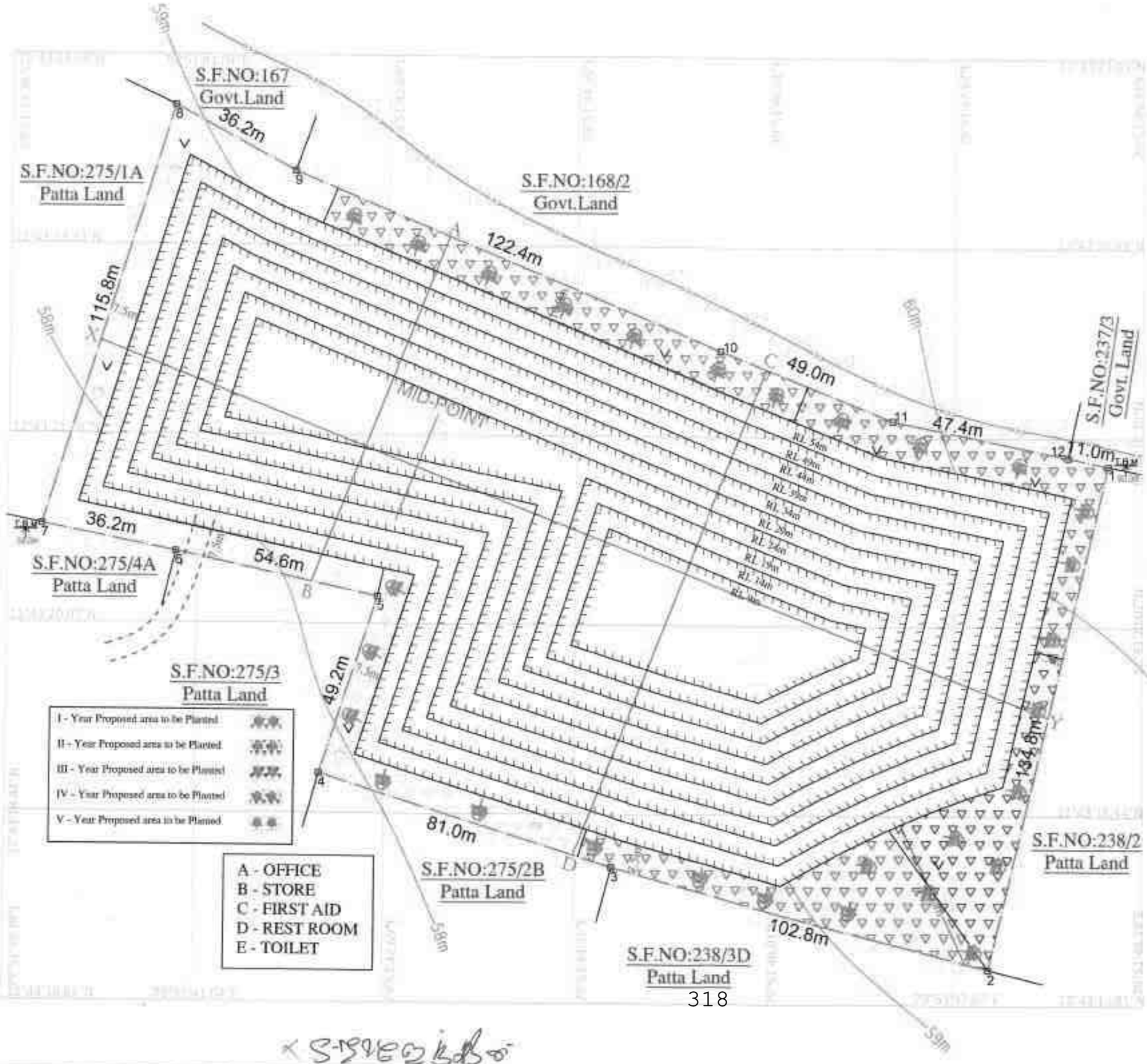

PLATE NO-VI

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD.
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:

S.F.NO	: 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT	: 3.35.5Hect.
VILLAGE	: SIRUTHAMUR,
TALUK	: UTHIRAMERUR,
DISTRICT	: KANCHEEPURAM.

