DRAFT OF ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

Environmental Clearance under EIA Notification – 2006

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

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

CLUSTER EXTENT = 5.25.95 hectares

BLACK GRANITE QUARRY

At

Irudukottai Village, Denkanikottai Taluk, Krishnagiri District,

Tamil Nadu State

TOR File No.10853

TOR Identification No. TO24B0108TN5105918N, dated.25/06/2024

NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT

Name and Address	Extent & S.F.No.	Production
D.Karunanidhi S/o.Dharuman, No.15, Valasagoundanur, Puliyampatti Post, Pochampalli Taluk, Krishnagiri- 635206.	1.36.45ha & 720/3(B), 725/1(P), 725/2A,726/B1(P) & 726/B2A	Black Granite 15% Recovery 5 years Production 4049m^3

ENVIRONMENTAL CONSULTANT

GEO TECHNICAL MINING SOLUTIONS

No: 1/213-B, Ground Floor, Natesan Complex
Oddapatti, Collectorate Post office,
Dharmapuri-636705. Tamil Nadu.
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com
NABET ACC. NO: NABET/EIA/23-26/RA 0319
Valid till: 31.12.2026

ENVIRONMENTAL LAB

GREEN LINK ANALYTICAL AND RESEARCH LABORATORY (INDIA) PVT LTD

No:414/1, Tex Park Road, Coimbatore,

Tamil Nadu Accreditation number TC-6144,

valid till 18.05.2025

TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.10853

TOR Identification No. TO24B0108TN5105918N, Dated.25/06/2024

D. Karunanidhi, Black Granite quarry

Specific Terms of Reference for (Mining of Minerals)

1. SEAC Conditions – Site Specific

S. No	Terms of Reference		Remarks
1.1	1	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m, (iv) 300 m, (v) 500 m with details such as dwelling houses with number of occupants, whether it belongs to the owner or not, places of worship, industries, factories, sheds, etc with indicating the owner of the building nature of construction, age of the building, number of residents, their profession and income, etc.	The map showing the structures located within the radius of 50m, 100m, 200m, 300m, 500m with details will be submitted during final EIA report.
	2	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Detailed hydrological study will be submitted in the final EIA report.

2. SEAC Standard Conditions

<table>
<tr><th>S.No</th><th colspan="4">Terms of Reference</th></tr>
<tr><td rowspan="3">2.1</td><td>1</td><td colspan="3">In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</td></tr>
<tr><td rowspan="2"></td><td>(i)</td><td>Original pit dimension</td><td rowspan="2">It is a fresh quarry lease area and the condition is not applicable.</td></tr>
<tr><td>(ii)</td><td>Quantity achieved Vs EC Approved Quantity</td></tr>
</table>

		(iii)	Balance Quantity as per Mineable Reserve calculated.	
		(iv)	Mined our Depth as on date Vs EC permitted depth	
		(v)	Details of illegal/illicit mining	
		(vi)	Violation in the quarry during the past working.	
		(vii)	Quantity of material mined out outside the mine lease area	
		(viii)	Condition of Safety zone/benches	
		(ix)	Revised/Modified Mining plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	
	2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site		The VAO certificate is attached in Annexure IV.
	3	The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m, (iv) 300 m, (v) 500 m with details such as dwelling houses with number of occupants, whether it belongs to the owner or not, places of worship, industries, factories, sheds, etc with indicating the		The map showing the structures located within the radius of 50m, 100m, 200m, 300m, 500m with details will be submitted during final EIA report.

		owner of the building nature of construction, age of the building, number of residents, their profession and income, etc.	
	4	The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the water bodies like lake, water tanks, etc are located within 1 km of the proposed quarry.	Detailed hydrological study will be submitted in the final EIA report.
	5	The proponent shall carry out Bio diversity study through reputed institution and the same shall be included in EIA Report.	The details of Bio diversity from the reputed institution will be submitted in the final EIA report.
	6	The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc, up to a radius of 25 km from the proposed site.	The DFO letter will be submitted in the final EIA report.
	7	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions – CSIR-Central Institute of Mining & Fuel	It is a fresh quarry lease area and the condition is not applicable.

		Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg. Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.	
	8	However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.	It is a fresh quarry lease area and the condition is not applicable.
	9	The PP Shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR l96l such as blaster. mining mate, mine foreman. II/I Class mines manager appointed by the proponent.	The affidavit for blasting has been enclosed in the approved mining plan report in Annexure III.
	10	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as	A conceptual design of blasting has been given in Section 2.6 under Chapter II in the EIA report page 14-19.

		no fly rock travel beyond 30 m from the blast site.	
	11	The EIA coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	Photographic evidence showing the project proponent's mining activities shall be submitted in the final EIA report.
	12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016. then the proponent shall furnish the following details from AD/DD, mines,	
	13	What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	It is a fresh quarry lease area and the condition is not applicable.
	14	Quantity of minerals mined out.	
		• Highest production achieved in any one year	
		• Detail of approved depth of mining.	
		• Actual depth of the mining achieved earlier.	
		• Name of the person already mined in that lease area.	
		• If EC and CTO already obtained, the copy of the same shall be submitted.	
		• Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	

	15	All corner coordinates of the mine lease area. superimposed on a High-Resolution Imagery/Toposheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.3, under Chapter II, in the EIA report page 11.
	16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing etc.,	The drone video will be submitted during final EIA presentation.
	17	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 of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA report.
	18	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, The anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for The same.	The Resources and Reserves of Black granite were calculated based on cross- section method by plotting sections to cover the maximum lease area for the proposed project. The plate used for reserve estimation has been presented in Figure 2.5 results of geological resources and reserves have been shown in Table 2.3. under Chapter II in the EIA report page 14.
	19	The Project Proponent shall provide the Organization chart	Details of manpower required for this project have been given in Table 2.14

		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.	under Chapter II, in the EIA report page 26.
	20	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD/ TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly – be shown whether working will intersect groundwater, Necessary data and documentation in this regard may be provided.	The detailed hydrological report will be submitted in the final EIA report.
	21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil	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, in the EIA report page 27-84.

		quality & flora/fauna including traffic/vehicular movement study.	
	22	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.	Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII, in the EIA report page 113-114.
	23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks. The detailed rain water harvesting report will be submitted in the final EIA report.
	24	Land use of the study area delineating forest area, agricultural land, gazing 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	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, in the EIA report page 28-37 under Chapter III. The details of surrounding sensitive ecological features have been provided in Table 3.39 under Chapter III in the EIA report page 84. Land use plan of the project area showing pre-

		any, of change of land use should be given.	operational, operational and post-operational phases are discussed in Table 2.8 under Chapter II in the EIA report page 26.
	25	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.	This condition is not applicable to this project because no dumps have been proposed outside the lease area.
	26	Proximity to Areas declared as 'Critically Polluted, (or) the project areas which attracts the court restrictions for mining operations. Should also be indicated and where so required. Clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable. Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.
	27	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.	As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks. The detailed rain water harvesting report will be submitted in the final EIA report.
	28	Impact on local transport infrastructure due to the project should be indicated.	Details regarding the impact of the project on traffic are given in Section 3.7 under Chapter III in the EIA report page 81-83.

	29	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 in the EIA report page 63-78.
	30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.8 under Chapter II in the EIA report page 18.
	31	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 educated the local students about the importance of protecting the biological environment.
	32	The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating	A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV in the EIA report page 94-96.

		with shrubs should be planted in a mixed manner.	
	33	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/Horticulture 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.
	34	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.	A disaster management plan for the project has been provided in Section 7.3 under Chapter VII in the EIA report page 120-121.
	35	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.	A risk assessment plan for the project has been provided in Section 7.2 under Chapter VII in the EIA report page 117-112.
	36	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	Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report page 98-99.

		project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
	37	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 in the EIA report page117.
	38	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.	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 22 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page116.
	39	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.
	40	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 in the EIA report page108-115.

	41	If any quarrying operation were carried out in the proposed quarrying sile 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.	It is a fresh quarry lease area and the condition is not applicable.
	42	The PP Shall prepare the EMP for the entire life/lease period of mine and also Furnish the sworn affidavit starting to Abide the EMP for the entire life of mine.	A detailed environment management plan has been prepared following the suggestion made by SEAC, as shown in Chapter X in the EIA report page120-126. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted during final EIA presentation.
	43	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.

3.SEIAA Standard Conditions

Cluster Management Committee		
1	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members	A cluster management committee including all the proponents of the Black granite quarrying projects within the cluster of 500 m radius will be constituted for the effective

	including the existing as well as proposed quarry.	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 in the EIA report page 14-21.
5	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	It will be informed to the committee.
6	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.

7	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.		A proper action plan regarding the restoration will be followed by the committee.
8	The committee shall furnish the Emergency Management plan within the cluster.		The committee will submit the emergency management plan to the respective authority in the stipulated time period.
9	The committee shall deliberate on the health of the 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 in the EIA report page 111-112
Impact study of mining			
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following.		
	a)	Soil health & soil biological, physical land chemical features.	Soil health and biodiversity have been discussed in Sections 3.1 and 3.5 respectively under Chapter III in the EIA report page 28-37 & 63-78.
	b)	Climate change leading to Droughts, Floods etc.	Climatic condition of the proposed project area has been discussed in Section 3.3.1.1 under Chapter III in the EIA report page 49-50.

	c)	Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local People.	The information about CO_2 emission has been added to Section 4.6 under Chapter IV in the EIA report page 94-97.
	d)	Possibi1ities of water contamination and impact on aquatic ecosystem health.	Possibilities of both surface and ground water contamination have been discussed in Section 4.3 under Chapter IV in the EIA report page 86. The impact on aquatic species has been discussed in Section 4.6 under Chapter IV in the EIA report page 93-97.
	e)	Agriculture, Forestry, & Traditional practices.	Sorgum, millet, groundnut, and coconut are the primary crops that are cultivated in the study area.
	f)	Hydrothermal/Geothermal effect due to destruction in the Environment.	The average geothermal gradient of earth is 25^0C/km. As the proposed depth of mining is 13m below the local ground level, the temperature will increase by 0.325^0C at the depth of mining. Hence the geo thermal is very low.
	g)	Bio-geochemical processes and its foot prints including environmental stress.	There is no observed Bio-geochemical processes and its foot prints including environmental stress.
	h)	Sediment geochemistry in the surface streams.	There is no rivers/drainages/canals within 1km from the lease area.
	Agriculture & Agro-Biodiversity		
13	Impact on surrounding agricultural fields around the proposed mining area.		There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.6 under Chapter IV in the EIA report page 93-97.

14	Impact on soil flora & vegetation around the project site.	The details on flora have been provided in Section 3.5 under Chapter III in the EIA report page 63-78. There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area shall be given and if so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III in the EIA report page 63-78. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 93-97.
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 in the EIA report page 63-78 and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 93-97.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 85-101.
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 85.
	Forests	

19	The project proponent shall study on impact of mining on Reserve forests free ranging wildlife.	The project proponent shall do barbed wire fencing work and develop a green belt around the lease area to prevent wildlife from entering the site.
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 93-97
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 in the EIA report page 93-97
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National parks, corridors and wildlife pathways, near project site.	The protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.40 under Chapter III in the EIA report page 84.
	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.	The hydrogeological study is discussed in the Section 3.2.3 under Chapter III in the EIA report page 41-49.
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 in the EIA report page 86-87.
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, waterbodies/rivers & any ecological fragile areas.	The matter has been discussed under Chapter IV in the EIA report page 85-101.
26	The project proponent shall study impact on fish habitats and the food WEB/food chain in the water body and Reservoir.	An analysis for food chain in aquatic ecosystem has been discussed in Section 3.5 under Chapter 3 in the EIA report page 63-78.
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	The impacts of the proposed project on the surrounding environment have discussed in Chapter IV in the EIA report page 85-101.
28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sits possible land form changes visual and aesthetic impacts.	The impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV in the EIA report page 93-97.
29.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components.	The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 86.
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 in the EIA report page 86-87.
Energy		
31	The measures taken to control Noise, Air, water, Dust control and steps adopted to efficiently utilise the Energy shall be furnished.	The measures taken to control noise, air, water, and dust have been given under Chapter IV in the EIA report page 85-101.
Climate Change		

32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV in the EIA report page 93-97.
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The matter has been discussed in Chapter IV in the EIA report page 85-101.
	Mine Closure Plan	
34	Detailed Mine closure plan covering the entire mine lease period as per precise area communication order issued.	A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.8 under Chapter II in the EIA report page 18.
	EMP	
35	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	A detailed Environment Management plan has been given under Chapter X in the EIA report page 120-126.
36	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	A detailed Environment Management plan has been given in Tables 10.1 & 10.2 under Chapter X in the EIA report page 121-126.
	Risk Assessment	

37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII in the EIA report page 108-111.
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.	The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 111-112.
Others		
39.	The project proponent shall furnish VAO certificate with reference to 300 m radius regard to approved habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, river, lake pond, tank etc.	The VAO certificate of 300 m radius have been attached in the attached in the Annexure IV.
40	As per the MoEF & CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management plan.	The concerns raised during the public consultation is submitted in final EIA.

41	The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	The matter on plastic waste management has been given in Section 7.5 under Chapter VII in the EIA report page 115.

4. SEIAA Specific Conditions

	Terms of Reference		
	After detailed discussions, the Authority accepted the recommendation of SEAC and decided to grant of Terms of Reference (ToR) along with Public Hearing for the quantity of 4049 m^3 of Black Granite @ 15% Recovery & 22951 m^3 of Granite waste @ 85% with a depth of mining is 13 m BGL as per the approved mining plan under cluster of undertaking the combined Environmental Impact Assessment Study and Preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & the conditions mentioned in 'Annexure B' of this minutes & in addition to the following conditions:		
	1	The PP shall carry out the scientific studies to design the controlled blast parameters for reducing the blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations carried out in the quarry, by involving anyone of these reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall	It is an Eco-friendly quarry, so blasting design is not required.

		be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.	
	2	The PP shall carry out the scientific studies to assess the hydrogeological condition of the quarry by involving any one of the reputed Research and Academic Institution - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, University of Madras – Centre for Environmental Studies, and Anna University Chennai-Dept of Geology, CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.	The detailed hydrogeological report through reputed Institute will be submitted in the final EIA report.
	3	For the safety of the persons employed in the quarry, the PP shall carry out the scientific studies to assess the slope stability of the working benches by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad,	It is a fresh quarry lease area and the condition is not applicable.

		NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation	

Standard Term of Reference for (Mining of Minerals)

1.

S.No	Terms of Reference	
1.1	An EIA-EMP Report shall be prepared for peak capacity (...MTPA) operation in an ML/project area of.... ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.	Yes, it is based on the generic structure specified in Appendix III of the EIA Notification, 2006. i.e., the peak capacity of the proposed quarry is 11337 MTPA and operation in an ML/project area of 1.36.45 ha.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modelling for.... MTPA of mineral production based on approved project/Mining Plan for.... MTPA. Baseline data collection	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 - May 2024 with CPCB guidelines. The detailed baseline environmental monitoring studies were carried out and the results are discussed in the Chapter III and the approved mining plan is attached in the Annexure III.

	can be for any season (three months) except monsoon.	
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided	The KML file with proper pin drop and coordinate of the mine will be uploaded during the online submission.
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also	The details of environmentally sensitive ecological features in the study area are given in the Table 3.40 under Chapter III in the EIA report page 84.
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.	The map showing the lease area with cluster details is shown in the Figure 1.1, Chapter I, p.4. The details are given in the Table 3.40 under Chapter III in the EIA report page 84.

1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.	The contour map will be submitted in the final EIA report.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of length, quantity and quality of water to be diverted.	The catchment area map will be submitted in the final EIA report.
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.	The reserve details are discussed in the Section 2.5, in Chapter II in the EIA report page 14.

1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.	The details of mining method, technology, equipment, etc is discussed in the Section 2.6, under Chapter II in the EIA report page 14-21.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channelling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.	There is no any drainage within or around the lease area. The drainage map is shown in Figure 3.1 under Chapter III in the EIA report page 28-37.
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.	Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Table 2.7 under Chapter II in the EIA report page 16. There is no any drainage within or around the lease area. The drainage map is shown in Figure 3.1 under Chapter III in the EIA report page 30. The traffic survey conducted based on the transportation route of material, the Black granite is proposed to be transported mainly through Village road connecting Kundhukottai - Denkanikottai as shown in Table 3.36 and in Figure 3.27 under Chapter III. pp. 82.
1.12	Original land use (agricultural land/forestland/grazing land / wasteland / water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations	

<table>
<tr><td></td><td colspan="3">should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights.<table>
<tr><td>S.No</td><td>ML/Project Land use</td><td>Area under Surface Area Rights(ha)</td><td>Area Under Mining Rights(ha)</td><td>Area under Both (ha)</td><td></td></tr>
<tr><td>1</td><td>Agricultural land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>2</td><td>Forest Land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>3</td><td>Grazing Land</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>4</td><td>Settlements</td><td>---</td><td>---</td><td>---</td><td></td></tr>
<tr><td>5</td><td>Others (specify)</td><td>1.36.45</td><td>1.36.45</td><td>1.36.45</td><td></td></tr>
<tr><td>S.No</td><td colspan="2">Details</td><td>Area (ha)</td><td colspan="2" rowspan="5"></td></tr>
<tr><td>1</td><td colspan="2">Buildings</td><td>---</td></tr>
<tr><td>2</td><td colspan="2">Infrastructure</td><td>---</td></tr>
<tr><td>3</td><td colspan="2">Roads</td><td>---</td></tr>
<tr><td>4</td><td colspan="2">Others (area under quarry)</td><td>1.36.45</td></tr>
<tr><td colspan="3">Total</td><td>1.36.45</td><td colspan="2"></td></tr>
</table></td></tr>
<tr><td>1.13</td><td>Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan</td><td colspan="2">The details on flora and fauna have been provided in Section 3.5 under Chapter III in the EIA report page 63-78.</td></tr>
</table>

	along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.	
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.	The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering March through May 2024 with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Green Link Analytical and Research Laboratory (India) Pvt Ltd for the environmental attributes including soil, water, air, and noise and by FAEs for ecology and biodiversity, traffic, and socio-economy.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind	The detailed study is discussed in the Chapter III in the EIA report page 27-84.

	(air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.	
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided.	10km baseline study can be conducted only when total cluster area extent of the projects is above 25ha. Here, the proposed cluster area of the projects is less than 25ha, (i.e,5.25.95ha) and so baseline monitoring study is done for 5 km only. The baseline study of the air quality is discussed in the Section 3.3, in Chapter III in the EIA report page 49-59.
1.17	A detailed traffic study along with presence of habitation in 100m distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the	There is no need of road widening, the details of traffic study are discussed in the Section 3.7 under Chapter III in the EIA report page 81-83. Carbon released from quarrying machineries and tippers during quarrying would be 35 kg

	road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.	per day, 9389 kg per year and 4020 kg over five years
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.	The socio-economic study is discussed in the Section 3.6, in Chapter III in the EIA report page 78-81.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.	There is no forest within 10km. The Ecology and biodiversity study is discussed in the Section 3.5 in Chapter III in the EIA report page 63-78. 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 16358kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
1.20	Baseline data on the health of the population in the impact zone and	The occupational health and safety of the personnel and manpower for the mine is

<table>
<tr><td></td><td>measures for occupational health and safety of the personnel and manpower for the mine should be submitted.</td><td colspan="3">submitted in the Section 4.8 in Chapter IV in the EIA report page 98-100.</td></tr>
<tr><td>1.21</td><td>Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted.</td><td colspan="3">Hydrological studies as per GEC 2015 guidelines will be prepared and submitted in the final EIA report.</td></tr>
<tr><td>1.22</td><td>Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.</td><td colspan="3">Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program. The detailed rain water harvesting will be submitted in the final EIA report.</td></tr>
<tr><td>1.23</td><td>Study on land subsidence including modelling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.</td><td colspan="3">It is a fresh quarry lease area and the condition is not applicable.</td></tr>
<tr><td>1.24</td><td>Detailed water balance should be provided. The breakup of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts</td><td>Purpose</td><td>Quantity</td><td>Source</td></tr>
<tr><td></td><td></td><td>Dust Suppression</td><td>1.0 KLD</td><td rowspan="4">The water requirement is purchased from the authorized water vendor.</td></tr>
<tr><td></td><td></td><td>Green Belt development</td><td>1.0 KLD</td></tr>
<tr><td></td><td></td><td>Drinking & Domestic</td><td>1.0 KLD</td></tr>
<tr><td></td><td></td><td>Total</td><td>3.0 KLD</td></tr>
<tr><td></td><td></td><td colspan="3"></td></tr>
</table>

	vis-à-vis the competing users should be provided.	
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs	Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored	The PP is adviced to use LNG/CNG trucks in mining operation because these trucks can control air pollution and noise pollution.
1.27	PP to evaluate the greenhouse emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.	There is no greenhouse emission in the project lease area.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.	The details are discussed in the Section 7.2 & 7.3 in Chapter VII in the EIA report page 108-112.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.	The impact on the air quality is discussed in the Section 4.4 in Chapter IV in the EIA report page 87-91.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling,	The details regarding is discussed in the Section 4.5.2 under Chapter IV in the EIA report page 93.

	transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.	
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.	The details are given in the Section 2.6 under Chapter II in the EIA report page 14-21.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.	Quarry project proponent controls air pollution by water sprinkling method on roads and quarry sites and green belt development method is adopted.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined-out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.	The ultimate mining is proposed to an average depth 28m bgl. the mined-out area will be fenced on top of working bench with SI fencing to arrest the entry of cattle's and public in to the quarry site. The details of mine closure budget is discussed in the Section 2.6.4 under Chapter II in the EIA report page 16-17.

1.34		Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be	The details are given in the Section 4.6 under Chapter IV in the EIA report page 93-97.
1.35		Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The detailed EMP is given in the Chapter X in the EIA report page 120-126.
1.36		Details of R&R. Detailed project specific R&R plan with data on the existing socio-economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with schedule of the implementation of the R&R plan should be given.	Not Applicable. The proposed lease area belongs to the lessee and there is no any habitation in the lease area.
1.37		CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.	The CSR plan is discussed in the Section 8.6 in Chapter VIII in the EIA report page 117.
1.38	Corporate Environment Responsibility:		
1.39	a)	The Company must have a well laid down Environment Policy approved by the Board of Directors.	The CER plan is discussed in the Section 8.7 in Chapter VIII in the EIA report page 118.
1.40	b)	The Environment Policy must prescribe for standard operating	

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

	of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.	
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.	The clearance copy of approved mining plan letter is attached in the Annexure III.

1.48	Details on the Forest Clearance should be given as per the format given:					
	Total ML Project Area	Total Forest land (ha) If more than one provides details of each FC	Date of FC	Extent of Forest Land	Balance area for which FC is yet to be obtained	Status of appl For diversion of forest Land
	NA	NA	NA	NA	NA	NA

1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report	Approved Mining plan of the expansion proposal is attached in the Annexure III and the mine closure plan is discussed in the Section 2.6.4 in Chapter II in the EIA report page 16.
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.	The public hearing comments will be submitted during final EIA report.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes	The drone video survey will be submitted in the final EIA report.

1.52	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.	The required documents for the proposed quarry are provided in the chronology order in Annexure III.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)	The first page of the EIA report mentions the peak capacity production, area, project proponent details, Consultant and NABET details0 and authorized Laboratory (NABL / MoEF & CC certification) details.
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter's section.	ToR Compliance is cited with respective Chapter section and page no in tabular form.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

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 B2 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 100 ha, 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.

In compliance with ToR obtained vide TOR File No.10853 and TOR Identification No. TO24B0108TN5105918N, dated.25/06/2024. This EIA report is prepared for the project proponent, Mr.D.Karunanidhi applied for Black Granite quarry lease in the Patta land falling in S.F.No.720/3B, 725/1(Part), 725/2A, 726/B1 (Part) & 726/B2A over an extent of 1.36.45ha in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District and Tamil Nadu. Considering cumulative load of all the Black granite quarry project including three proposed quarries and five existing quarries falling in the cluster of 500m radius from the periphery of the proposed project. The total extent of all the quarries in the cluster is 5.25.95ha. All the quarries in the cluster are shown in Figure 1.1.

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 2024** 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.