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- MINE LEASE AREA
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- PILLAR STONES
- CONTOUR LINES
- TEMPORARY BENCH MARKS
- GRAVEL
- SHRUBS
- BENCH

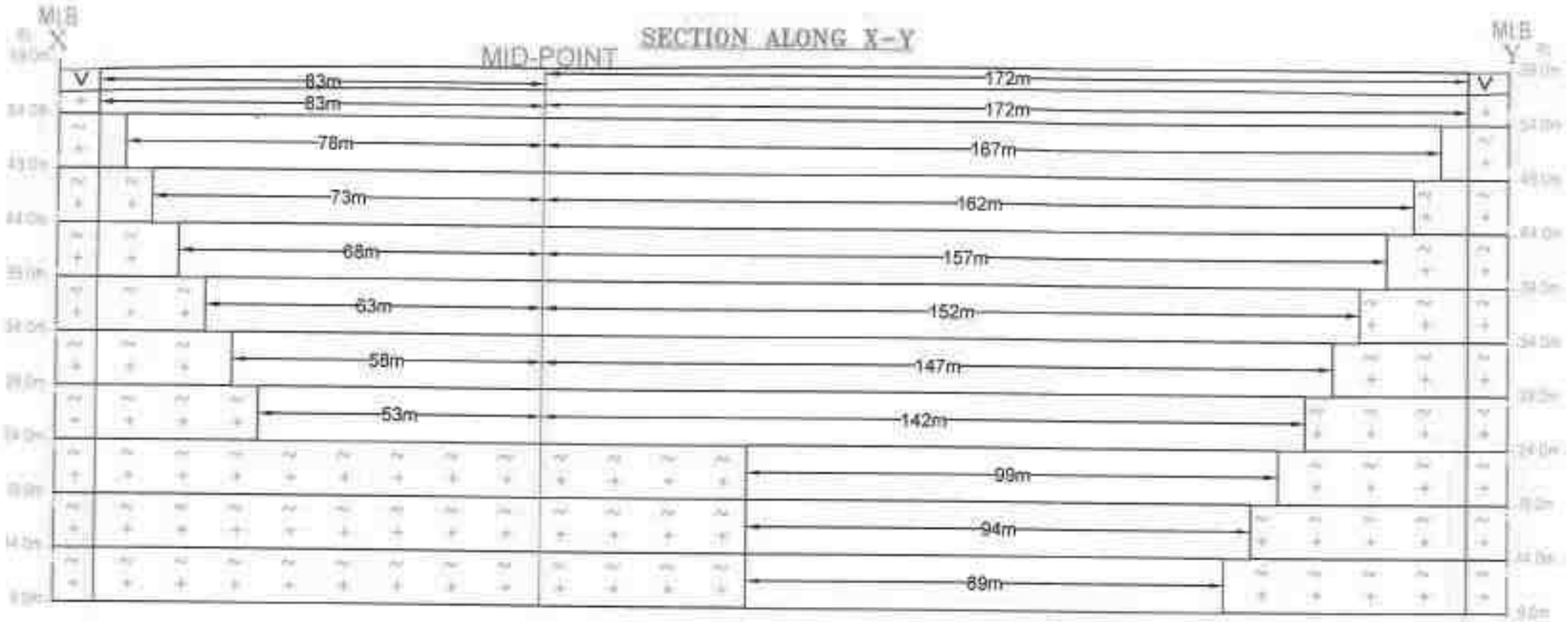
CONCEPTUAL PLAN
PLAN SCALE 1 : 1000

Prepared By:

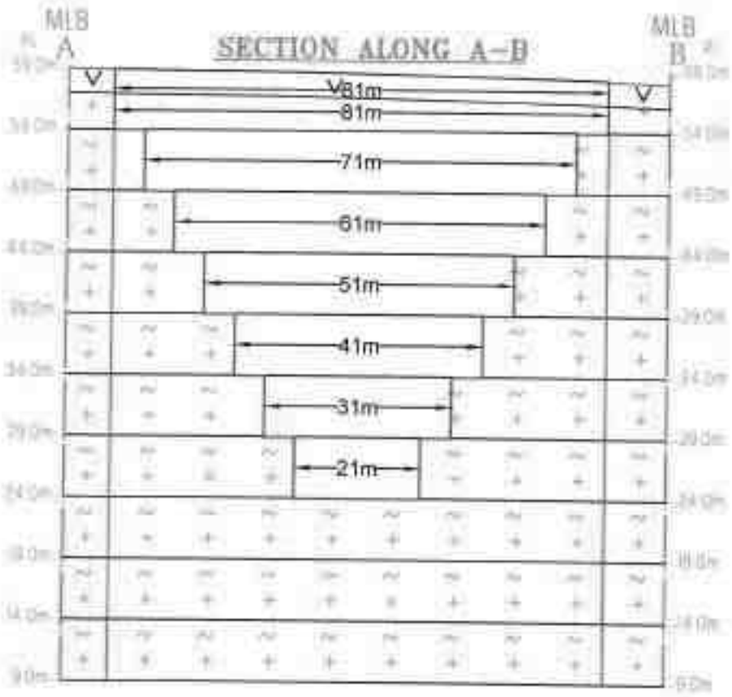
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