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

Proposed Quarries					
Code	**Name of the Lease**	**S.F. No**	**Village**	**Extent (ha)**	**Lease Period**
P1	D.Karunanidhi	720/3(B), 725/1(P), 725/2A, 726/B1(P) & 726/B2A	Irudukottai	1.36.45	Applied area
Existing Quarry Quarries					
E1	D.Karunanidhi	715/3(P), 719/4(P), 721/1, 721/2A(P), 721/2B(P) &722/1(P)	Irudukottai	3.89.5	25.01.2018 to 24.01.2038
Total Cluster Extent				**5.25.95**	---

Source:

DD Letter – Rc.No.226 /2020/Mines dated 11.01.2024.

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

1.2 ENVIRONMENTAL CLEARANCE

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

- Screening
- Scoping
- Public consultation
- Appraisal

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/469362/2024 dated:23.04.2024) 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 06.05.2024.

Scoping

The proposal was placed in the 472st meeting of SEAC on 31.05.2024. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) and the recommendation for ToR is subjected to the outcome of the Honourable NGT, Principal Bench, New Delhi (O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).

Public Consultation

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

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 ToR obtained vide TOR File No.10853 and TOR Identification No. TO24B0108TN5105918N, dated.25/06/2024 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).

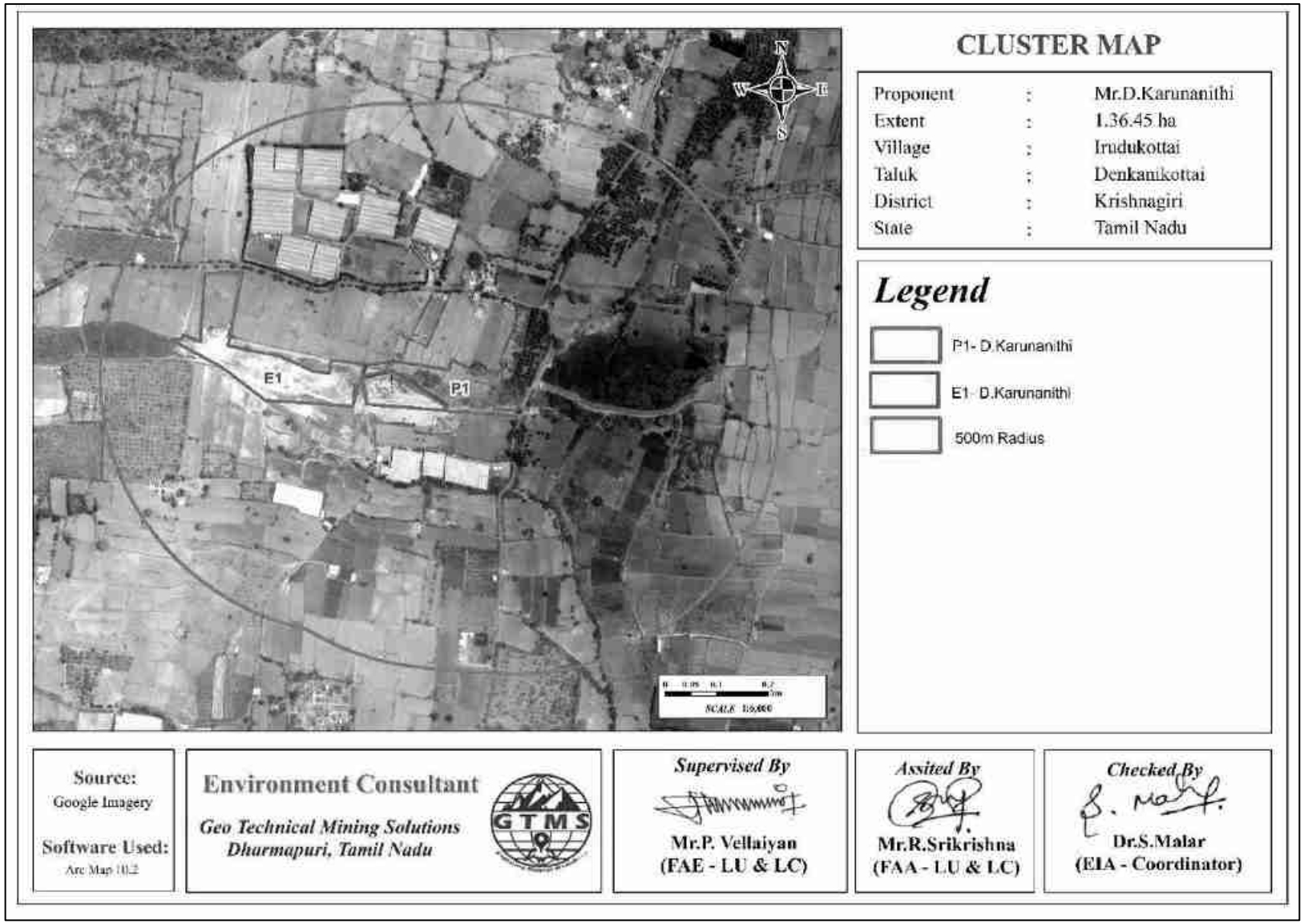


Figure 1.1 Location of Proposed and Existing Quarries in the Cluster of 500 m Radius

1.6 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.

Table 1.2 Details of Project Proponent

Name of the Project Proponent	D.Karunanidhi
Address	S/o.Dharuman, No.15, Valasagoundanur, Puliyampatti Post, Pochampalli Taluk, Krishnagiri- 635206.
Status	Proprietor

1.7 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of Black granite which is primarily used in construction projects. The method adopted for Black granite excavation is open cast semi-mechanized method involving formation of benches with 5m height and 5m width. The proposed project site is located in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu. Some of the important features of the proposed project have been provided in Table 1.3.

Table 1.3 Details of the Project

Name of the Quarry	D.Karunanidhi, Black granite		
S.F.No.	720/3(B), 725/1(P), 725/2A, 726/B1(P) & 726/B2A		
Land Type	Patta land		
Extent	1.36.45ha		
Proposed Depth for 5 years	13m BGL		
Toposheet No	57-H/15		
Latitude between	12°27'36.97907"N to 12°27'50501"N		
Longitude between	77°47'0.03493"E to 77°47'9.65484"E		
Highest Elevation	855m ASML		
Topography	Hilly Terrain Topography		
Geological Reserves	Black Granite 15 % Recovery	Granite Waste 85%	Top Soil
	29431	166809	13629
Mineable Reserves	16113	91317	9301
Proposed production for 5 years	4049	22951	4686
Method of Mining	It is an Eco – friendly quarry operation, no blasting is proposed. Diamond wire saw cutting method is adopted by the lessee.		
	Jack Hammer	4	

Machinery proposed	Compressor	2
	Tippers	2
Proposed manpower deployment	22	
Project cost	Rs. 69,92,800/-	
CER cost	Rs. 10,00,000/-	
Proposed Water Requirement	3.0 KLD	

Source: Approved mining plan book

1.8 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 2024** 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.

1.9 Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

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

CHAPTER II

PROJECT DESCRIPTION

2.0 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.D.Karunanidhi, Black Granite is involved in the undertaking of establishment, construction, development, and closure of open cast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of granite. Therefore, the proponent had applied for quarry lease on 06.03.2020 to extract granite and produce dimension stones. The precise area communication letter was issued by the Additional Chief Secretary Government of Tamandu Chennai Rc.no.4811/MME.2/2023-I, dated.06.11.2023. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Director of Geology and Mining, Chennai (Rc.No.1336/MM4/2021, dated:13.12.2023). The overall view of the project site is shown in Figure 2.1.

Figure 2.1 Overall View of Proposed Project Site

2.2 LOCATION AND ACCESSIBILITY

The proposed project area is Irudukottai Village, Denkanikottai Taluk, Krishnagiri District as shown in Figure 2.2. The area is located between a latitude of 12°27'36.97907"N to 12°27'40.50501"N and a longitude of 77°47'0.03493"E to 77°47'9.65484"E. Accessibility details to the proposed project site have been given in Table 2.1.

Table 2.1 Site Connectivity to the Project Area

Nearest Road	MDR-588Karandapalli-Noganoor	1.59km	W
Nearest Railway Station	Periya Nagathunai	17.5 km	NE
Nearest Medical Facility	Denkanikottai	6.4 km	N
Nearest Town	Denkanikottai	6.7 km	N
Nearest Airport	Hosur	23.0 km	N
Nearest Port	Chennai	279.0 km	NE
Nearest Village	Noganoor	3.1km	N
	Giriyanhalli	1.1km	NE
	Maniyambadi	1.15km	S
	Andevanpalli	1.9km	W

2.3 LEASEHOLD AREA

- The proposed project is site is 1.36.45ha.
- 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

ID	Latitude	Longitude	ID	Latitude	Longitude
1	12° 27' 39.79141" N	77° 47' 8.76822" E	14	12° 27' 39.46937" N	77° 47' 0.32083" E
2	12° 27' 39.33694" N	77° 47' 8.79496" E	15	12° 27' 39.41345" N	77° 47' 0.03493" E
3	12° 27' 37.75913" N	77° 47' 8.39588" E	16	12° 27' 40.18509" N	77° 47' 0.22337" E
4	12° 27' 37.37407" N	77° 47' 8.29833" E	17	12° 27' 40.4203" N	77° 47' 2.0691" E
5	12° 27' 37.34942" N	77° 47' 9.65484" E	18	12° 27' 40.1589" N	77° 47' 3.7021" E
6	12° 27' 36.97907" N	77° 47' 9.64369" E	19	12° 27' 39.8788" N	77° 47' 5.45136" E
7	12° 27' 37.09266" N	77° 47' 7.99325" E	20	12° 27' 40.50501" N	77° 47' 5.63023" E
8	12° 27' 37.21285" N	77° 47' 6.24586" E	21	12° 27' 39.90277" N	77° 47' 6.82624" E
9	12° 27' 37.31136" N	77° 47' 5.27150" E	22	12° 27' 39.89826" N	77° 47' 7.04404" E
10	12° 27' 37.67923" N	77° 47' 5.31677"E	23	12° 27' 39.66295" N	77° 47' 7.03903" E
11	12° 27' 38.55157" N	77° 47' 3.92053" E	24	12° 27' 39.62113" N	77° 47' 7.76570" E
12	12° 27' 39.42388" N	77° 47' 2.52423" E	25	12° 27' 39.84881" N	77° 47' 7.77069" E
13	12° 27' 39.78677" N	77° 47' 1.94325" E	---	--	--

Source: Approved Mining plan

2.4 GEOLOGY

The lease area geologically occurs over grey hornblende biotite gneiss, commercially called as rough stone. In addition, the lease area geomorphologically occurs over moderately dissected structural hills and valleys. The north-western part of Tamil Nadu is characterized by the occurrences of a number of Dolerite dykes. The dolerite dykes in general trending is in NNE - SSW direction and rarely in NNW– SSE directions.

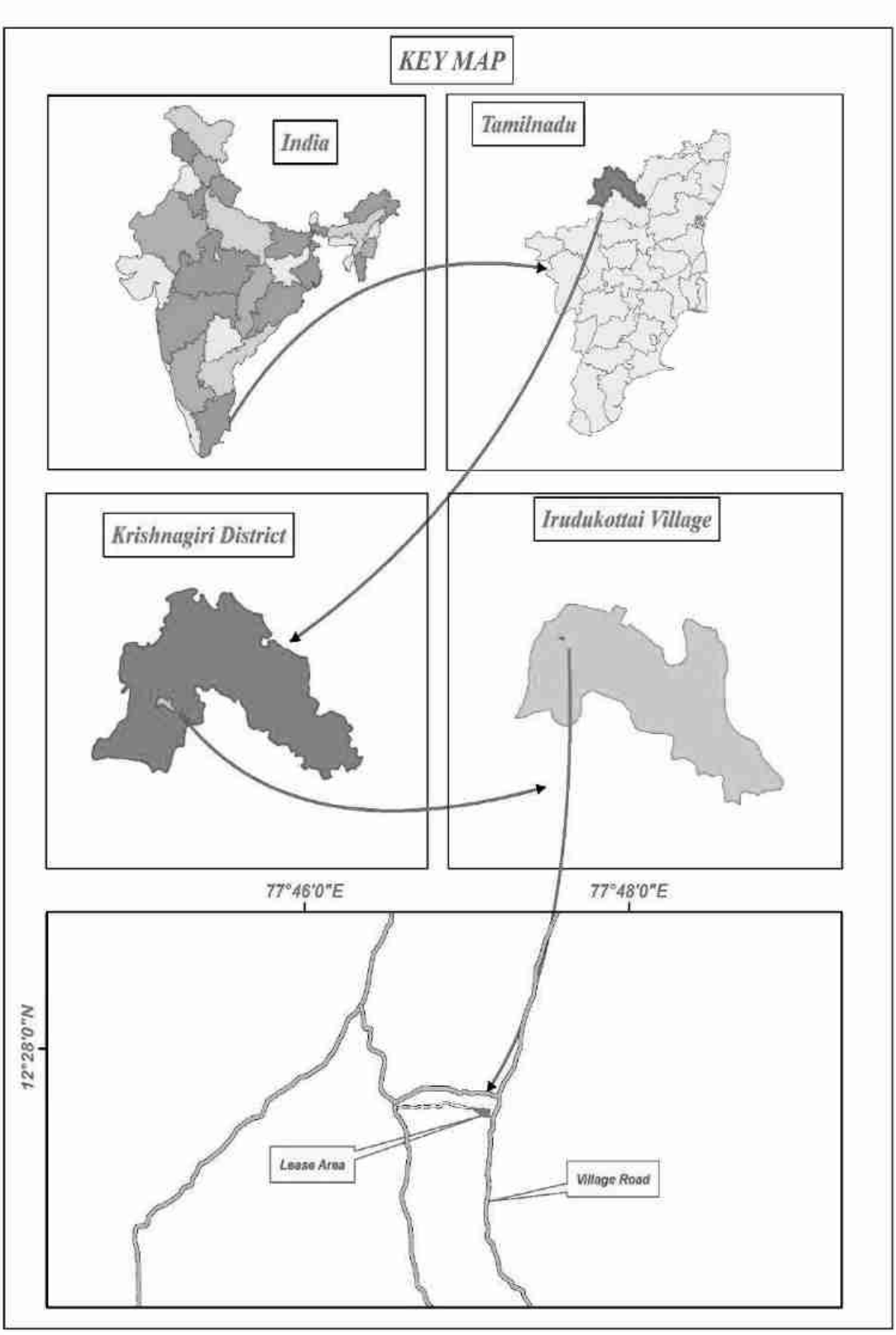


Figure 2.2 Key Map Showing Location of Project Site

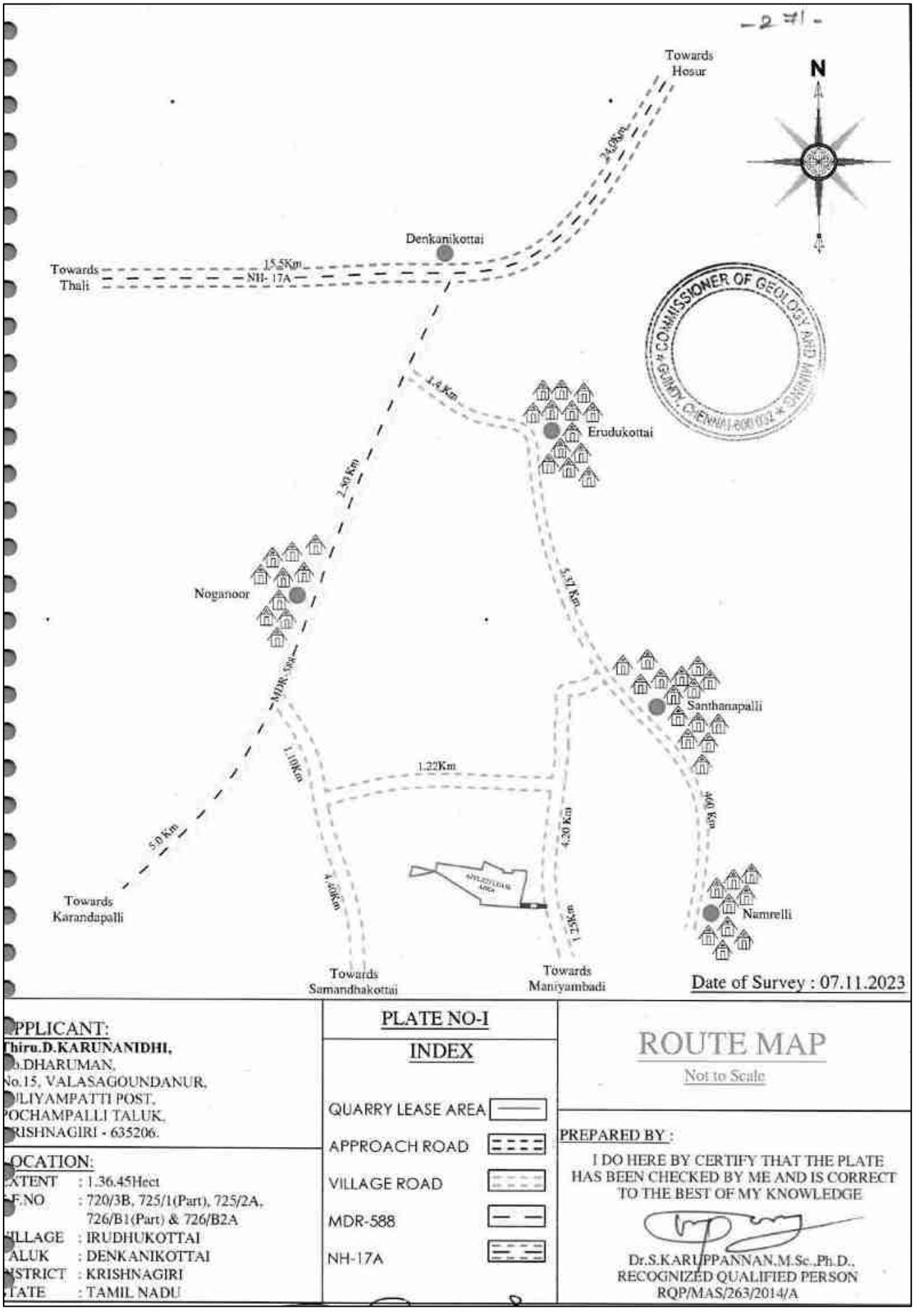


Figure 2.3 Site Connectivity of the Lease Area

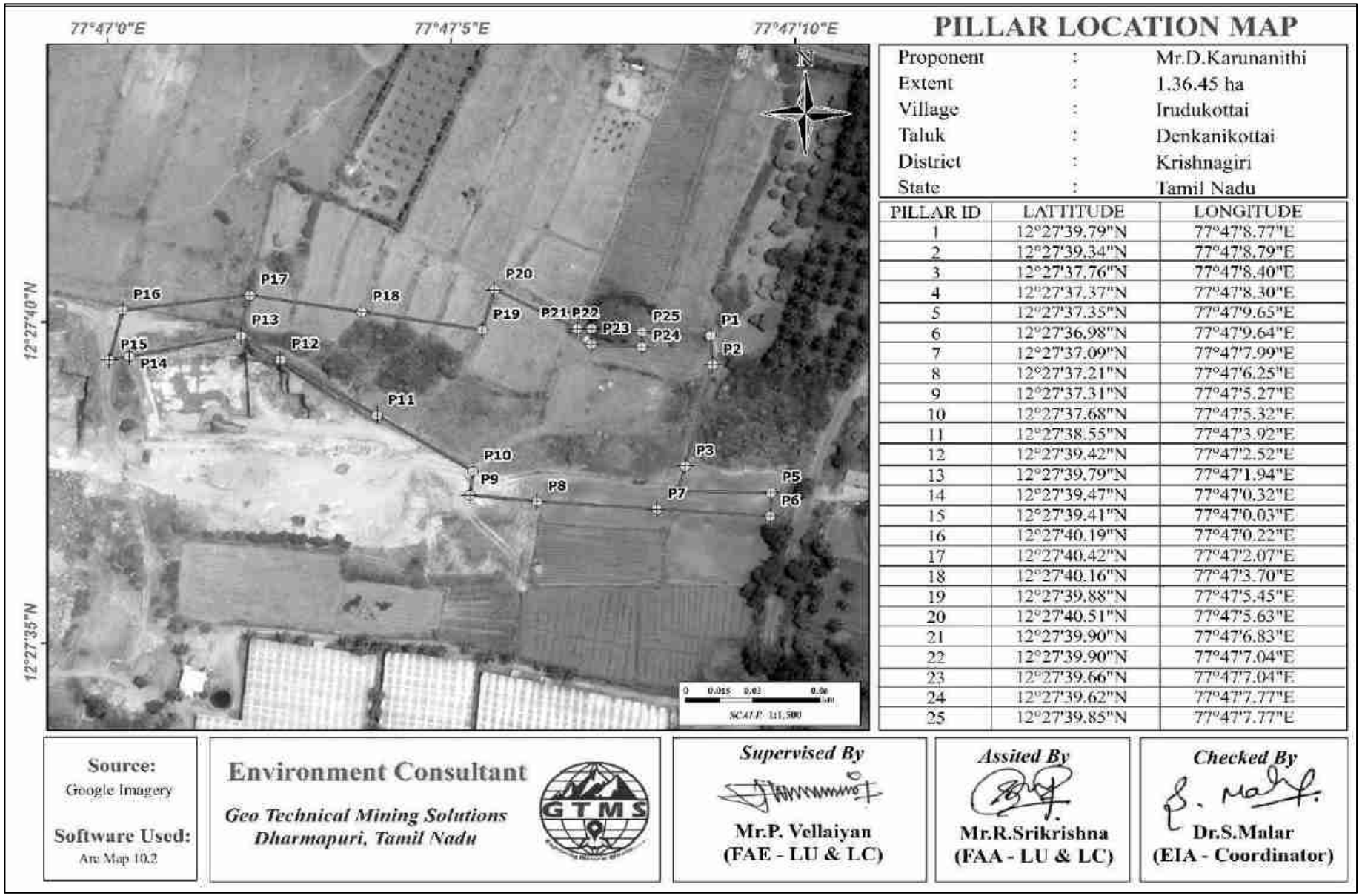
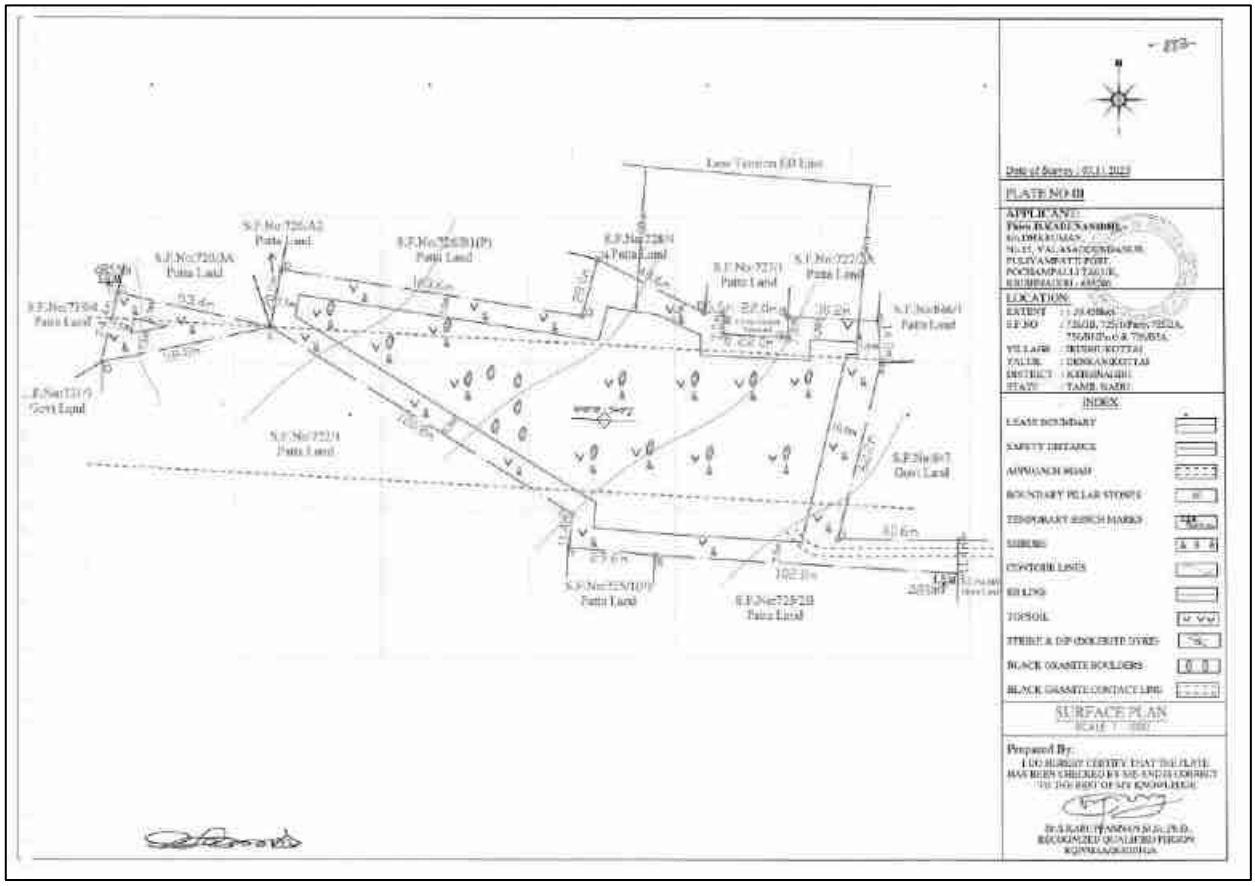


Figure 2.4 Google Earth Image Showing Lease Area with Pillar



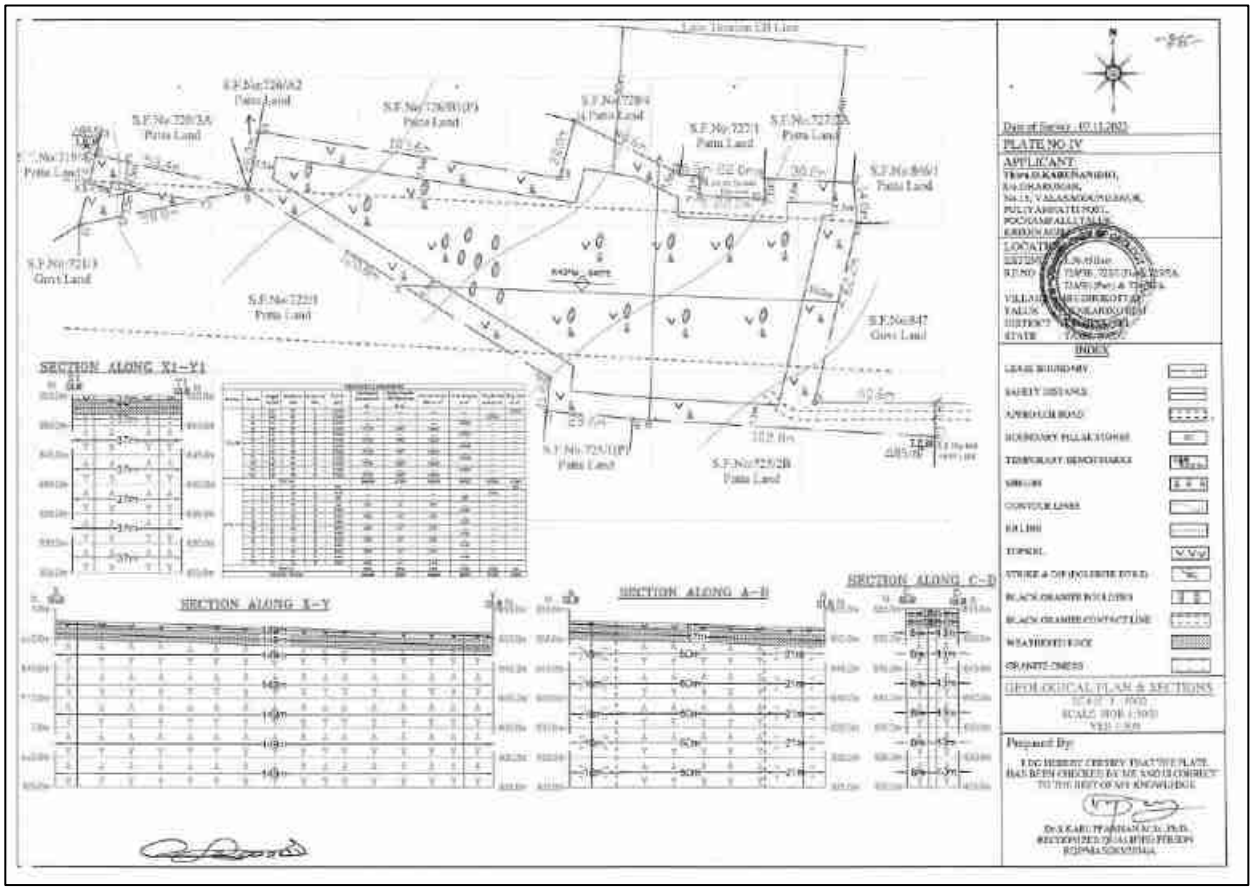


Figure 2.5 Surface & Geological Plan and Section

2.5 RESOURCES AND RESERVES

The estimated geological resources and mineable reserves of the proposed project is provided in Table 2.3.

Table 2.3 Estimated Resources and Reserves of the Project

Description	ROM in m^3	Black Granite 15 % Recovery in m^3	Granite Waste 85% in m^3	Top Soil in m^3	Weathered Rock in m^3
Geological Resources	196240	29431	166809	13629	27258
Mineable Reserves	107430	16113	91317	9301	17408

Year-Wise Production

On the basis of year-wise development plan and its sections, as shown in Figures 2.6 year-wise production details are given in Table 2.4.

Table 2.4 Year wise Production Details

Year	ROM in m^3	Black Granite @ 15% Recovery in m^3	Granite Waste @ 85% in m^3	Top Soil in m^3	Weathered Rock in m^3
I	5500	825	4675	2059	3536
II	5500	825	4675	1562	2992
III	5000	749	4251	1065	2040
IV	5500	825	4675	---	---
V	5500	825	4675	---	---
Total	**27000**	**4049**	**22951**	**4686**	**8568**

Source: Approved Mining plans

2.6 MINING METHOD

The mining operation is opencast semi-mechanized method adopted on single shift basis only. Under the regulation 106 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 45ºC from horizontal.

The Black Granite is proposed to quarry at 5m bench height & width conventional open cast method. Drill hole is of diameter 32mm, depth and inclination of drill hole is generally drilled vertically in an alignment, however in primary cutting in the absence of sheet joints to bottom level, horizontal holes also are drilled. The spacing will be about 0.1m to 0.3m from

hole to hole and burden goes up to 1.6m for the splitting of the rock. The intrusive body will be tackled with latest technology by deploying diamond wire saw cutting for obtaining the good recovery factor of sizeable blocks.

2.6.1 Blasting pattern:

It is an Eco-friendly quarry operation, no blasting is proposed, Diamond wire saw cutting method is adopted by the applicant. Now a day, the splitting within the sheet rock is affected by diamond wire-sawing, which largely reduces the use of explosives in granite mining. Besides, chemical powder called as "Rock breaking Powder" [$Ca(OH)_2$] are also used for splitting. Many adverse effects of blasting are avoided and hence diamond wire cutting will substantially increase the recovery. Since primary cutting comprising splitting from the sheet rock is affected by diamond wire-sawing there will not be any drilling or blasting involved. Hence, there will not any adverse effects and vibration due to this type of mining operation.

Chemical Blasting Method:

The Black Granite operations should not be conducted with any blasting. This will totally damage the possible output by including cracks in the rock. For this reason, Chemical explosives are not used for this process. Inserted the rock is spilt with help of chemical powder which is an expander of the rock. The process is an under long jack hammer holes of around 3 to 6 meters are drilled in close spacing. The spacing is generally 5 to 10mm after the entire line is drilled, it is plugged to prevent any foreign materials entering the hole, later two vertical and one bottom cut are made with chemical generation a crack which is through the holes drilled. The crack is expanded any hydraulic bags are used to pull the rock.

2.6.2 Magnitude of Operation

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

Table 2.5 Operational Details for Proposed Project

	Black Granite @ 15% Recovery in m^3	**Granite Waste @ 85% in m^3**
Quantity of Material to be Quarried out in five years	4049	22951
Number of working days/Annum	270	270
Production of /Day (m^3)	3	17
No. of Lorry Loads	1	3

2.6.3 Extent of Mechanization

To achieve the above-mentioned production, various machineries are proposed for the quarrying operation, as given in Table 2.6.

Table 2.6 Machinery Details

Drilling Equipment						
Type	**No. of Unit**	**Dia. of Hole (mm)**	**Size capacity**	**Make**	**H.P**	**Motive Power**
Compressor	2	---	Air	---	---	Diesel
Jack Hammer	4	32	Hand held	---	---	Compressor Air
Diamond wire saw	2	--	--	--	--	
Line drilling Mechinary	1	--	--	--		
Loading Equipment						
Excavator	1	---	---	Disel	2.9 - 4.5m^3	---
Haulage & Transport Equipment						
Tipper	2	---	---	---	---	Diesel

Stacking of Granite Rejects and Disposal of Waste

The black granite rejects are 22951m^3 (up to 85%), side burden is 5110m^3 and weathered rock are 8568m^3 (Totally 36629m^3) will be removed and dumped in the west side of the lease area average dimensions of (L65m X W30m X H 18.5m) for the period of five years. The topsoil is 4686m^3 will be removed and stacked for earth bund in the lease hold area to prevent inherent entry of cattle's and human as per rules 106, Metalliferous Mines Regulations, 1961. If black granite may be unsold will be keep within the lease boundary.

2.6.4 Progressive Quarry closure plan

The progressive quarry closure plan of the proposed project showing present, and future land use statistics is provided in Table 2.7. According to data shown in the table, where at the present land use area is of unutilized area is about 1.36.45ha and whereas at the end of the quarry life, about 0.39.0ha of land for waste dump, 0.02.0ha for infrastructures, 0.05.0ha for roads, 0.19.25ha for green belt development, and the remaining 0.23.86ha would have been left as unutilized area.

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

Description	**Present Land Use Area (ha)**	**Land Use Area at the end of mine life (ha)**
Area under quarry	Nil	0.41.82
Infrastructure	Nil	0.02.0
Roads	Nil	0.05.0
Green Belt	Nil	0.19.25
Waste Dump	Nil	0.39.0
Drainage & Settling Tank	Nil	0.05.52
Unutilized Area	1.36.45	0.23.86
Total	**1.36.45**	**1.36.45**

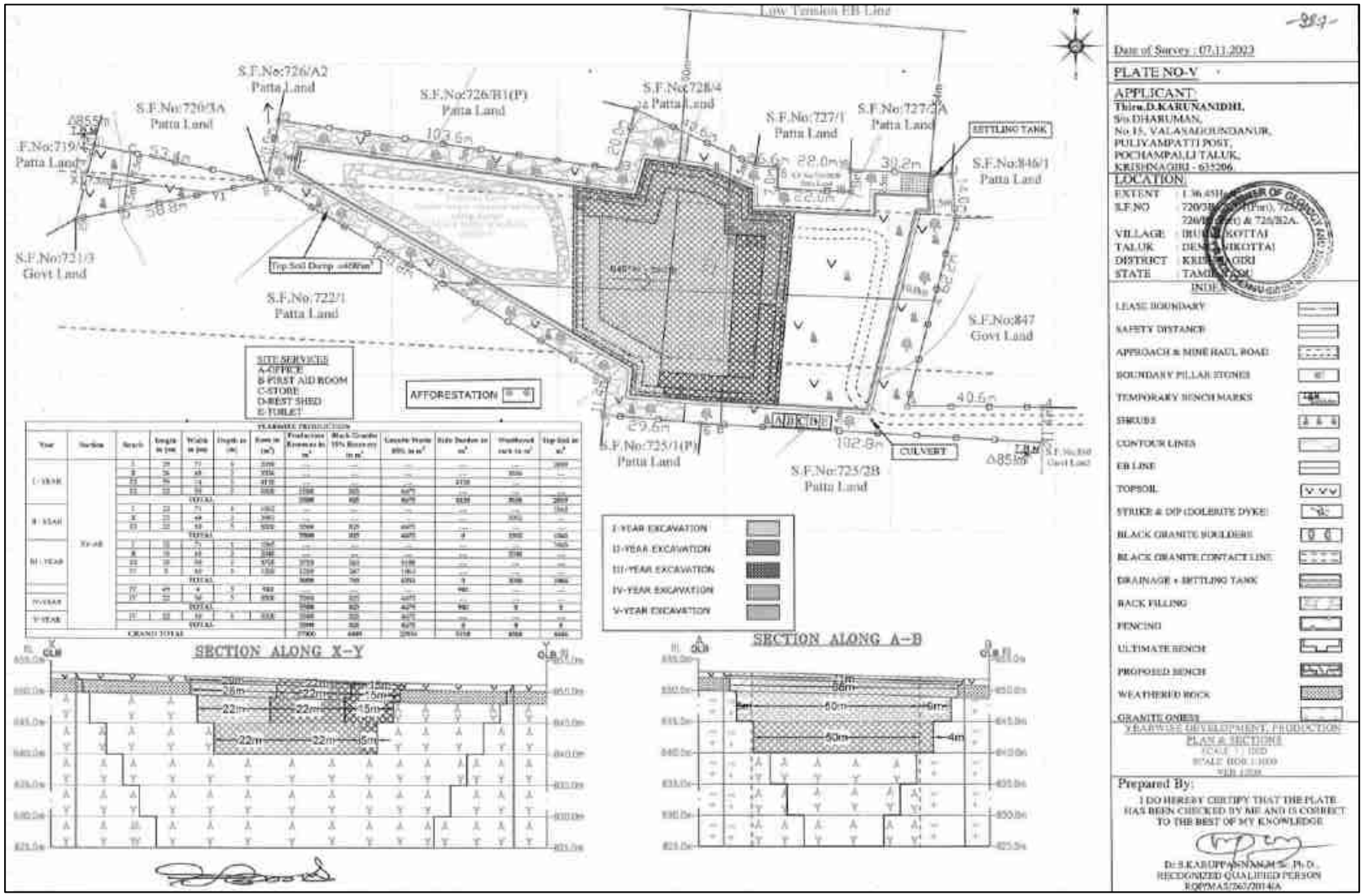


Figure 2.6 Year-Wise Development Production Plan & Sections

2.6.5 Mine closure

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, as shown in Figures 2.7 for the scheme period, the progressive mine closure cost is given in Table 2.8.

Table 2.8 Progressive Mine Closure Budget

Activity	Capital Cost
273 plants inside the lease area	54580
409 plants outside the lease area	122805
Wire Fencing	272900
Garland Drain	13645
Total	**463930**

Source: Environment Management Plan

2.6.6 Conceptual Mining Plan

The ultimate size is designed on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. The ultimate pit dimension derived from figure 2.8 and it is provided in the Table 2.9.

Table 2.9 Ultimate Pit Dimension

Pit	Length (m)	Width (m)	Depth (m)
I	131	71	28

2.6.7 Infrastructure Requirement

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.

Other Infrastructure Requirement

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

2.6.8 Water Requirement

Detail of water requirement in 3.0 KLD is given in Table 2.10.

Table 2.10 Water Requirement for the Project

Purpose	Quantity Required (KLD)	Source
Domestic & Drinking	1.0	Water for domestic, dust suppression, and green belt
Dust Suppression	1.0	

Green Belt	1.0	development purposes will be sourced from existing bore wells and drinking water from approved water vendors.
Total	**3.0**	

Source: Prefeasibility Report

2.6.9 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.11, around 147795 litres of HSD will be used for Black granite extraction during this 5years plan period. The diesel will be brought to the site from nearby diesel pumps.

Table 2.11 Fuel Requirement Details

Fuel Requirement for Excavator					
Details	**Black Granite Recovery @15% (4049m^3)**	**Granite Waste @85% (22951m^3)**	**Weathered Rock (8568m^3)**	**Top Soil in m^3**	**Total Diesel (litre)**
Average Rate of Fuel Consumption (l/hr)	16	16	16	10	---
Working Capacity (m^3/hr)	20	20	20	60	---
Time Required (hours)	202	1148	428	78	---
Total Diesel Consumption for 5 years (litre)	3239	18361	6854	781	**29235**
Fuel Requirement for Tipper					
Average Rate of Fuel Consumption/Trip (litre)	20	20	20	--	---
Carrying Capacity in m^3	6	6	6	--	---
Number of Trips / days	1	3	1	--	---
Number of Trips / 5 years	675	3825	1428	--	---
Total Diesel Consumption for 5 years (litre)	13497	76503	28560	--	**118560**
Total Diesel Consumption by Excavator and Tipper					**147795**

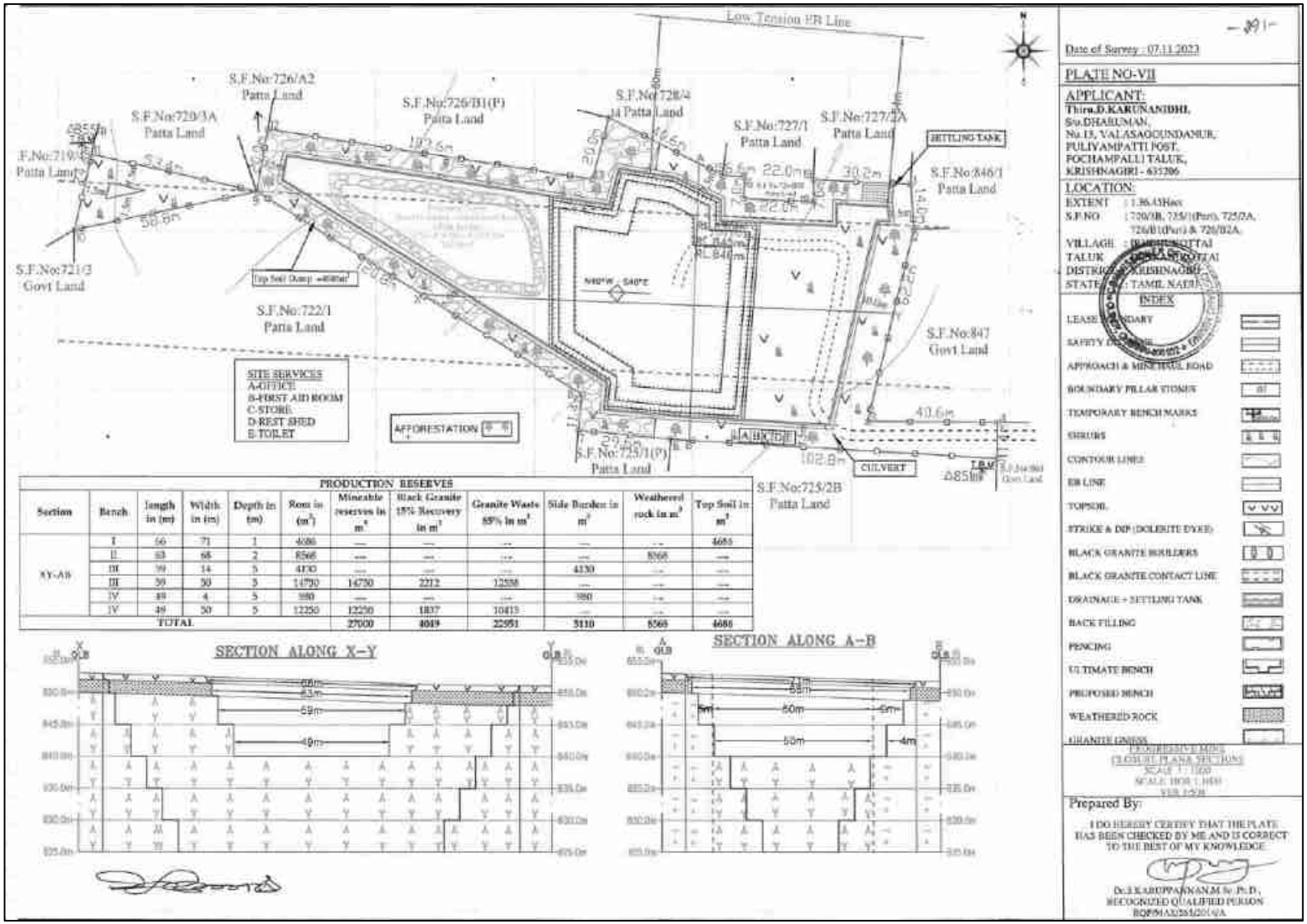
2.6.10 Capital Requirement

The project proponent will invest **Rs.69,92,800/-** to the project. The breakup summary of the investment has been given in the Table 2.12

Table 2.12 Capital Requirement Details

S. No.	Description	Cost (Rs.)
1	Fixed Asset Cost	26,86,000/-
2	Machinery Cost	20,00,000/-
3	Expenditure Cost	23,06,800/-
Total Project Cost		**69,92,800/-**

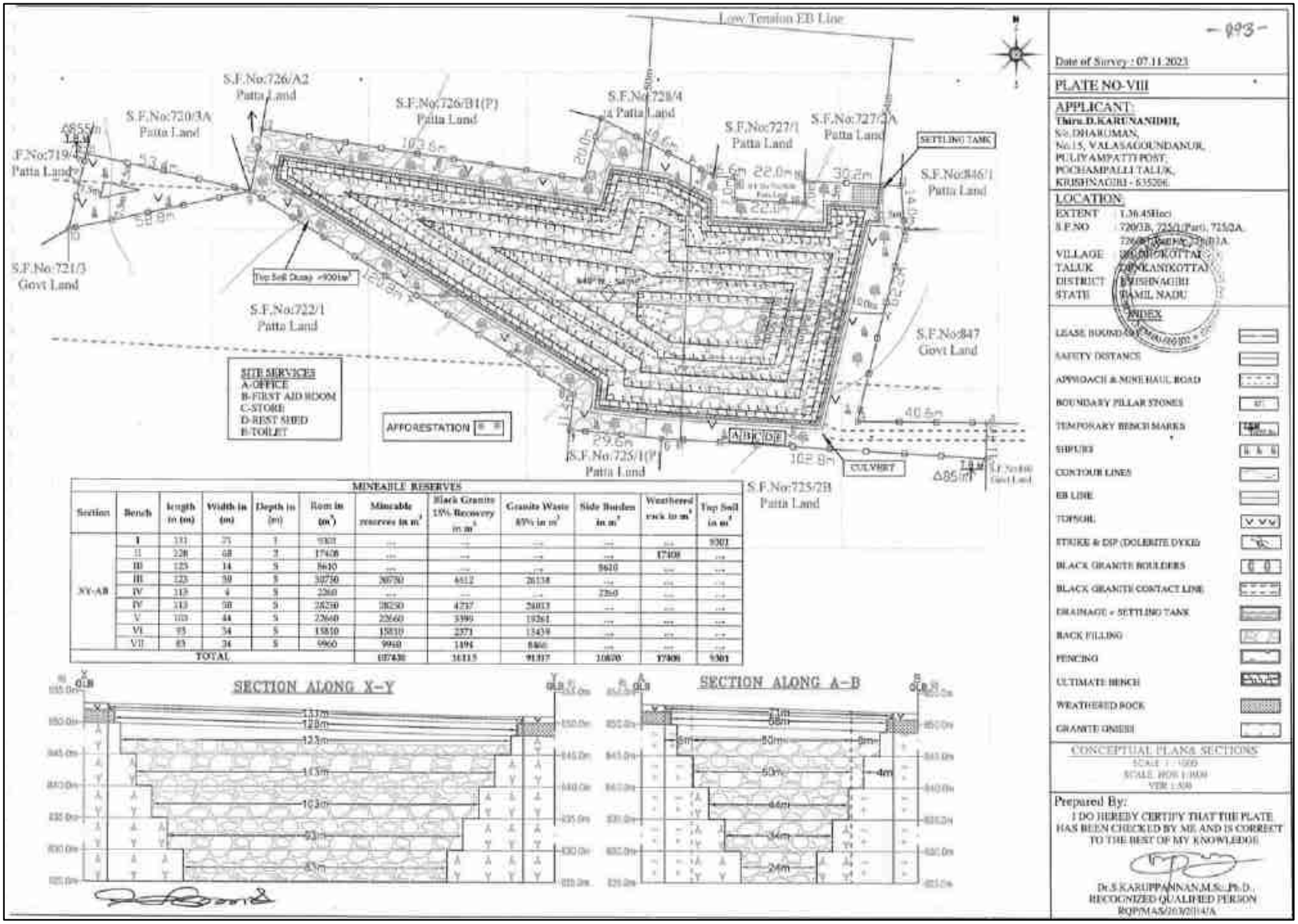
Source: Mining plan report



PRODUCTION RESERVES

Section	Bench	length in (m)	Width in (m)	Depth in (m)	Area in (m^2)	Mineable reserves in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
XY-AB	I	66	71	1	4686	—	—	—	—	—	4686
	II	83	68	2	8566	—	—	—	—	8566	—
	III	99	14	5	4330	—	—	—	4330	—	—
	III	59	50	5	14750	14750	2212	12538	—	—	—
	IV	49	4	5	980	—	—	—	980	—	—
	IV	49	50	5	12250	12250	1837	10413	—	—	—
TOTAL						27000	4049	22951	5310	8566	4686

Figure 2.7 Progressive Mine Closure Plan & Sections



MINEABLE RESERVES

Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m³)	Mineable reserves in m³	Black Granite 15% Recovery in m³	Granite Waste 85% in m³	Side Burden in m³	Weathered rock in m³	Top Soil in m³
XY-AB	I	131	25	3	9303	---	---	---	---	---	9303
	II	228	68	3	17408	---	---	---	---	17408	---
	III	125	14	5	8610	---	---	---	8610	---	---
	III	225	50	5	30750	30750	6612	26138	---	---	---
	IV	113	4	5	2260	---	---	---	2260	---	---
	IV	313	50	5	28250	28250	4237	24013	---	---	---
	V	103	44	5	22660	22660	3399	19261	---	---	---
	VI	93	34	5	15810	15810	2371	13439	---	---	---
	VII	83	24	5	9960	9960	1494	8466	---	---	---
TOTAL						117430	36113	91317	10870	17408	9303

Figure 2.8 Conceptual Plan & Sections

2.7 Employment 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 2.13.

Table 2.13 Employment Potential for the proposed project

S. No.	Category	Role	Nos.
1	Highly Skilled	Quarry Manager	1
		Mines Forman	1
		Mechanical Engineer	1
		Accountant cum & admin	1
2	Skilled	Earth moving operator	1
		Line drilling operator	1
		Wire saw operator	2
		Driver	1
3	Semi-Skilled	Helpers/Greaser's	1
4	Unskilled	Musdoor / Labours	8
		Cutter	4
Total			**22**

Source: Approved Mining Plan

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 2.14.