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

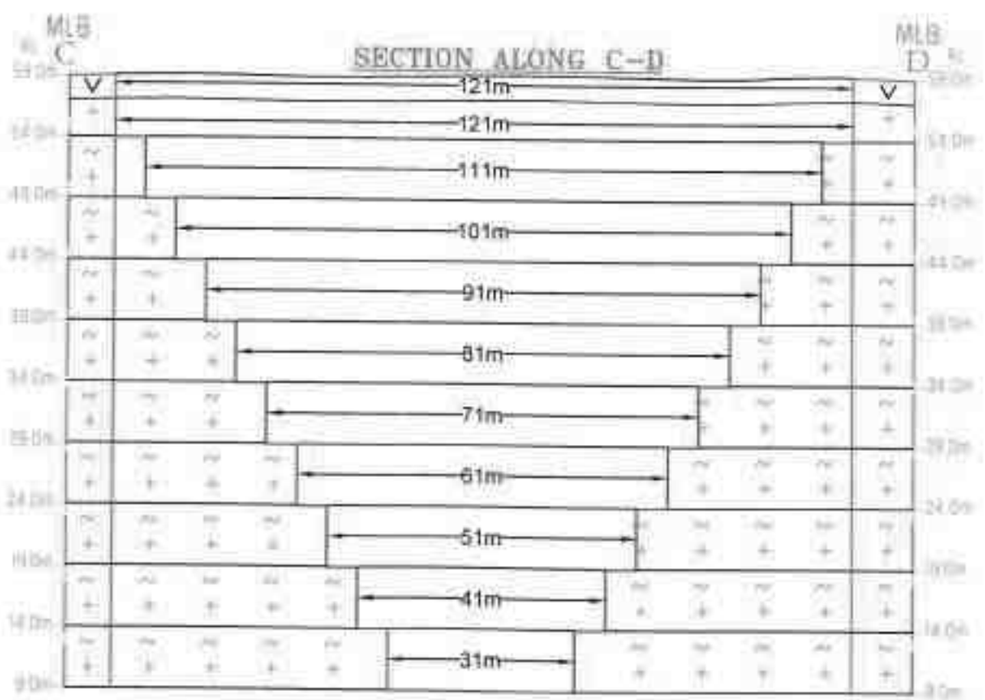
SECTION ALONG X-Y



SECTION ALONG A-B



SECTION ALONG C-D



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	83	81	2	13446	.....	13446
	I	83	81	5	20169	20169	.....
	II	78	71	5	27690	27690	.....
	III	73	61	5	22265	22265	.....
	IV	68	51	5	17340	17340	.....
	V	63	41	5	12915	12915	.....
	VI	58	31	5	8990	8990	.....
	VII	53	21	5	5565	5565	.....
TOTAL					128380	114934	13446
XY-CD	I	172	121	2	41624	.....	41624
	I	172	121	5	62436	62436	.....
	II	167	111	5	92685	92685	.....
	III	162	101	5	81810	81810	.....
	IV	157	91	5	71435	71435	.....
	V	152	81	5	61560	61560	.....
	VI	147	71	5	52185	52185	.....
	VII	142	61	5	43310	43310	.....
	VIII	98	51	5	25245	25245	.....
	IX	94	41	5	19270	19270	.....
	X	89	31	5	13795	13795	.....
TOTAL					565350	523731	41624
GRAND TOTAL					693735	638665	55070

PLATE NO-VI A

APPLICANT:
Mr.S.RAJENDRAN
S/o.Mr.SEVAGAPERUMMAL,
No.2/4 JOTHI NAGAR MN RD.
EKATTUTHANGAL,
GUINDY INDUSTRIAL ESTATE,
CHENNAI-600 032

LEASE APPLIED AREA:
S.F.NO : 275/1B, 273/2A, 238/1A, 238/1B, 238/1C, 238/1D
EXTENT : 3.35.5Hect.
VILLAGE : SIRUTHAMUR,
TALUK : UTHIRAMERUR,
DISTRICT : KANCHEEPURAM.

INDEX

MINE LEASE AREA

SAFETY BOUNDARY

GRAVEL

ROUGH STONE

ULTIMATE BENCH

CONCEPTUAL SECTIONS
SECTION HOR 1 :1000 & VER 1 :500

Prepared By:

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

From
K. Vijayaragavan, M.Sc.,
Assistant Director,
Dept. of Geology and Mining,
Kancheepuram.

To
Thiru. S. Rajendiran,
S/o. Sevagaperumal,
No.2/4, Jothi Nagar Main Road,
Ekattuthangal, Guindy,
Chennai - 600 032.

Rc.No.302/Q3/2020, Dated.07.10.2021

Sir,

Sub: Mines and Quarries – Kancheepuram District – Uthiramerur Taluk – Siruthamur Village - S.F. Nos. 275/1B, 275/2A, 238/1A, 238/1B, 238/1C, 238/1D - over an extent of 3.35.50 Hectares of patta lands - permission requested for Quarrying Rough stone and Gravel under rule 19(1) of Tamil Nadu Minor Mineral Concession Rules 1959 – applied by Thiru. S. Rajendiran - Mining Plan submitted for approval – **Mining Plan approved for Five years** - directed to obtain Environmental clearance from State Level Environment Impact Assessment Authority, Tamil Nadu -Reg.

Ref:
1. Application of Thiru. S. Rajendiran, S/o. Sevagaperumal, No.2/4, Jothi Nagar Main Road, Ekattuthangal, Guindy, Chennai - 600 032 dated.04.12.2020.
2. Precise are notice issued by the Assistant Director, Geology and Mining, Chengalpattu in Rc.No.302/Q3/2020, dated.06.09.2021.
3. Representation of Thiru. S. Rajendiran, S/o. Sevagaperumal dated.01.10.2021.