Table 2.14 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						
3	Consent to operate						Project establishment period.
							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, 2024** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** 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	6 (1 core & 5 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	6 (2 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, and Fugitive dust	24 hours, twice a week	7 (1 core & 6 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	7 (1 core & 6 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

3.1.1 Geology and Geomorphology

Study area is mainly composed of biotite hornblende genesis and grey hornblende biotite genesis, as shown in Figure 3.1.

Among the geomorphic units, shallow weathered/buried pediplain and pediment dominate the study area, as shown in Figure 3.2. The lease area occurs in shallow weathered/buried pediplain terrain.

3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LU/LC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius. Totally, 8 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 6.84 ha of which lease area of 1.36.45 ha contributes only about 0.017%. 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	Extent (ha)	Area (%)
1	Crop Land	4009.10	52.52
2	Dense Forest	226.94	2.97
3	Fallow land	2497.06	32.67
4	Land with or without scrub	590.93	7.74
5	Mining / Industrial lands	6.84	0.09
6	Plantations	121.01	1.59
7	Settlements	123.30	1.62
8	Water Bodies	65.71	0.86
Total		**7634.04**	**100**

Source: Sentinel II Satellite Imagery

3.1.3 Topography

The applied lease area exhibits an elevated topography, which is elevation difference of 16 m. The highest elevation observed in lease area is 880 m AMSL, whereas the lowest elevation is 864 m AMSL.

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

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.

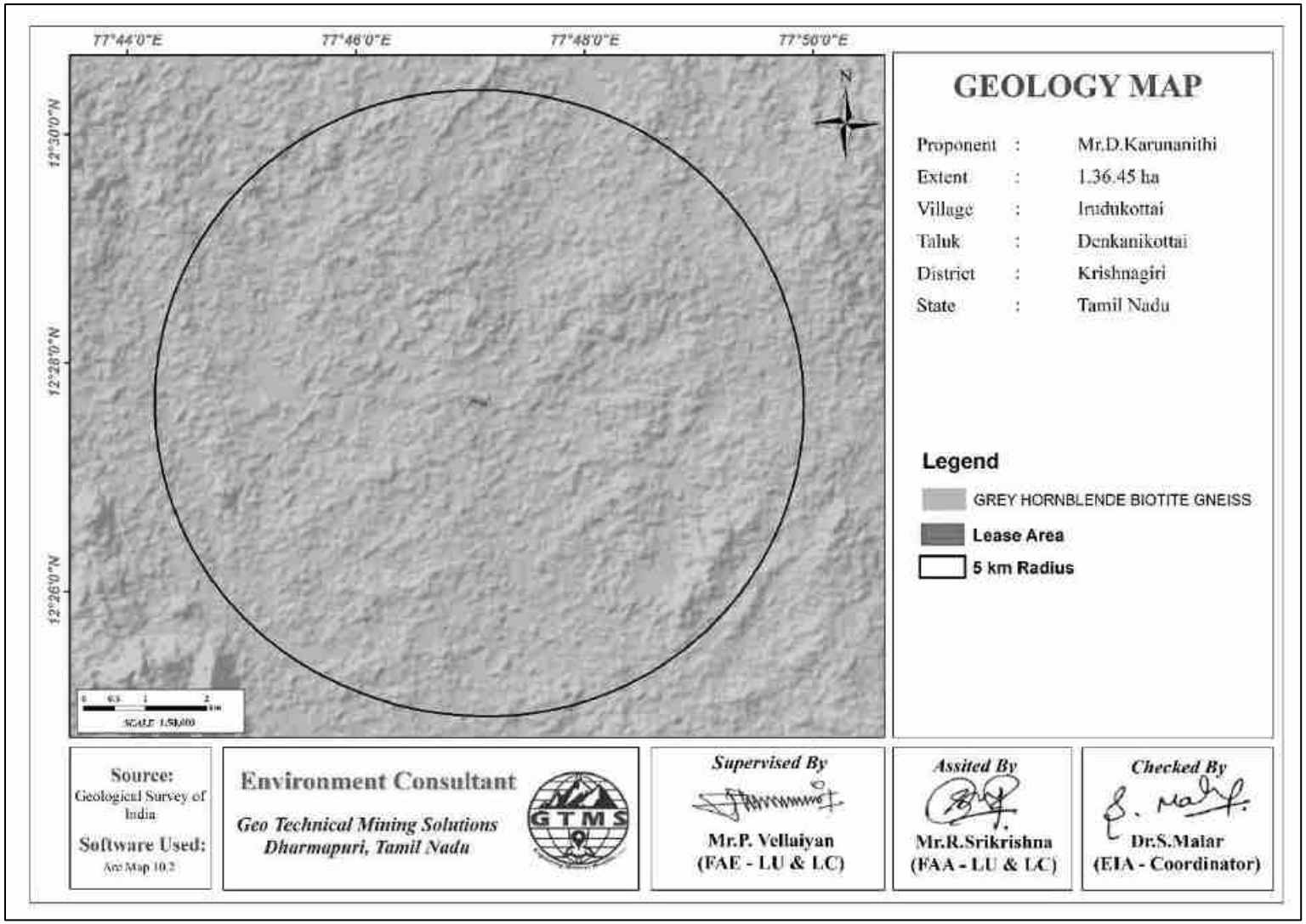


Figure 3.1 Geology Map of 5 km Radius from the Proposed Project Site

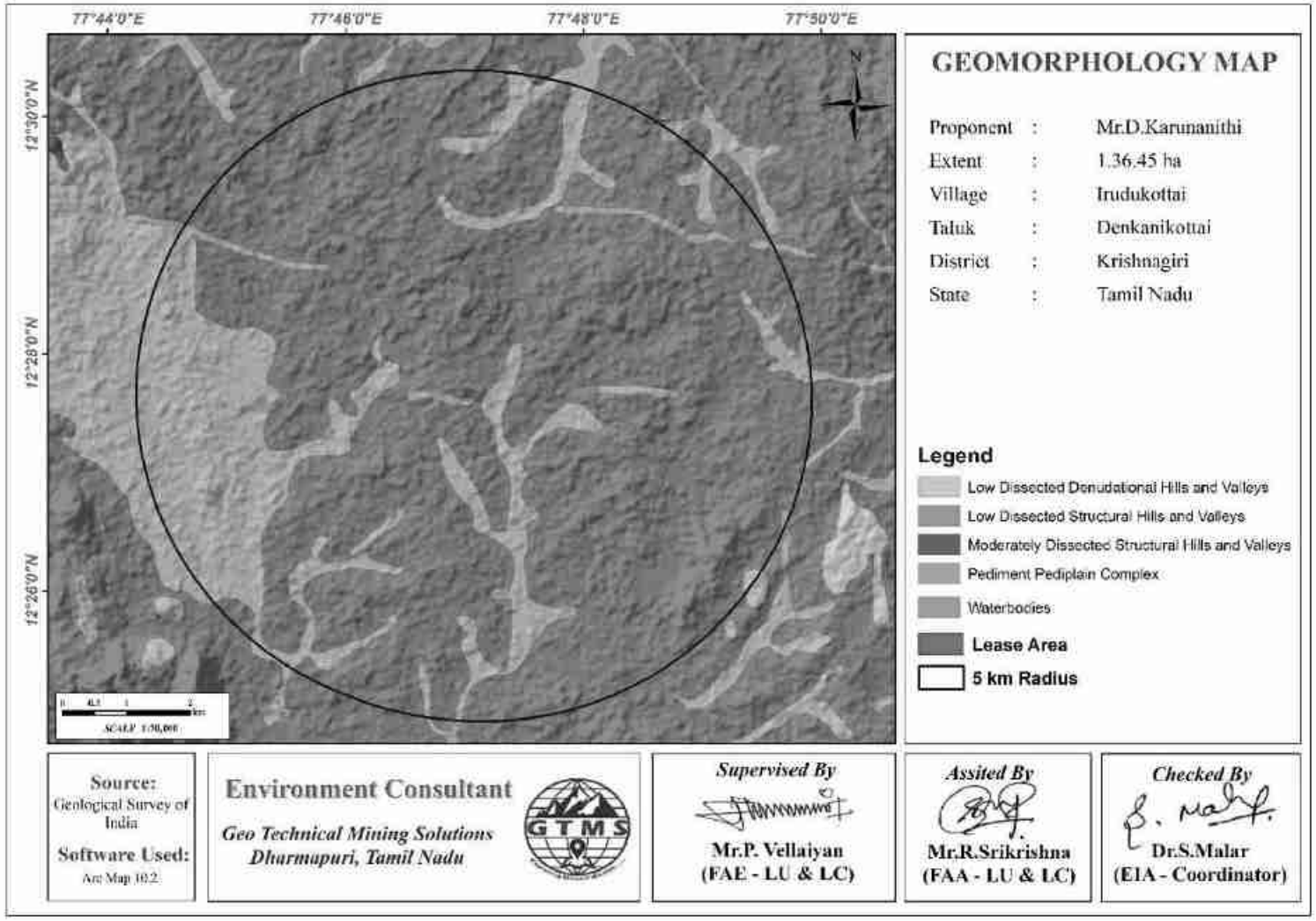


Figure 3.2 Geomorphology Map of 5 km Radius from the Proposed Project Site

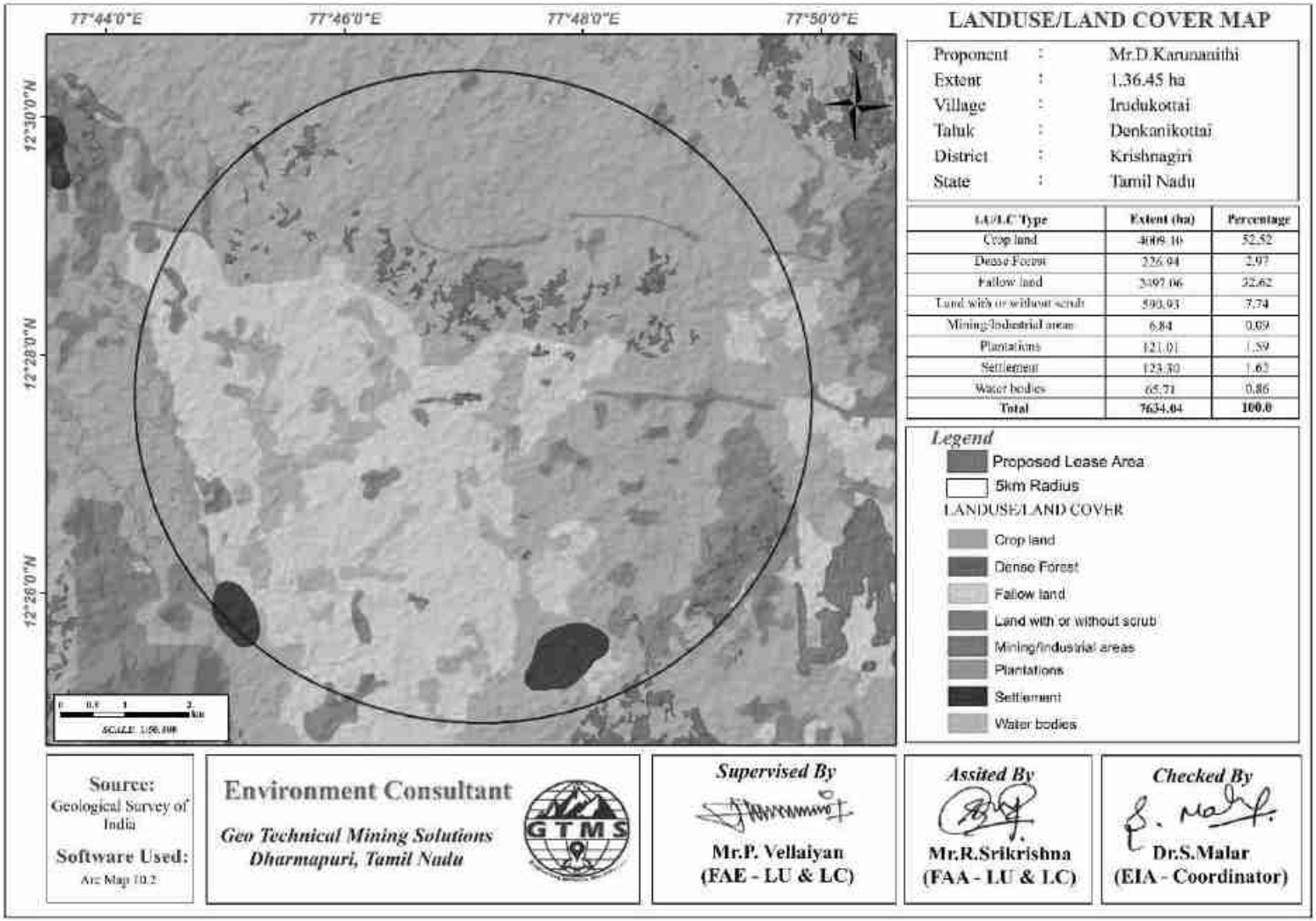


Figure 3.3 LULC Map of 5 km Radius from the Proposed Project Site

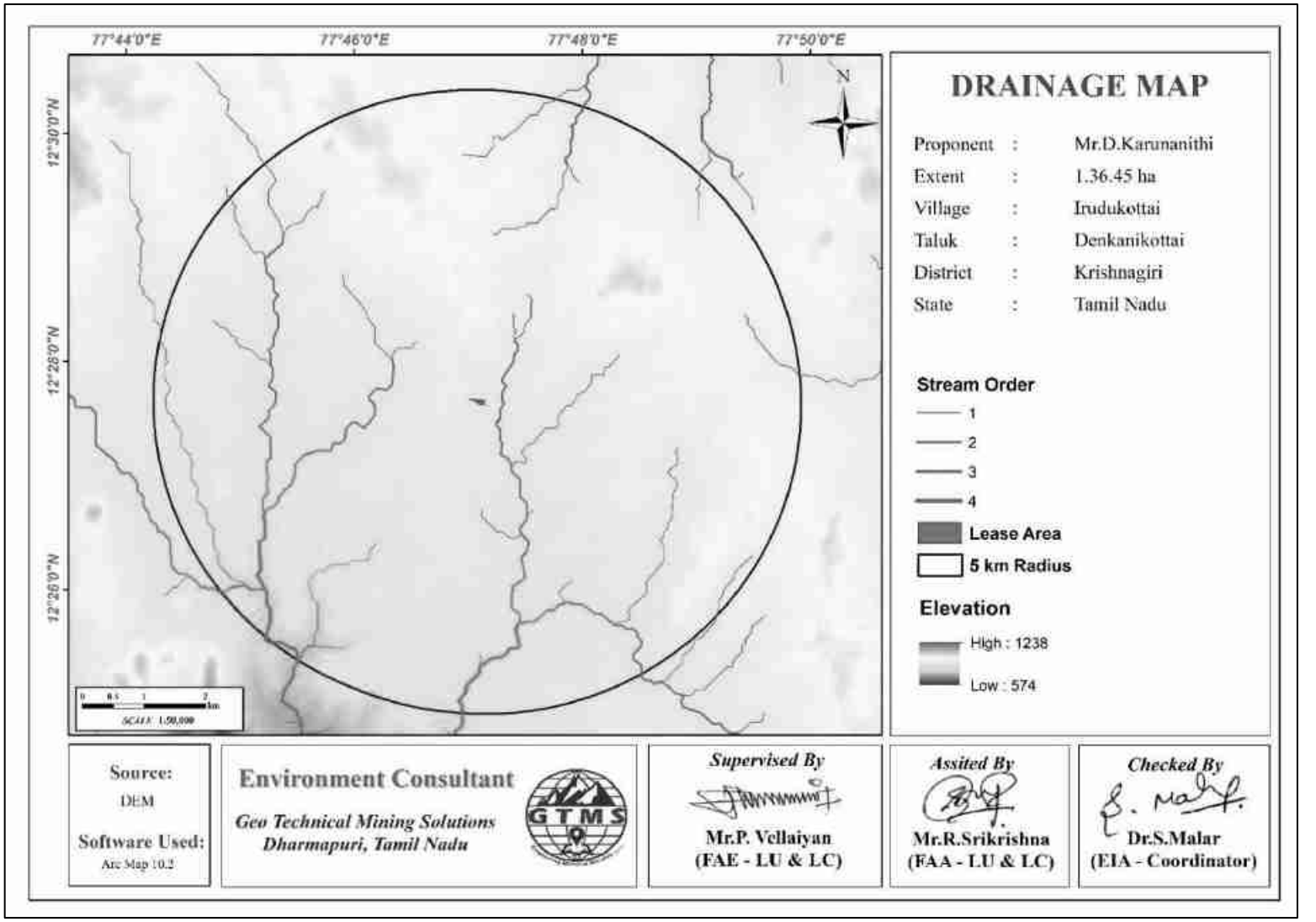


Figure 3.4 Drainage Map of 5 km Radius from the Proposed Project Site Showing Dendritic Pattern

3.1.6.1 Methodology

Six (6) 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 3.6. 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

Location ID	Monitoring Locations	Distance & Direction	Coordinates
S1	Karunanithi core	-	12°27'39.38"N, 77°47'6.05"E
S2	Bikkanapalli	2.40 Km SE	12°26'23.01"N, 77°47'35.07"E
S3	Santhanapalli	4.14 Km E	12°28'13.12"N, 77°49'21.64"E
S4	Salivaram	4.15 km S	12°25'24.30"N, 77°46'41.54"E
S5	Karandapalli	1.94 km W	12°27'40.33"N, 77°45'56.10"E
S6	Noganoor	4.60 km N	12°30'9.76"N, 77°46'53.05"E

Source: On-site monitoring/sampling ***Greenlink Analytical and Research Laboratory (India) Private Ltd,*** *in association with GTMS.*

3.1.6.2 Results and Discussion

Physical Characteristics & Chemical Characteristics

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 6.4 to 7.9 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 43.85 to 119.2 µs/cm. Potassium ranges between 1334 and 5632, Calcium ranges between 4455 and 7508 mg/kg. Organic matter content ranges between 0.07 and 0.23%.

Soil erosion

Soil erosion map shows that:

- Soil erosion is low moderate in the proposed lease area
- Medium soil erosion is in Southwest side of the lease area. Showing in Figure 3.5 Soil erosion map.