In the reference 1st cited, one Thiru. S. Rajendiran, S/o. Sevagaperumal, No.2/4, Jothi Nagar Main Road, Ekattuthangal, Guindy, Chennai - 600 032 has applied for quarrying Rough stone and gravel from S.F. Nos.275/1B (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50) and 238/1D (0.36.50) over an extent of 3.35.50 hectares of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

In this regard, based on the recommendations of the Revenue Divisional Officer, Kancheepuram, Tahsildar, Uthiramerur and Inspection report submitted by the Assistant Director, Geology and Mining, Kancheepuram the above application was considered for quarrying Rough stone and Gravel from the above area under rule 19(1) of Tamil Nadu Minor

Mineral Concession Rules,1959 for a period of **Five years** subject to certain conditions and precise area has been communicated to the applicant vide reference 2nd cited.

In exercise of the power delegated under Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959, I hereby approve the mining plan submitted by Thiru. S. Rajendiran, S/o. Sevagaperumal for the grant of lease to quarry Rough Stone and Gravel in S.F. Nos. 275/1B (0.40.50), 275/2A (1.58.00), 238/1A (0.22.00), 238/1B (0.46.00), 238/1C (0.32.50) and 238/1D (0.36.50) over an extent of 3.35.50 Hectares of Siruthamur Village, Uthiramerur Taluk, Kancheepuram District the mineable reserves of Rough stone & Gravel after leaving safety distance is arrived as 6,38,665 M^3 of Rough stone, 55,070 M^3 of Gravel for **Five years** upto a depth of 50 meter (BGL). This approval is subject to the following conditions:-

i) That the Mining Plan is approved without prejudice to any other Law applicable to quarrying Rough stone and Gravel from time to time whether such laws are made by the Central Government/State Government or any other authority.

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

iii) The Mining Plan is approved without prejudice to any other order or direction from any Court of competent jurisdiction.

iv) The applicant is directed to submit the application in Form –I as prescribed by the MoEF along with the approved Mining Plan.

27/9/24

Encl: Approved Mining Plan

Assistant Director,
Geology and Mining,
Kancheepuram.

27/9/24

சான்று

காஞ்சிபுரம்மாவட்டம் உத்திரமேரூர்வட்டம் சிறுதாமூர்கிராமம் புன்செய் புலஎண்கள். 275/1B. 275/2A. 238/1A. 238/1B. 238/1C. 238/1D-ல் மொத்தபரப்பு 3.35.50 ஹெக்டேர்-புன்செய் பட்டாநிலம் சாதாரணகற்கள் மற்றும் கிராவல்மண் வெட்டிஎடுக்க திரு .Sராஜேந்திரன் த/பெ. திரு சேவுகப்பெருமாள் என்பவர் குவாரி செய்ய மனு செய்துள்ளார் . புலதணிக்கையில் சுமார் 300 மீட்டர் சுற்றிலும் அங்கீகரிக்கப்பட்ட வீடு மற்றும் குடியிருப்பு ஏரி. குளம். புராதன சின்னங்கள். கோவில்கள். உயர்மின் அழுத்த கம்பிகள் மற்றும் கம்பங்கள் ஏதும் இல்லை என சான்றளிக்கபடுகிறது.

நான்கு பக்க எல்லைகள்.

வடக்கில் :புலஎண்168/2

தெற்கில் :புலஎண்238/1D,275/2B.

மேற்கில் :புலஎண்275/1A

கிழக்கில் :புலஎண்238/2B , 238/2A

கிராம நிர்வாக அலுவலர்
நெ.83, சிறுதாமூர்
உத்திரமேரூர் வட்டம்
காஞ்சிபுரம் மாவட்டம்

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Certificate of Accreditation

Geo Technical Mining Solutions

1/213B, Natesan Complex, Dharmapuri Salem Main Road, Oddapatti, Collectorate post office, Dharmapuri, Tamil Nadu-636705

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

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated September 13, 2022 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/23/2641 dated January 19, 2023. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions following due process of assessment.

Sr. Director, NABET
Dated: January 19, 2023

Certificate No.
NABET/EIA/2124/SA 0184

Valid up to
Dec 31, 2023

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