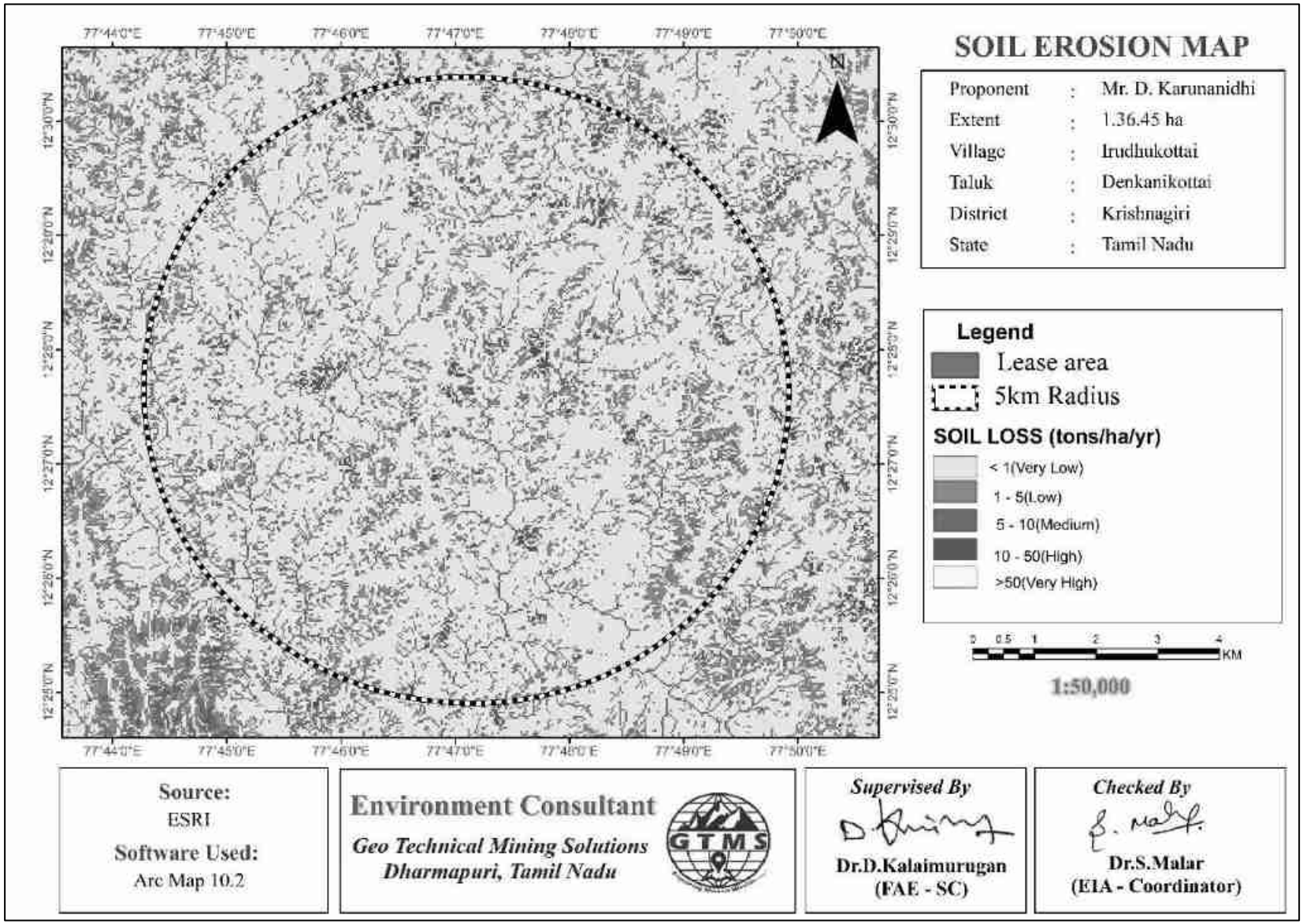


Figure 3.5 Soil Erosion Map within 5 km Radius around the Proposed Project Site

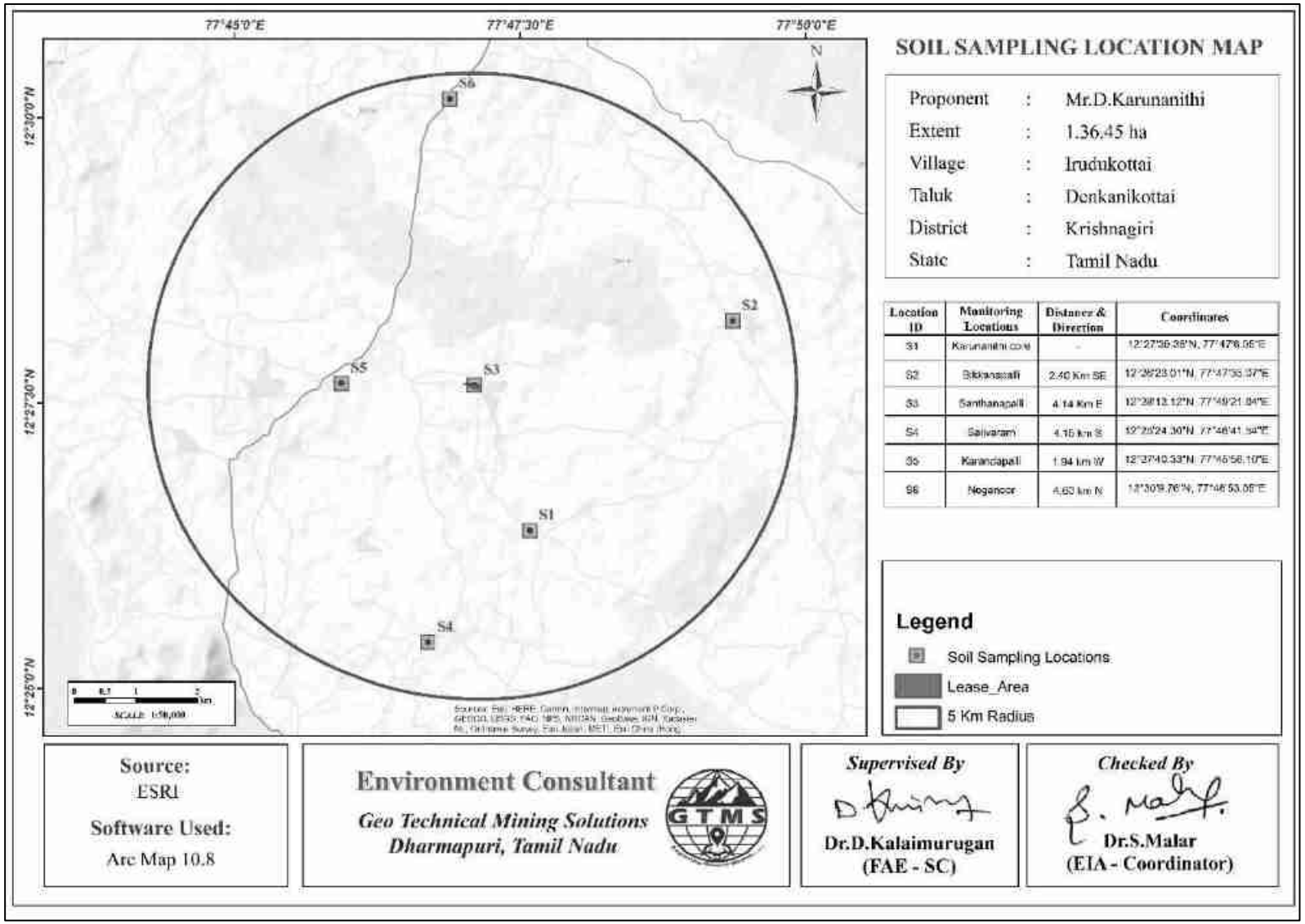


Figure 3.6 Map Showing Soil Sampling Locations within 5 km Radius around the Proposed Project Site

Table 3.4 Soil Quality of the Study Area

S. No	Name of the Test	Units	S1 Core	Minimum	Maximum	Average
1	pH value @ 25°C	---	6.81	6.4	7.91	7.388
2	Specific Electrical Conductivity@25°C	µS/Cm	68.41	43.85	119.2	77.032
3	Moisture @ 150^0C	%	34.2	19.58	33.5	24.496
4	Total Organic Carbon	%	0.32	0.07	0.23	0.132
5	Available Calcium as Ca	mg/kg	3521	4455	7508	6032.2
6	Available Magnesium as Mg	mg/kg	7450	4623	9464	5859.6
7	Available Nitrogen	kg/ha	213	152	208	175.4
9	Available Potassium	kg/ha	1214	1334	5632	3853.2
10	Available Phosphorous	kg/ha	32.6	6.3	258	86.084
12	Zinc as Zn	ppm	21.3	16	60.7	30.6
13	Copper as Cu	ppm	36.5	12.6	37.5	22.96
14	Total Organic Matter	%	0.62	0.12	0.31	0.238
15	Total Iron as Fe	ppm	12561	12351	41581	22514.8
16	Nickel	mg/kg	BDL [DL0.1]	BDL [DL 0.1]	BDL [DL 0.1]	BDL [DL 0.1]
17	Lead	mg/kg	1.3	1.03	5.7	2.07
18	Bulk Density	kg/m3.	1425	1123	1458	1268.8
19	Porosity	%	22	24	35	31.6
20	Texture	-	Silt Loam	Silt Loam, Silt Clay Loam,		
21	Sand	%	34.20	11.1	35.3	22.924
22	Clay	%	13.50	18.5	72.8	45.54
23	Silt	%	52.30	6.8	51.3	31.536
24	Available Sodium	kg/ha	0.4	0.7	3056	878.5
25	Available Sulphur	kg/ha	0.788	1.35	37.5	10.859

Source: Sampling Results by ***Greenlink Analytical and Research Laboratory (India) Private Ltd,*** *in association with GTMS*

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 Water Sampling Locations

Location ID	Monitoring Locations	Distance & Direction	Coordinates
BW1	Santhanapalli	4.07 km NE	12°28'11.09"N, 77°49'19.63"E
BW2	Karandapalli	2.09 km W	12°27'47.99"N, 77°45'51.59"E
OW1	Bikkanapallis	2.12 Km SE	12°26'30.09"N, 77°47'26.60"E
OW2	Salivaram	4.40 Km S	12°25'16.15"N, 77°46'40.39"E
OW3	Noganoor	4.52 Km N	12°30'3.79"N, 77°46'31.92"E
SW1	Duglipuram lake	0.08 km E	12°27'39.40"N, 77°47'11.54"E

Source: On-site monitoring/sampling ***Greenlink Analytical and Research Laboratory (India) Private Ltd,*** *in association with GTMS.*

3.2.1 Surface Water Resources and Quality

Duglipuram lake are the one prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. one surface water samples, known as SW1 were collected from the one surface water bodies to assess the baseline water quality. Table 3.6 summarizes surface water quality data of the one samples.

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

3.2.2 Ground Water Resources and Quality

Groundwater in the study area occurs in the Study area is mainly composed of biotite hornblende genesis and grey hornblende biotite genesis. 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. Five groundwater samples, known as BW1, BW2, OW1, OW2 and OW3 were collected from open well and bore well and analysed for physico-chemical conditions, heavy metals and bacteriological 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 3.6 summarizes ground water quality data of the four samples.

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

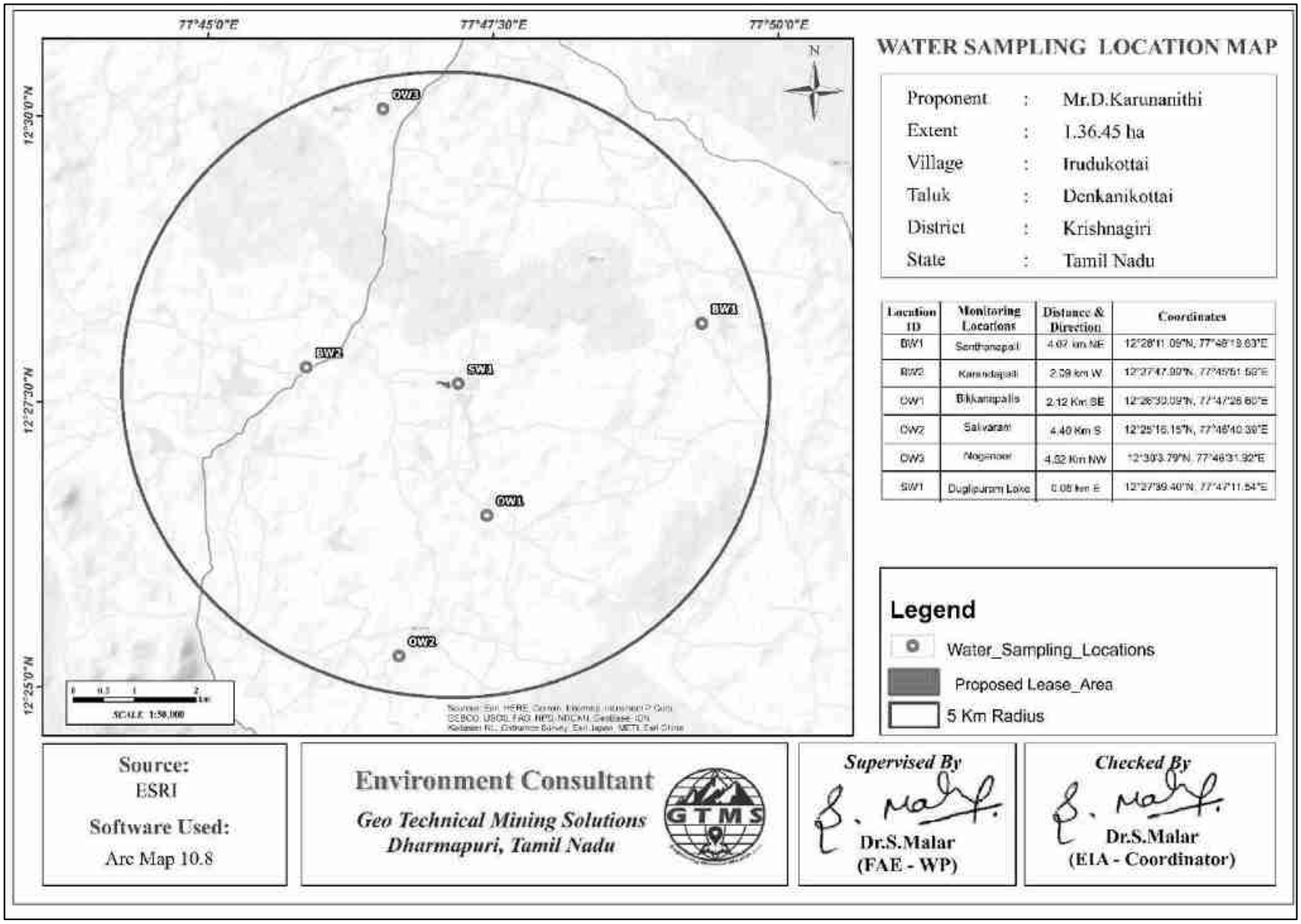


Figure 3.7 Map showing water sampling locations within 5 km radius around the proposed project site

Table 3.6 Water Quality Result

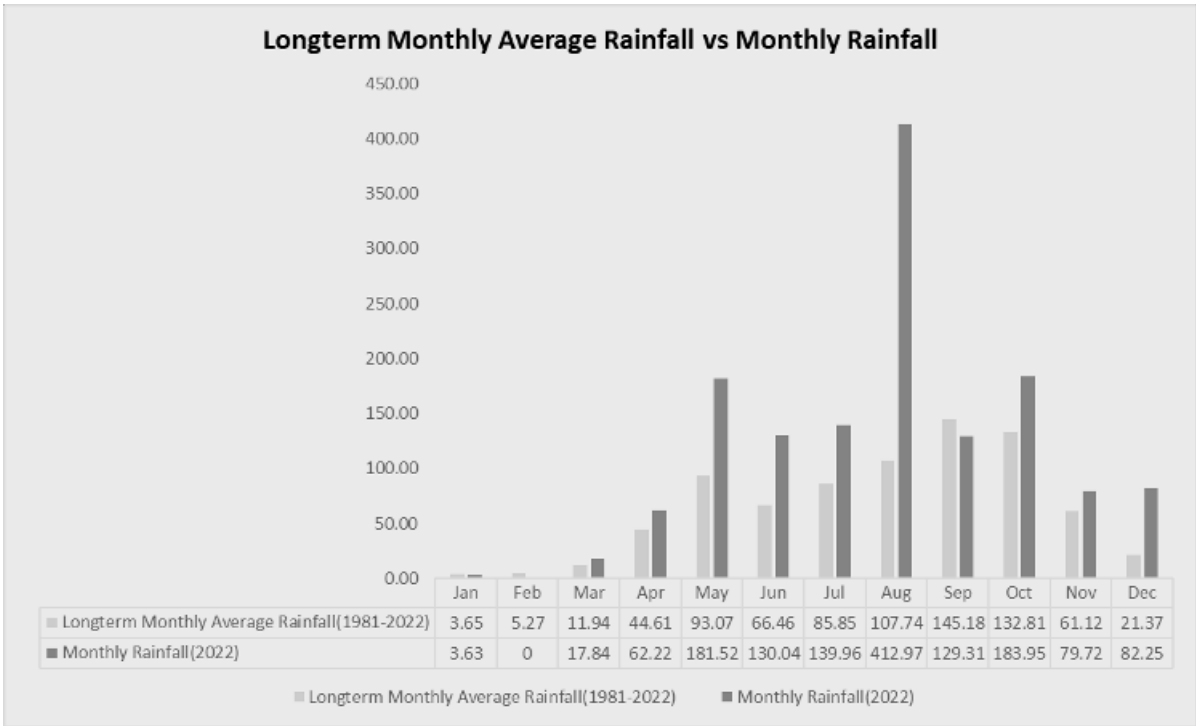
S. No.	Parameters	Units	Results					
			SW1	BW1	BW2	OW1	OW2	OW3
1	Colour	CU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	1	<0.1	<0.1	<0.1	<0.1	<0.1
5	pH value @ 25°C	-	6.7	7.8	7.5	7.2	7.7	7.4
6	EC @ 25°C	µS/cm	176	1078	1362	987	1448	1365
7	TDS	mg/l	112	1023	1154	352	895	756
8	Total Alkalinity ($CaCO_3$)	mg/l	124	319	197	278	286	342
9	Chloride (Cl)	mg /l	49	201	186	95	169	182
10	TH ($CaCO_3$)	mg/l	186	426	413	375	547	463
11	Calcium (Ca)	mg/l	43	174	163	110	142	163
12	Magnesium (Mg)	mg/l	21	43	22	21	18	22
13	Sulphates (SO_4)	mg/l	32	92	73	38	65	75
14	Nitrate (NO_3)	mg/l	11.4	8.3	7.6	14.3	8.6	7.3
15	Total Iron as Fe	mg/l	0.8	1.18	0.52	1.37	1.23	1.12
16	Fluoride (F)	mg/l	<0.1	1.1	0.74	0.85	1.4	1.3
17	Arsenic (As)	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
18	Copper (Cu)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19	Zinc as Zn	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
21	Lead (Pb)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
22	Mineral Oil	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
23	E-Coli	CFU/ml	Present	Absent	Absent	Absent	Absent	Absent
24	Coliform	CFU/ml	Present	Absent	Absent	Absent	Absent	Absent

*Source: Sampling Results by **Green link Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS*

3.2.3 Hydrogeological Studies

Rainfall

Rainfall data for the study area were collected for the period of 1981-2022(POWER | Data Access Viewer (nasa.gov). Long term monthly average rainfall was estimated from the data of 1981-2022 and compared with the monthly rainfall for the year 2022, shown in Figure 3.8. The Figure 3.8 shows that monthly rainfall in 2022 is generally high in the months of May, August and October, when compared to the long term monthly average rainfall.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Longterm Monthly Average Rainfall(1981-2022)	3.65	5.27	11.94	44.61	93.07	66.46	85.85	107.74	145.18	132.81	61.12	21.37
Monthly Rainfall(2022)	3.63	0	17.84	62.22	181.52	130.04	139.96	412.97	129.31	183.95	79.72	82.25

Figure 3.8 Long-term monthly average rainfall vs monthly rainfall

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

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 9 open wells and 9 bore wells at various locations within 2 km radius around the proposed project sites for the period from March through May, 2024 (Pre-Monsoon Season) and from October through December, 2023 (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.7 and 3.8. According to the data, average depths to the static water table in open wells range from 21.80 to 24.53 m BGL in pre monsoon and 17.93 to 18.90 m BGL in post monsoon. The bore well data thus collected onsite are provided in Tables 3.9 and 3.10. The average depths to static potentiometric surface in bore wells for the period of October through December 2023 (Post-Monsoon Season) vary from 57.80 to 59.10 m and from 63.77 to 66.40 m for the period of March through May, 2024 (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

From the maps of open well groundwater flow direction shown in Figures 3.9 -3.10, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well number 9 located in SE direction of the proposed project site. The groundwater flow maps in Figure 3.10-3.11 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 8. It is located in East direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Mar-2024	Apr-2024	May- 2024	Average		
OW01	20.8	21.5	23.4	21.90	12°27'35.98"N	77°47'19.37"E
OW02	21.2	22.2	23.2	22.20	12°28'6.53"N	77°47'26.40"E
OW03	20.9	21.4	23.1	21.80	12°27'28.36"N	77°47'58.79"E
OW04	21.2	22.1	22.3	21.87	12°27'13.20"N	77°47'47.18"E
OW05	20.4	21.9	23.1	21.80	12°27'34.12"N	77°47'1.69"E
OW06	21.1	21.7	23.2	22.00	12°27'57.03"N	77°46'28.98"E
OW07	20.4	26.1	27.1	24.53	12°26'46.43"N	77°46'25.35"E
OW08	20.9	25.2	27.4	24.50	12°26'40.95"N	77°47'3.76"E
OW09	21.31	24.8	27.1	24.40	12°27'9.46"N	77°46'53.76"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Water Table BGL (m)				Latitude	Longitude
	Oct-2023	Nov-2023	Dec-2023	Average		
OW01	19.5	17.8	16.5	17.93	12°27'35.98"N	77°47'19.37"E
OW02	19.6	17.4	16.8	17.93	12°28'6.53"N	77°47'26.40"E
OW03	20.1	19.2	17.1	18.80	12°27'28.36"N	77°47'58.79"E
OW04	19.9	18.5	16.8	18.40	12°27'13.20"N	77°47'47.18"E
OW05	20.1	19.4	17.2	18.90	12°27'34.12"N	77°47'1.69"E
OW06	20.2	19.2	16.5	18.63	12°27'57.03"N	77°46'28.98"E
OW07	19.5	19.6	16.8	18.63	12°26'46.43"N	77°46'25.35"E
OW08	20.4	19.4	16.4	18.73	12°26'40.95"N	77°47'3.76"E
OW09	20.60	18.8	17.2	18.87	12°27'9.46"N	77°46'53.76"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Mar-2024	Apr-2024	May- 2024	Average		
BW01	64.2	61.6	68.2	64.67	12°27'16.84"N	77°46'58.80"E
BW02	65.1	62.2	68.1	65.13	12°28'1.18"N	77°47'13.73"E
BW03	64.2	61.2	67.1	64.17	12°27'49.71"N	77°47'41.47"E
BW04	62.9	68.8	67.5	66.40	12°27'15.72"N	77°47'34.34"E
BW05	64.4	61.6	67.6	64.53	12°26'54.06"N	77°46'48.05"E
BW06	65.1	61.5	67.5	64.70	12°26'55.16"N	77°47'10.09"E
BW07	63.6	61.6	67.9	64.37	12°27'55.95"N	77°46'9.87"E
BW08	64.5	61.8	68.1	64.80	12°27'37.48"N	77°45'39.68"E
BW09	64.2	59.6	67.5	63.77	12°26'58.49"N	77°46'4.84"E

Source: Onsite monitoring data

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

Station ID	Depth to Static Potentiometric Surface BGL(m)				Latitude	Longitude
	Oct-2023	Nov-2023	Dec-2023	Average		
BW01	55.3	57.9	60.8	58.00	12°27'16.84"N	77°46'58.80"E
BW02	55.2	58.2	61.3	58.23	12°28'1.18"N	77°47'13.73"E
BW03	54.5	57.4	62.5	58.13	12°27'49.71"N	77°47'41.47"E
BW04	54.6	57.2	63.5	58.43	12°27'15.72"N	77°47'34.34"E
BW05	54.8	57.6	62.2	58.20	12°26'54.06"N	77°46'48.05"E
BW06	54.6	57.3	61.6	57.83	12°26'55.16"N	77°47'10.09"E
BW07	55.2	58.4	62.5	58.70	12°27'55.95"N	77°46'9.87"E
BW08	55.4	58.6	63.3	59.10	12°27'37.48"N	77°45'39.68"E
BW09	54.2	58.4	60.8	57.80	12°26'58.49"N	77°46'4.84"E

Source: Onsite monitoring data

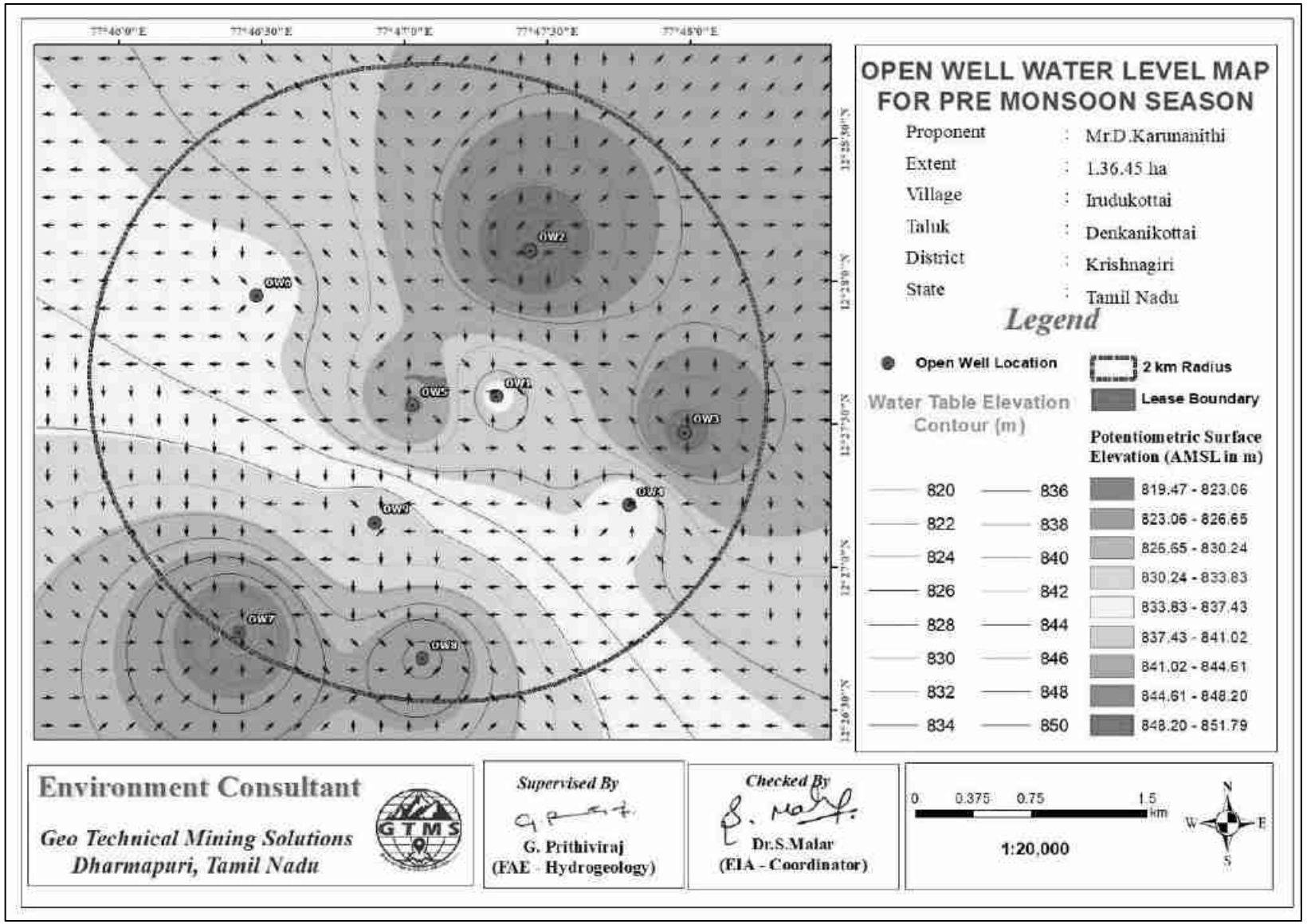


Figure 3.9 Open well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

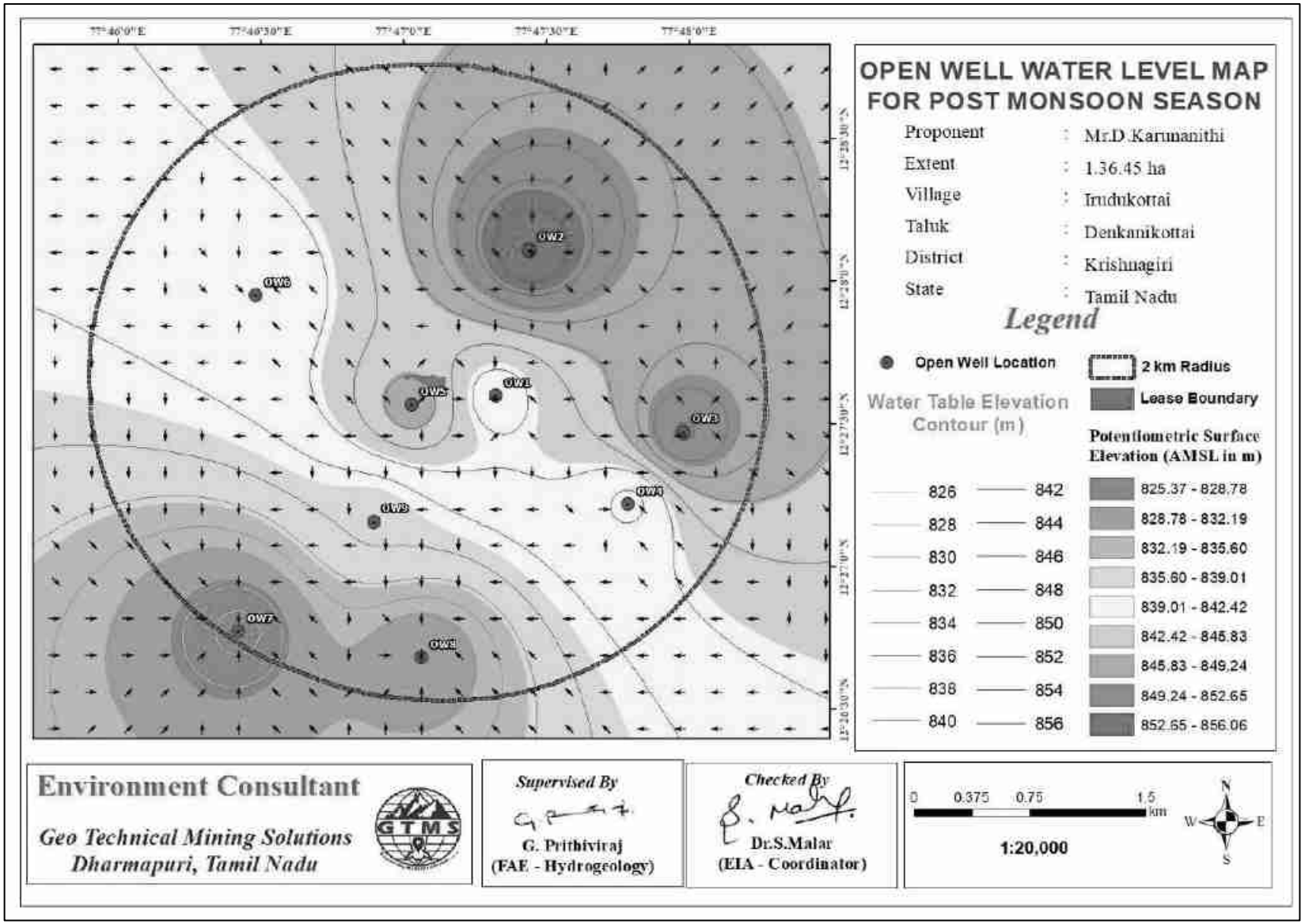


Figure 3.10 Open well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

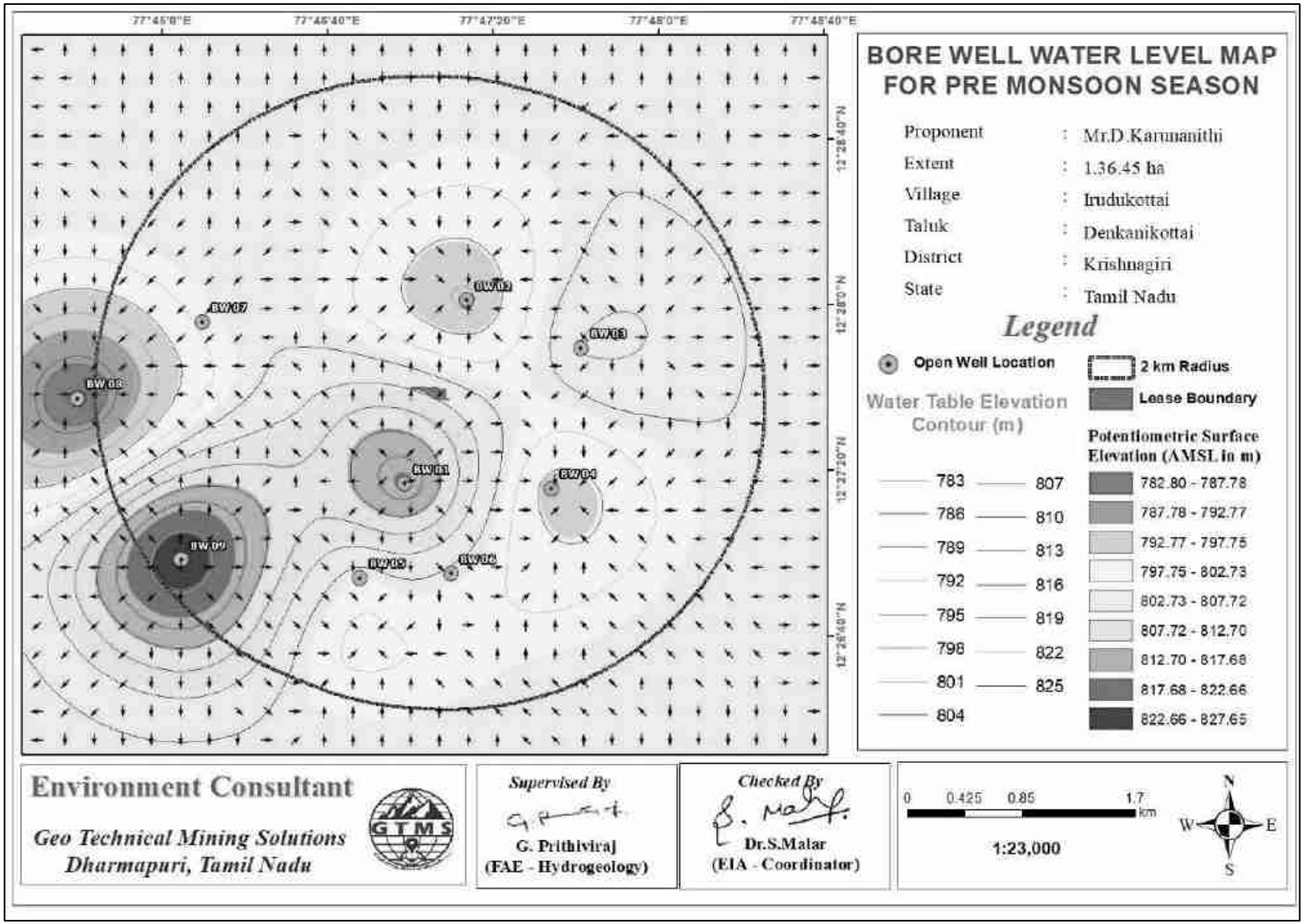


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

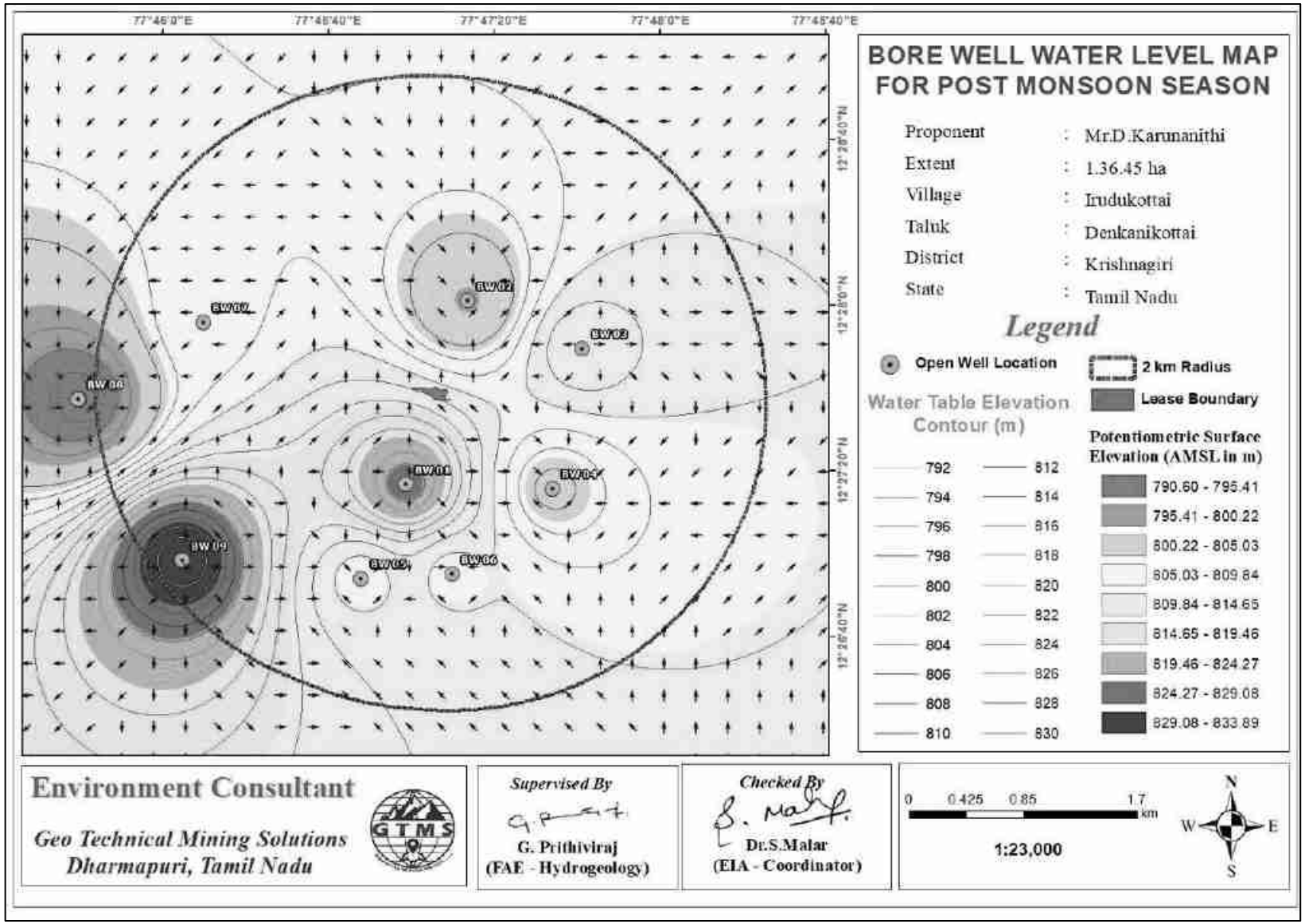


Figure 3.12 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

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 3.11. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.13.

Table 3.11 Vertical Electrical Sounding Data

Location Coordinates - 12°27'38.64"N, 77°47'6.46"E					
S. No.	**AB/2 (m)**	**MN/2 (m)**	**Geometrical Factor (G)**	**Resistance in Ω**	**Apparent Resistivity in Ωm**
1	5	2	4.71	23.4	110.05
2	10	2	23.55	6.74	157.95
3	15	5	54.95	3.15	168.485
4	20	5	98.91	4.04	219.784
5	25	5	155.45	3.011	434.748
6	30	10	173.65	19.56	461.615
7	35	10	117.75	7.68	482.304
8	40	10	274.75	2.89	758.275
9	45	10	494.55	1.89	876.525
10	50	10	777.15	1.45	1073.174
11	60	20	1122.55	1.011	1214.78
12	70	20	1530.75	0.83	1266.225
13	80	20	2001.75	0.541	1089.75
14	90	20	2535.55	0.57	1458.12
15	100	20	3132.15	0.49	1546.58

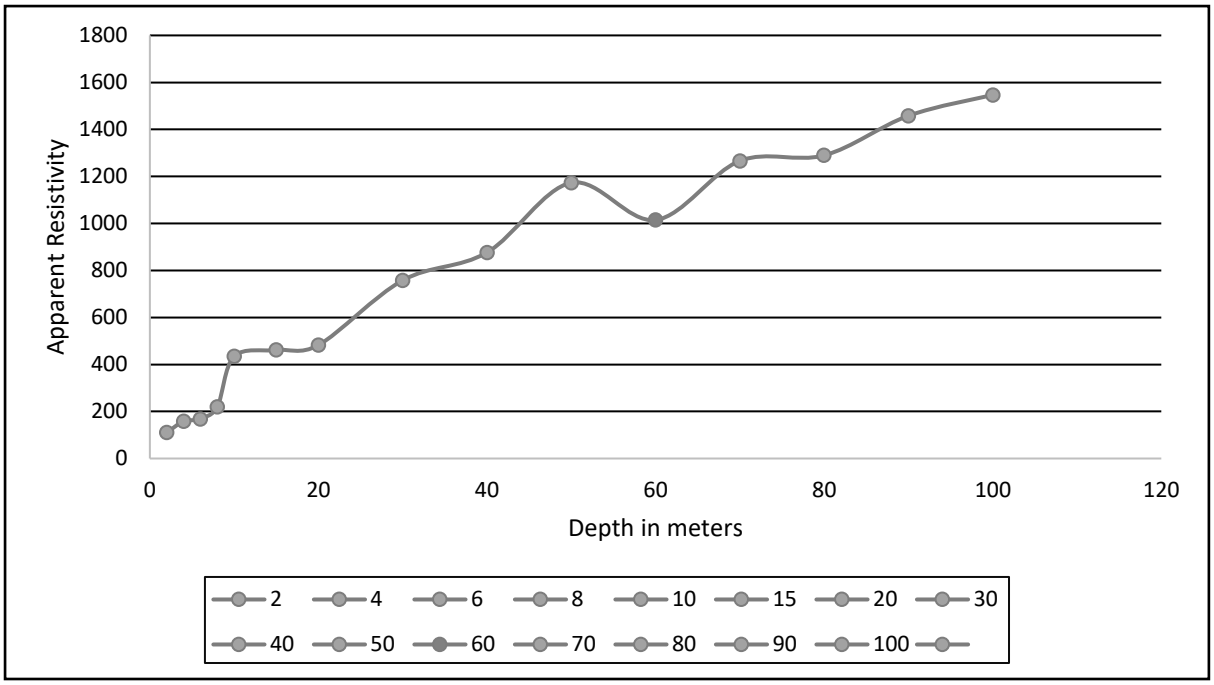


Figure 3.13 Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 55 – 60 m Below Ground Level in the Proposed Project Area

The rock formation of low resistivity values indicates occurrence of water at the depth of about 55 - 60 m below ground level. The maximum depth proposed for the proposed project is 13m (13 m BGL). 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 3.12.

According to the onsite data, the temperature in March, 2024 varied from 17.78 to 38.79^0C with the average of 28.07^0 C; in April, 2024 from 20.38 to 41.62^0C with the average of 30.79^0 C; and in May, 2024 from 21.20 to 42.51^0C with the average of 28.77^0C. In March, 2024, relative humidity ranged from 12.38 to 100 % with the average of 43.93%; in April,

2024, from 12.19 to 98.06 % with the average of 43.11%; and in May,2024, from 19.44 to 96.38 % with the average of 64.25%. The wind speed in March, 2024 varied from 0.06 to 6.83 m/s with the average of 3.33 m/s; in April, 2024 from 0.12 to 7.49m/s with the average of 3.67 m/s; and in May,2024 from 0.12 to 9.15 m/s with the average of 3.10m/s. In March,2024, wind direction varied from 2.33 to 312.14 with the average of 126.79^0; in April, 2024, from 67.26 to 320.19^0 with the average of 131.42^0; and in May,2024, from 9.27to 358.03^0 with the average of 184.68^0. In March,2024, surface pressure varied from 93.60 to 94.69kPa with the average of 94.13kPa; in April, 2024, from 93.33 to 94.33kPa with the average of 93.84 kPa; and in May,2024, from 93.01 to 94.19 kPa with the average of 93.62 kPa

Table 3.12 Onsite Meteorological Data

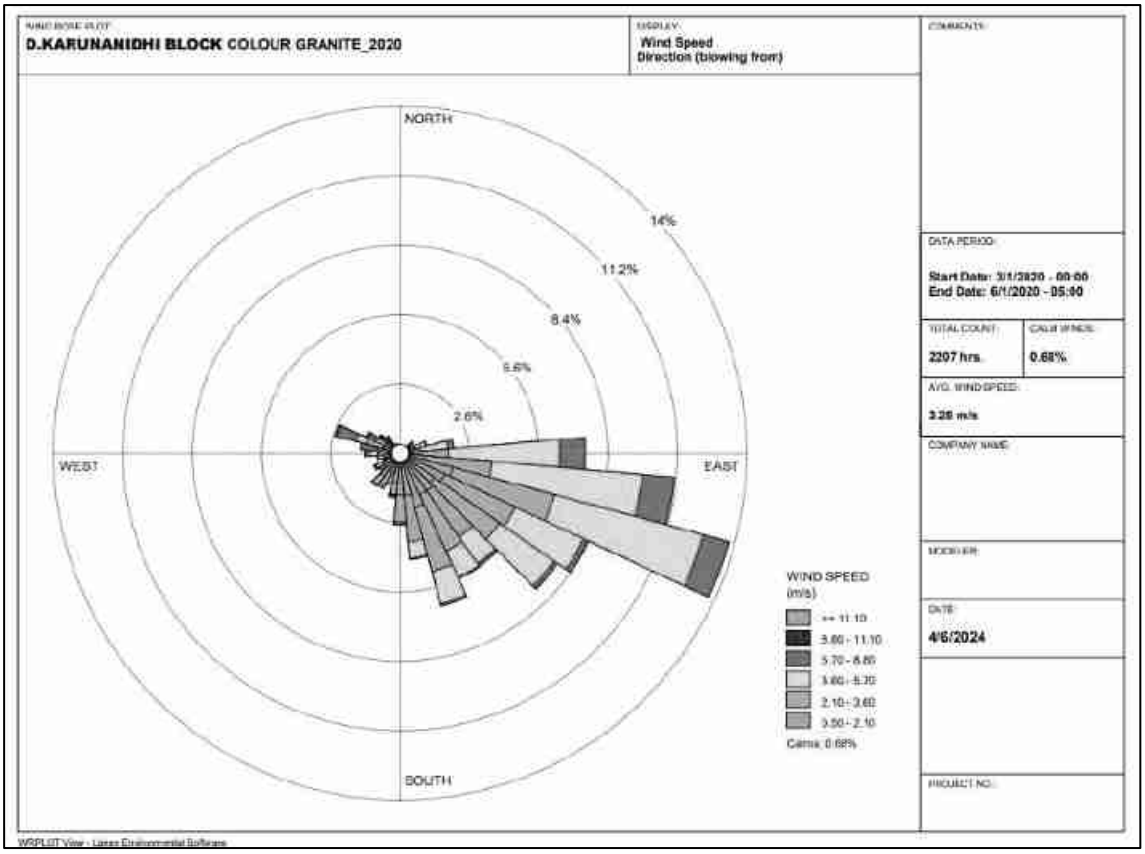
S. No.	Parameters		MARCH,2024	APRIL,2024	MAY,2024
1	Temperature (^{0}C)	Min	17.48	20.38	21.20
		Max	38.79	41.62	42.51
		Avg	28.07	30.79	28.77
2	Relative Humidity (%)	Min	12.38	12.19	19.44
		Max	100.00	98.06	96.38
		Avg	43.93	43.11	64.25
3	Wind Speed (m/s)	Min	0.06	0.12	0.12
		Max	6.83	7.49	9.15
		Avg	3.33	3.67	3.10
4	Wind Direction (degree)	Min	2.33	67.26	9.27
		Max	312.14	320.19	358.03
		Avg	126.79	131.42	184.68
5	Surface Pressure(kPa)	Min	93.60	93.33	93.01
		Max	94.69	94.33	94.19
		Avg	94.13	93.84	93.62

*Source: Sampling Results by **Green link Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS*

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 2020 to 2023 and the seasonal wind rose for the study period of March through May 2024. The wind rose diagrams thus produced are shown in Figures 3.14-3.14a. Figure 3.15 reveals that:

- ❖ The measured average wind velocity during the study period is 3.36m/s.
- ❖ Predominant wind was dominant in the directions ranging from Southeast to Northwest.



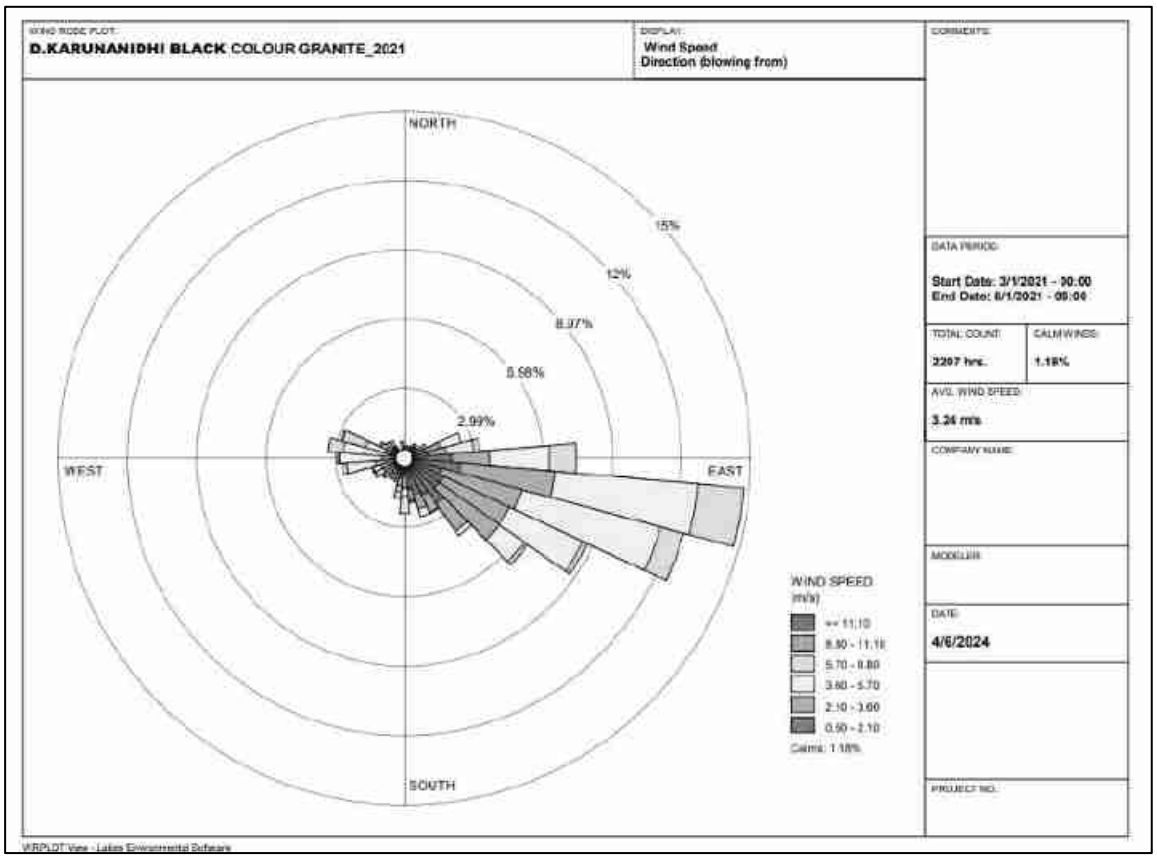
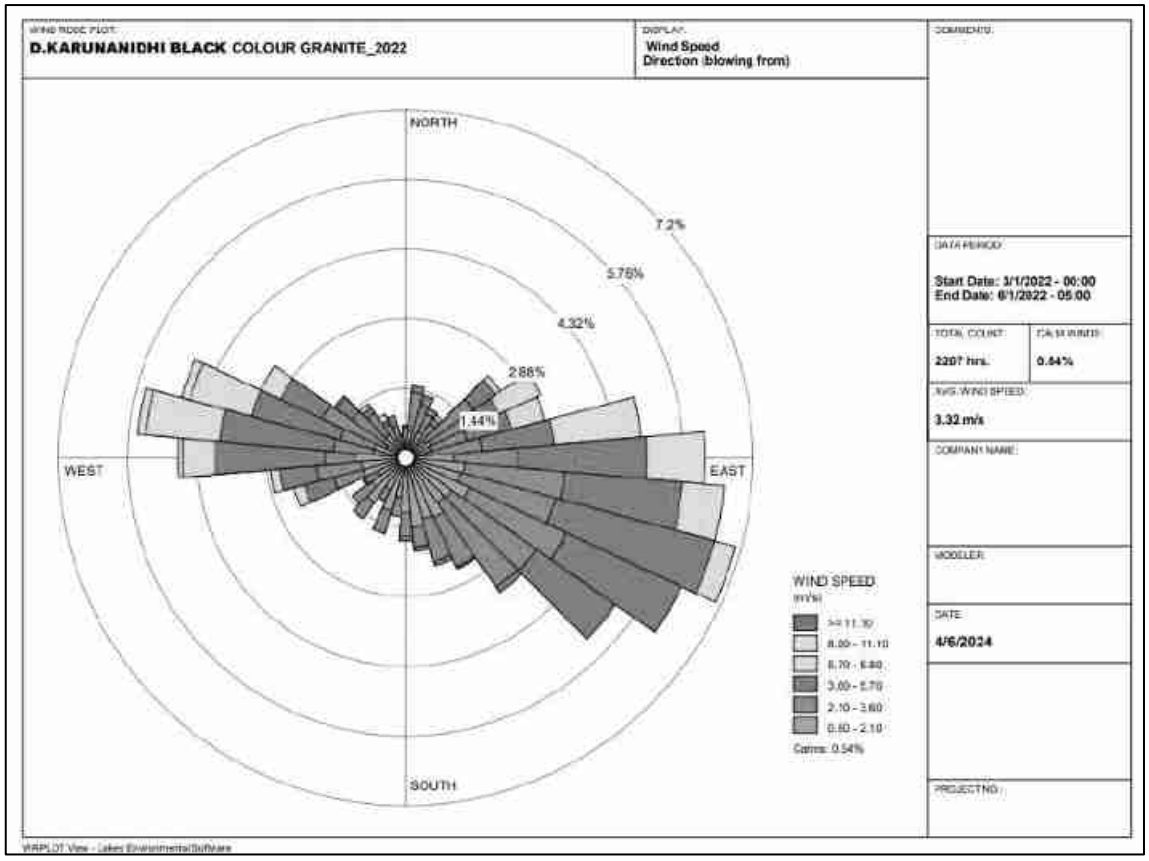


Figure 3.14 Windrose Diagram for 2020 and 2021 (March to May)



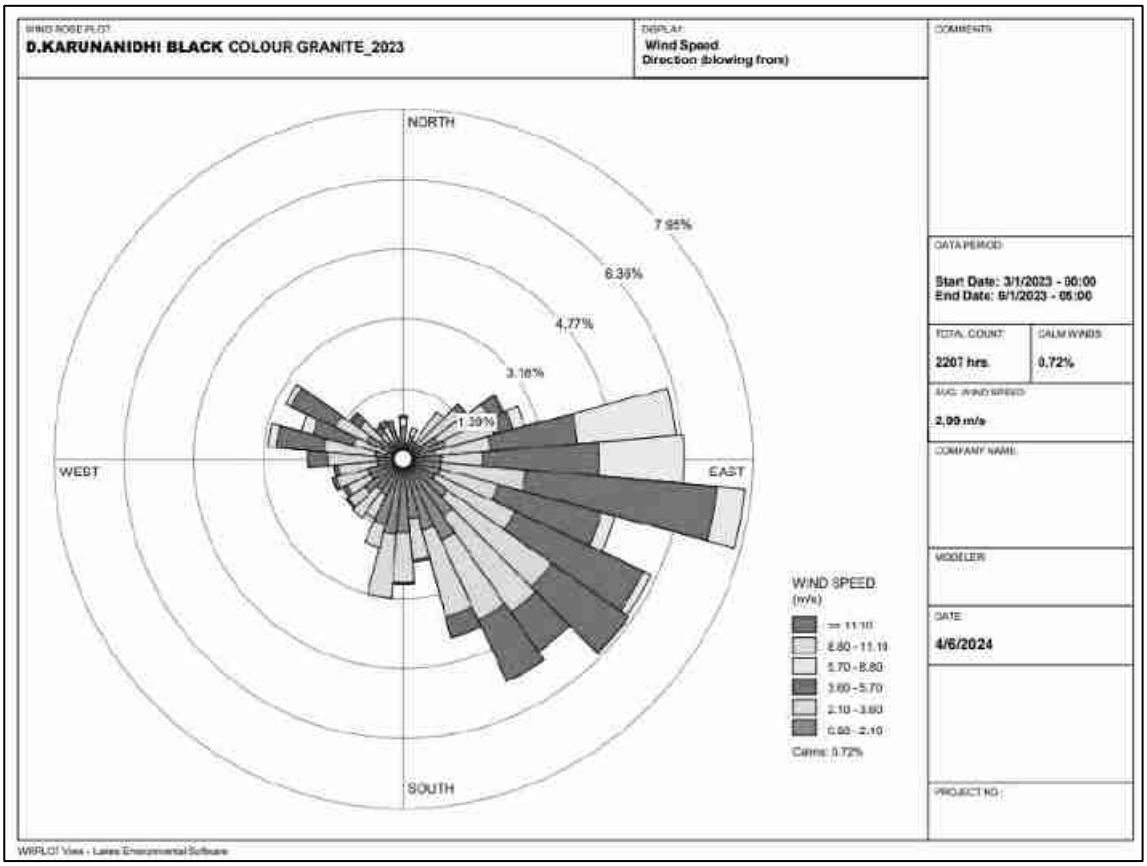


Figure 3.14(a) Windrose Diagram for 2022 and 2023 (March to May)

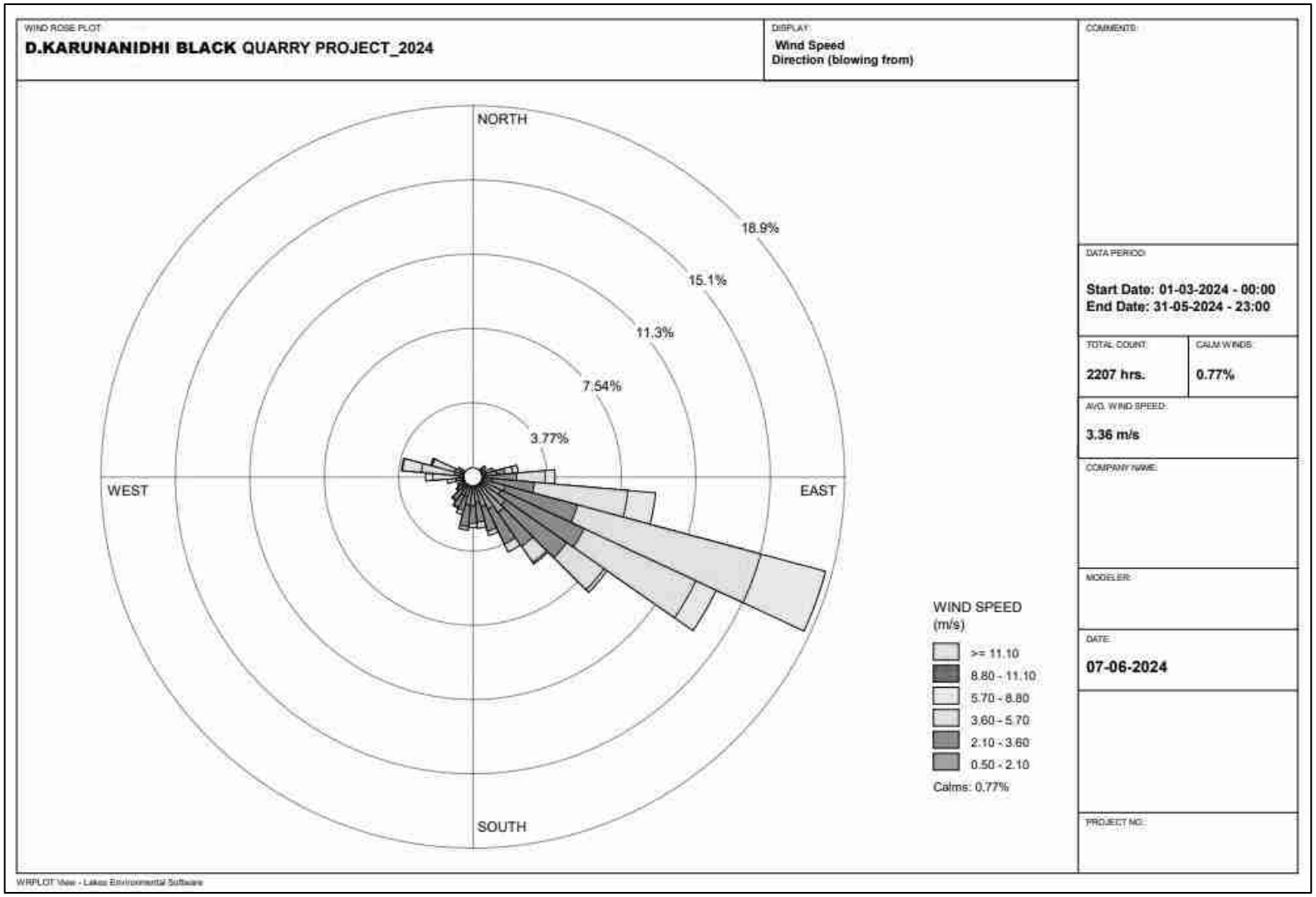


Figure 3.15 Onsite Windrose Diagram

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

Table 3.13 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 Results by **Green link Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS*

Table 3.14 National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	SO_2 ($\mu g/m^3$)	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	NO_2 ($\mu g/m^3$)	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	PM_{10} ($\mu g/m^3$)	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	$PM_{2.5}$ ($\mu g/m3$)	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at Seven (7) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March-May, 2024 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least 3 ± 0.5 m 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_{10}, $PM_{2.5}$, sulphur dioxide (SO_2) and nitrogen dioxide (NO_X). The sampling locations are shown in Figure 3.16 and average concentrations of air pollutants are summarized in Tables 3.15.

Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance (km)	Direction	Coordinates	
					Lat	Long
1	AAQ1	Core	--	--	12°27'39.90"N	77°47'0.32"E
2	AAQ2	Giriyanapalli	1.21	NE	12°27'58.50"N	77°47'44.77"E
3	AAQ3	Karandapalli	2.12	W	12°27'44.34"N	77°45'50.11"E
4	AAQ4	Bikkanapally	2.57	SE	12°26'20.72"N	77°47'40.32"E
5	AAQ5	Santhanapalli	4.84	NE	12°28'37.19"N	77°49'40.32"E
6	AAQ6	Kundhukottai	3.90	SW	12°26'10.27"N	77°45'28.99"E
7	AAQ7	Noganoor	4.43	N	12°30'4.19"N	77°46'48.21"E

Source: Sampling Results by ***Greenlink Analytical and Research Laboratory (India) Private Ltd,*** *in association with GTMS*

Results

As per the monitoring data, $PM_{2.5}$ ranges from 13.8 µg/m^3 to 15.8 µg/m^3; PM_{10} from 36.4 µg/m^3 to 41.6µg/m^3; SO_2 from 2.6µg/m^3 to 4.0µg/m^3; NO_X from 7.2 µg/m^3 to 11.1 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

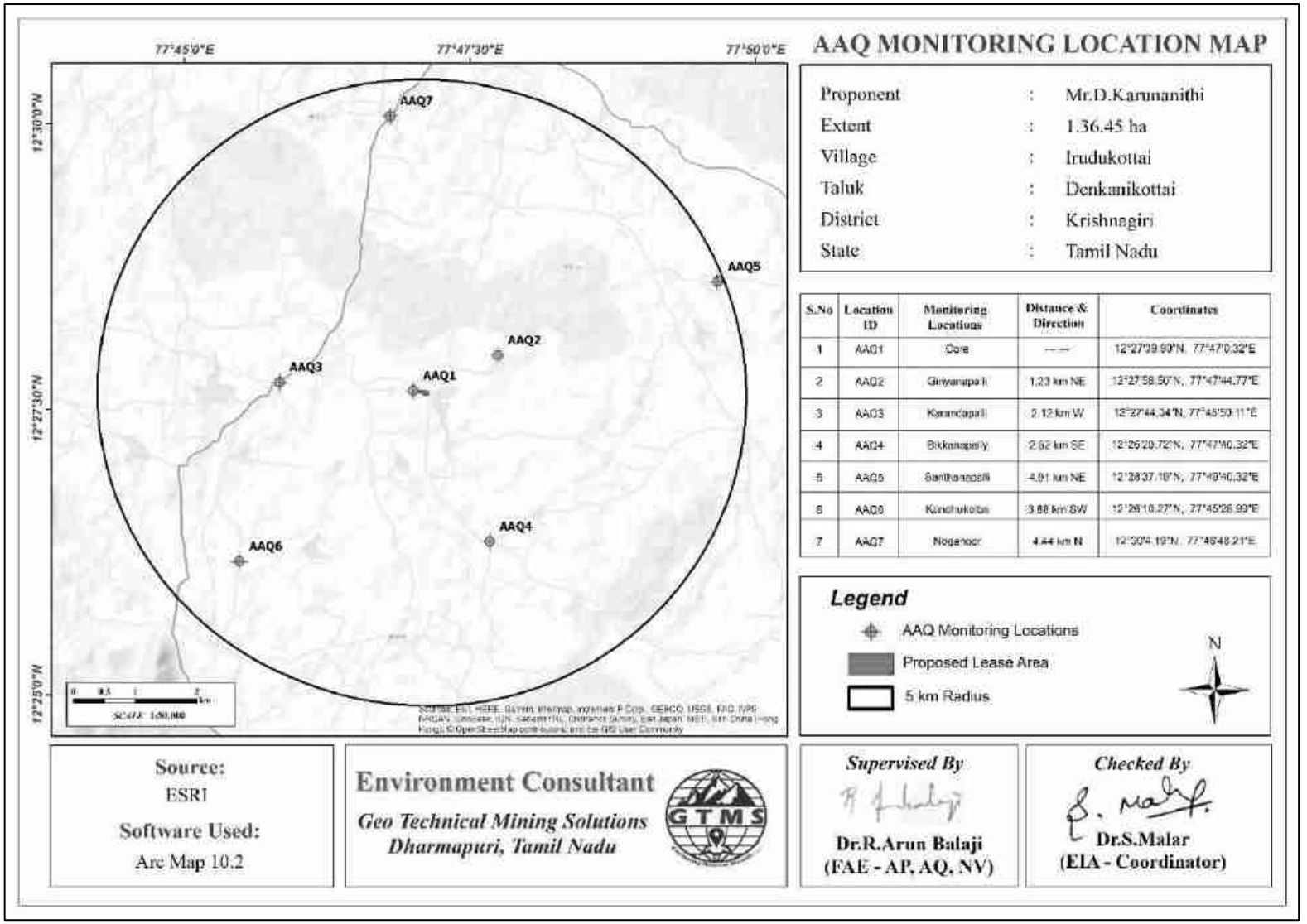


Figure 3.16 Ambient Air Quality Monitoring Station Locations around 5 km Radius from the Proposed Project Site

Table 3.16 Summary of AAQ Result

	$PM_{2.5}$				PM_{10}			
Station ID	**Max**	**Min**	**Mean**	**98th Percentile**	**Max**	**Min**	**Mean**	**98th Percentile**
AAQ1	14.6	12.7	13.6	14.6	36.4	31.8	34.0	36.4
AAQ2	17.5	14.4	15.7	17.5	43.8	36.0	39.3	43.8
AAQ3	15.3	14.1	14.6	14.9	43.2	39.8	41.2	43.1
AAQ4	16.2	14.1	15.1	16.2	40.6	35.3	37.7	40.5
AAQ5	17.5	14.4	15.7	17.5	43.8	36.0	39.3	43.8
AAQ6	14.2	12.8	13.5	14.2	39.9	36.1	38.0	39.9
AAQ7	15.3	14.1	14.6	15.3	43.2	39.8	41.2	43.1
	SO_2				NO_2			
AAQ1	3.7	2.9	3.2	3.7	11.8	9.3	9.4	11.7
AAQ2	3.5	2.1	2.7	3.4	10.9	6.5	7.6	10.6
AAQ3	4.5	3.0	3.6	4.4	11.3	7.5	8.2	11.0
AAQ4	3.9	2.2	3.2	3.9	10.9	6.2	8.1	10.9
AAQ5	3.5	2.1	2.7	3.4	10.9	6.5	7.6	10.6
AAQ6	4.2	2.8	3.4	4.1	10.5	7.0	7.8	10.3
AAQ7	4.5	3.0	3.6	4.4	11.3	7.5	8.2	9.8

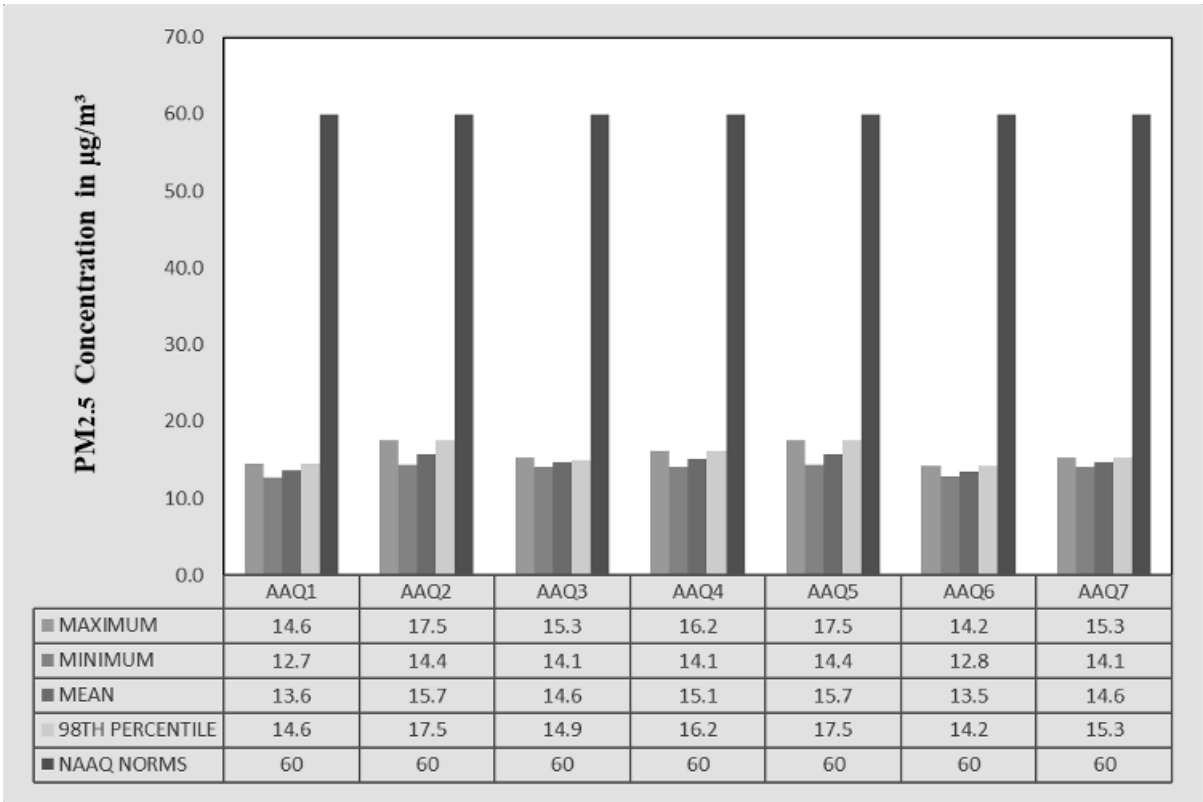
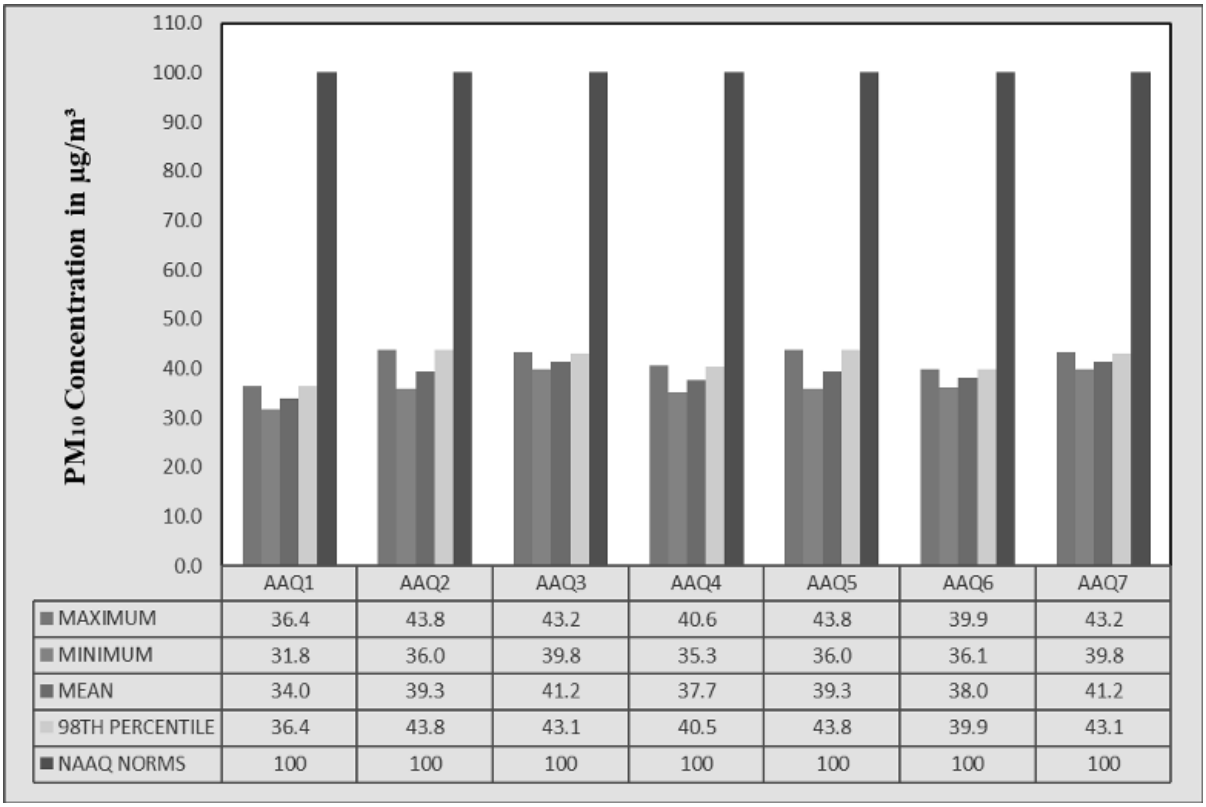
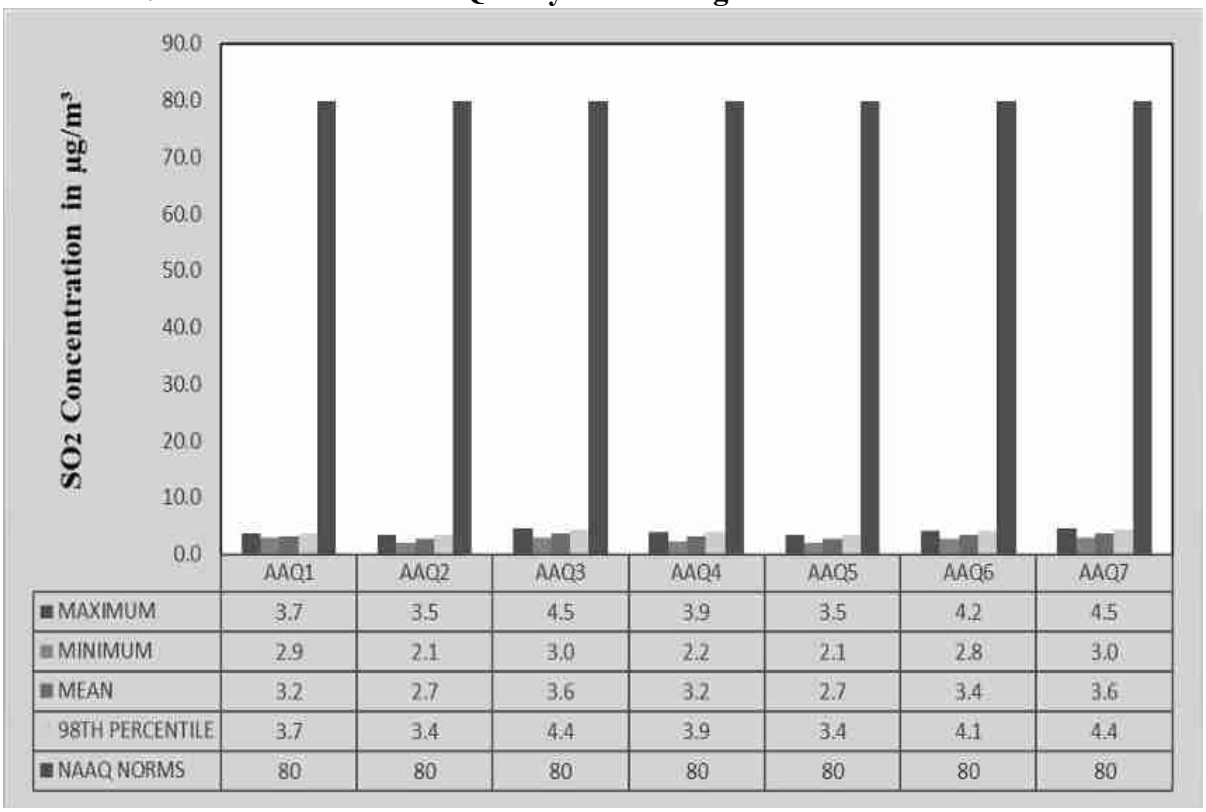


Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of $PM_{2.5}$ Measured from 7 Air Quality Monitoring Stations within 5 km Radius



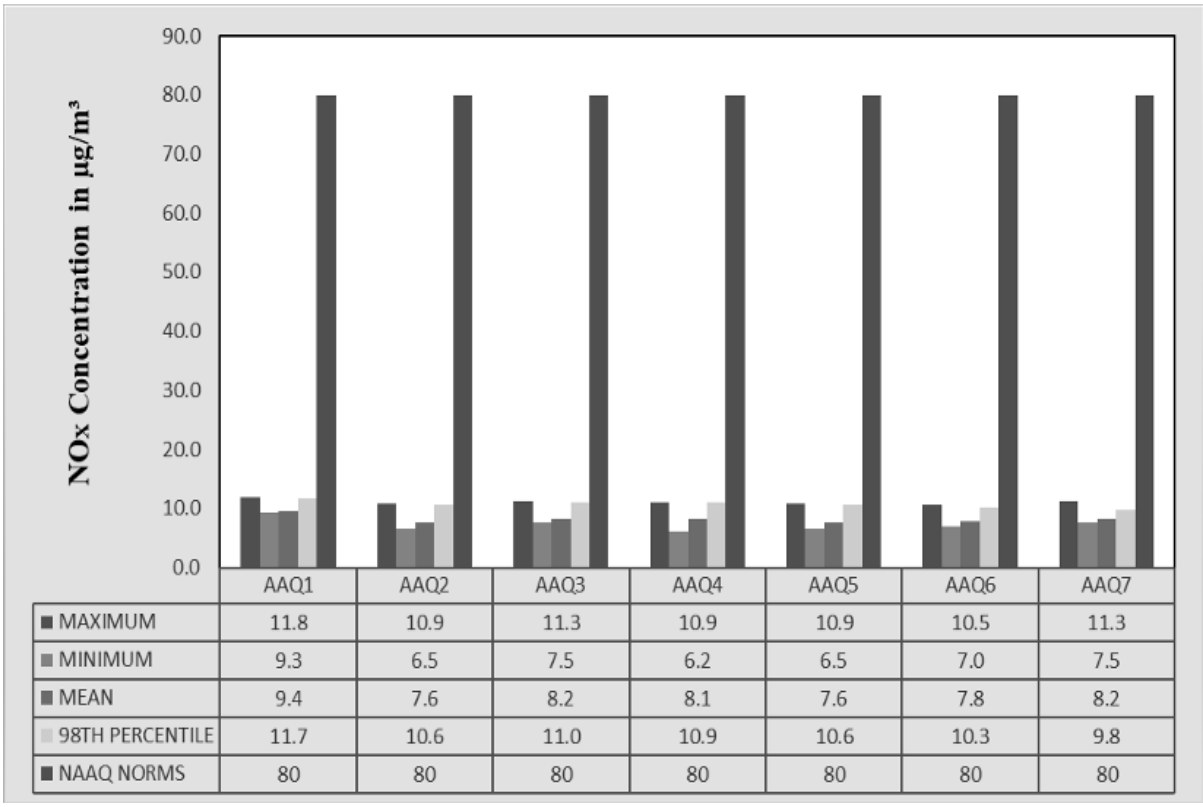
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAXIMUM	36.4	43.8	43.2	40.6	43.8	39.9	43.2
MINIMUM	31.8	36.0	39.8	35.3	36.0	36.1	39.8
MEAN	34.0	39.3	41.2	37.7	39.3	38.0	41.2
98TH PERCENTILE	36.4	43.8	43.1	40.5	43.8	39.9	43.1
NAAQ NORMS	100	100	100	100	100	100	100

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



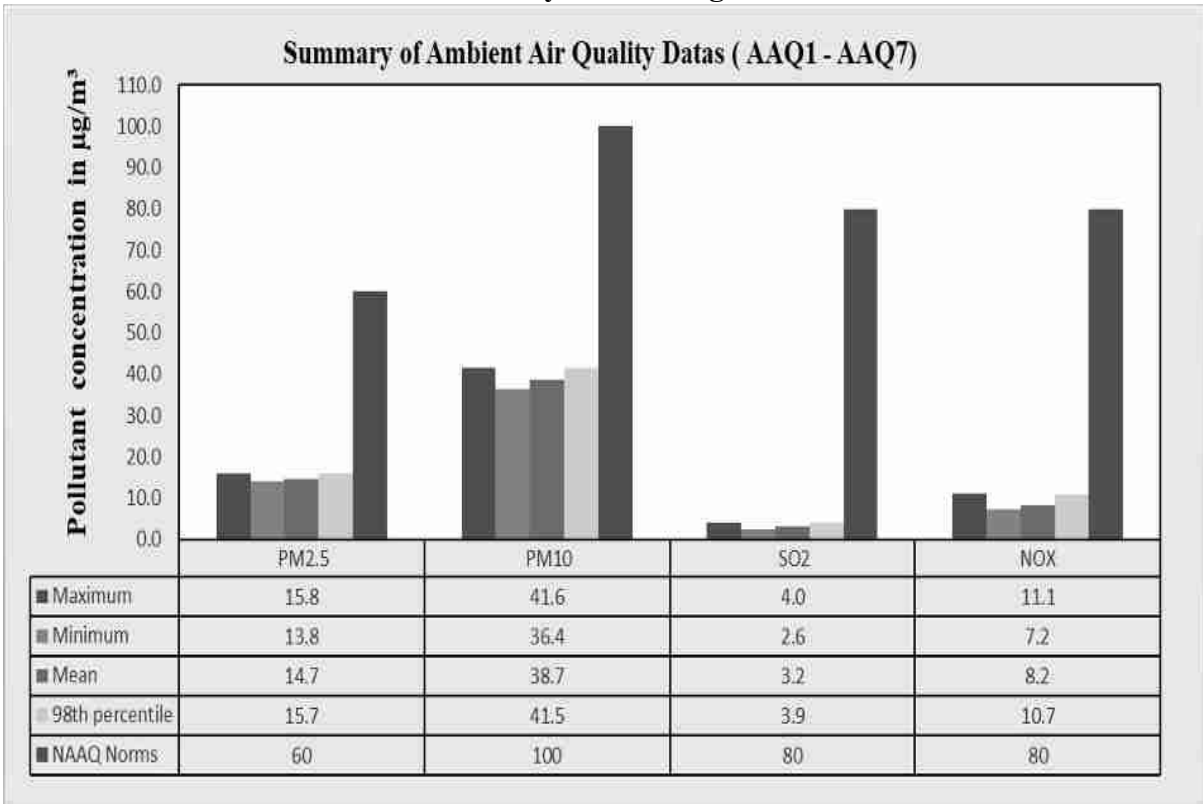
	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAXIMUM	3.7	3.5	4.5	3.9	3.5	4.2	4.5
MINIMUM	2.9	2.1	3.0	2.2	2.1	2.8	3.0
MEAN	3.2	2.7	3.6	3.2	2.7	3.4	3.6
98TH PERCENTILE	3.7	3.4	4.4	3.9	3.4	4.1	4.4
NAAQ NORMS	80	80	80	80	80	80	80

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



	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
MAXIMUM	11.8	10.9	11.3	10.9	10.9	10.5	11.3
MINIMUM	9.3	6.5	7.5	6.2	6.5	7.0	7.5
MEAN	9.4	7.6	8.2	8.1	7.6	7.8	8.2
98TH PERCENTILE	11.7	10.6	11.0	10.9	10.6	10.3	9.8
NAAQ NORMS	80	80	80	80	80	80	80

Figure 3. 20 Bar Chart Showing Maximum, Minimum, And Average Concentrations of NO_X Measured from 7 Air Quality Monitoring Stations within 5 km Radius



	PM2.5	PM10	SO2	NOX
Maximum	15.8	41.6	4.0	11.1
Minimum	13.8	36.4	2.6	7.2
Mean	14.7	38.7	3.2	8.2
98th percentile	15.7	41.5	3.9	10.7
NAAQ Norms	60	100	80	80

Figure 3.21 Bar Chart Showing Maximum, Minimum, and 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 Seven (7) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.17 and spatial occurrence of the locations are shown in Figure 3.24.

Table 3.17 Noise Monitoring Locations

S. No	Location Code	Monitoring Locations	Distance in km	Direction	Coordinates	
					Lat	Long
1	N1	Core	--	--	12°27'39.76"N	77°47'0.93"E
2	N2	Giriyanapalli	1.21	NE	12°27'55.53"N	77°47'45.33"E
3	N3	Karandapalli	2.12	W	12°27'45.28"N	77°45'50.01"E
4	N4	Bikkanapally	2.57	SE	12°26'19.60"N	77°47'41.83"E
5	N5	Santhanapalli	4.84	NE	12°28'36.79"N	77°49'38.36"E
6	N6	Kundhukottai	3.90	SW	12°26'10.66"N	77°45'27.61"E
7	N7	Noganoor	4.43	N	12°30'3.88"N	77°46'48.48"E

*Source: Sampling Results by **Greenlink Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS*

Table 3.18 Ambient Noise Quality Result

Station ID	Location	Environmental setting	Average day noise level(dB(A))	Average night noise level (dB(A))	Day time (6.00 AM – 10.00 PM)	Night time (10.00 PM – 6.00 AM)
					Standard (L_{eq}in dB(A))	
N1	Core	Industrial area	39.8	33.4	75	70
N2	Giriyanapalli	Residential area	41.6	39.4	55	45
N3	Karandapalli		44.2	39.8	55	45
N4	Bikkanapally		39	37.2	55	45
N5	Santhanapalli		40.2	38.2	55	45
N6	Kundhukottai		41.2	36.8	55	45
N7	Noganoor		42.6	38.2	55	45

*Source: Sampling Results by **Greenlink Analytical and Research Laboratory (India) Private Ltd,** in association with GTMS*

The Table 3.18 shows that noise level in core zone was 39.8dB (A) Leq during day time and 33.4dB (A) Leq during night time. Noise levels recorded in buffer zone during day time

varied from 39.0 to 44.2 dB (A) Leq and during night time from 36.8 to 39.4 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 3.22 and 3.23.

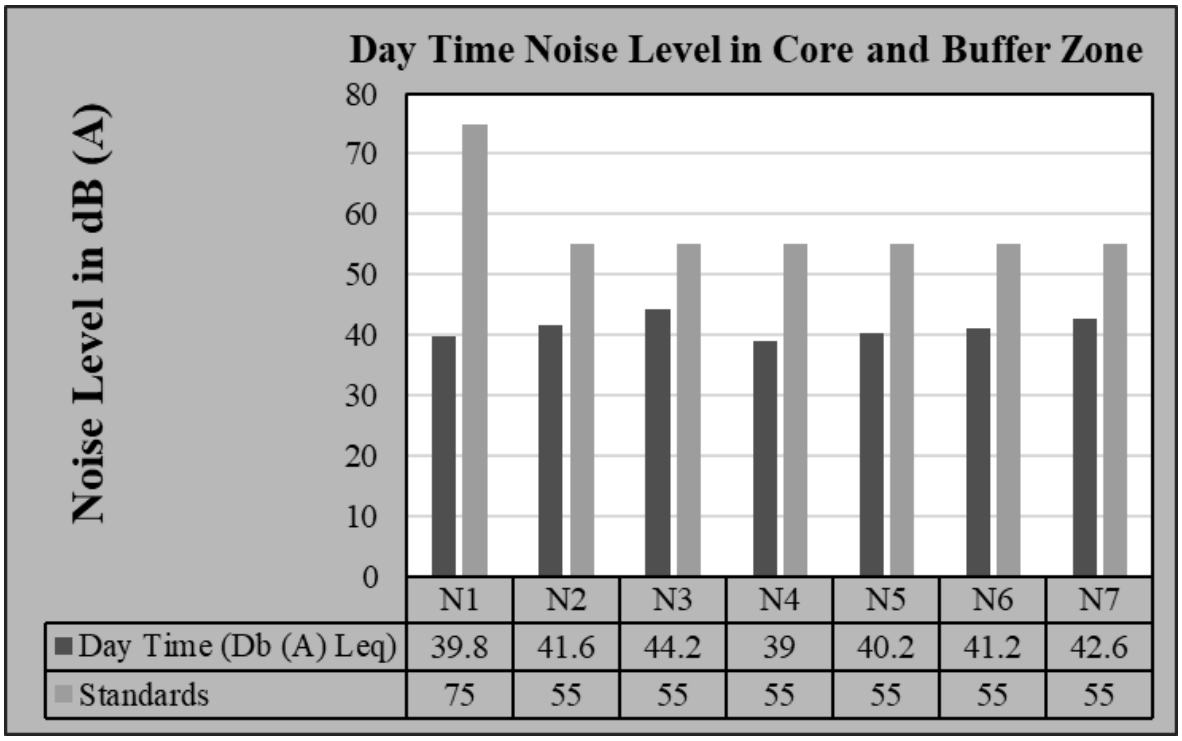


Figure 3.22 Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones

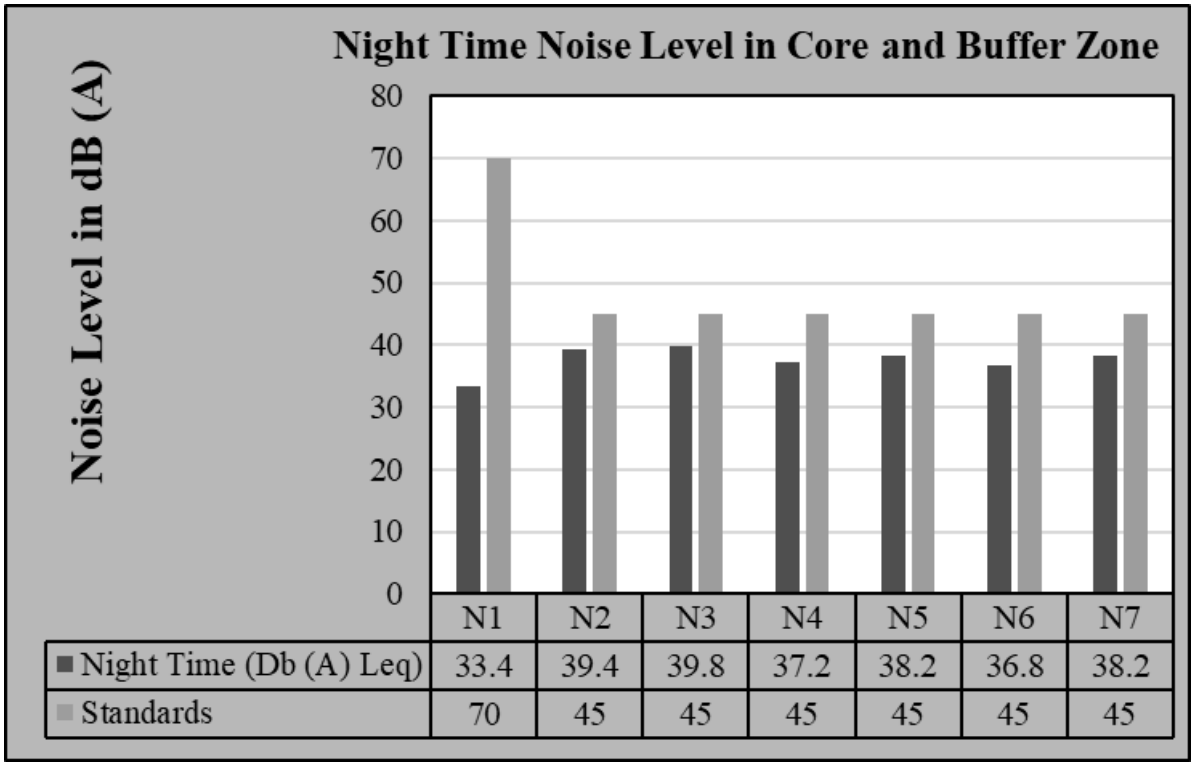


Figure 3.23 Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones

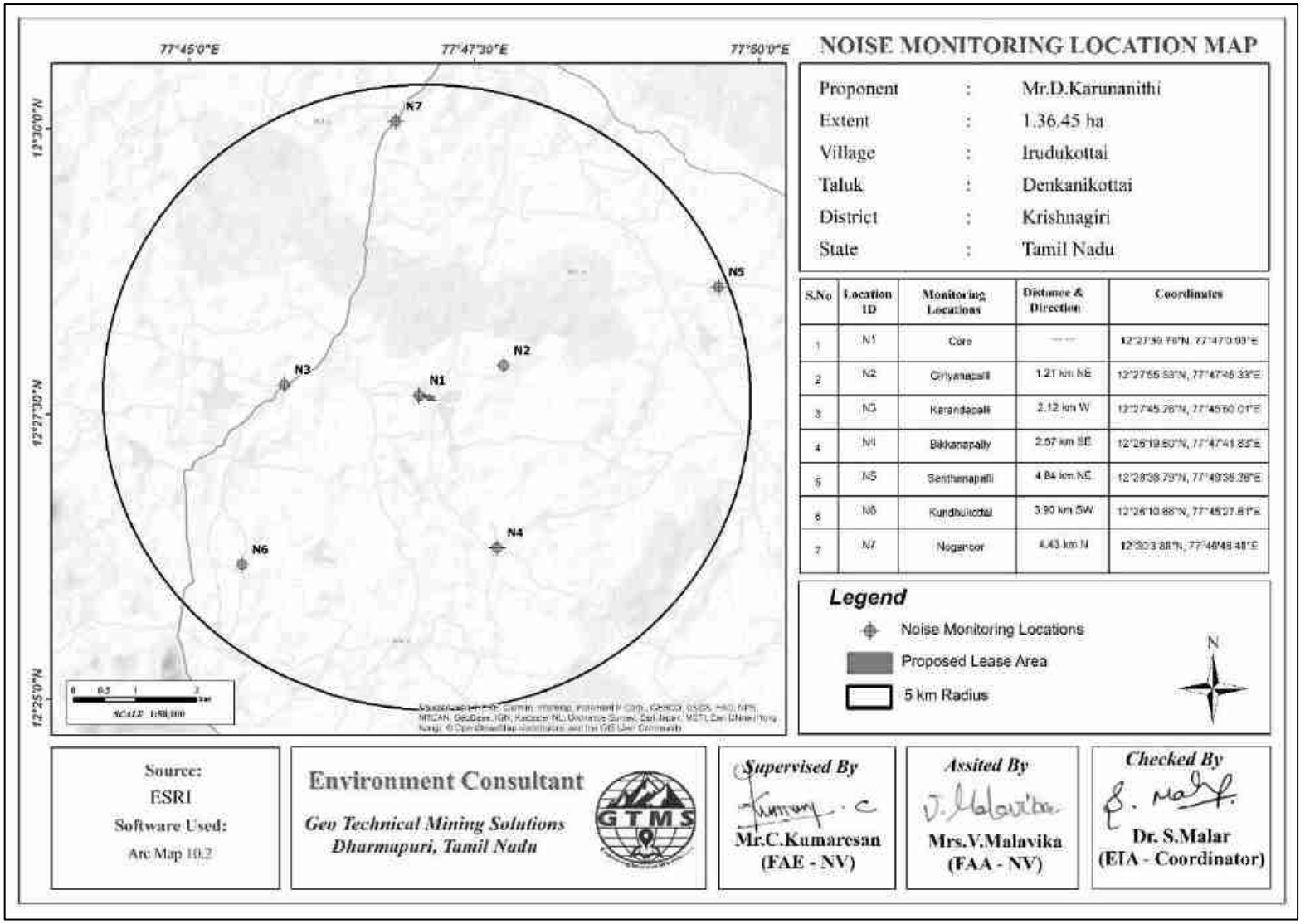


Figure 3.24 Noise Level Monitoring Station Locations around 5 km Radius from the Proposed Project Site

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 10 m × 10 m were laid down for shrubs, as shown in Figure 3.25.

Figure 3.25 Quadrates Sampling Methods of Flora

Phyto-Sociological Studies

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

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

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

Shannon – Wiener Index, Evenness and Richness

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

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

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

3.5.1 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. Photographs showing various species are provided in Figure 3.26.

Flora in mine lease area (core zone)

The mine lease area contains total of 17 species belonging to 13 families have been recorded from the mine lease area. 5 shrubs, 12 herbs were identified. It is a grassy land. There are trees in mine lease area. There are no endangered species in mine lease area. Details of vegetation with scientific name indicated in Table 3.21.

Table 3.21 Flora in mine lease area

S.no	Local name	Scientific name	Family name
Shrubs			
1	Avaram chadi	*Senna auriculata*	Fabaceae
2	Earuku	*Calotropis gigantea*	Apocynaceae
3	Communist pacha	*Chromolaena odorata*	Asteraceae
4	Unnichadi	*Lantana camara*	Verbenaceae
5	Thuthi	*Abutilon indicum*	Meliaceae
Herbs /Climber			
1	Perandai	*Cissus quadrangularis*	Vitaceae
2	Thathapondu	*Tridax procumbens*	Asteraceae
3	Kolunji chadi	*Tephrosia purpurea*	Fabaceae
4	Nayuruvi	*Achyranthes aspera*	Amaranthaceae
5	Nearunji mull	Tribulus zeyheri Sond	Zygophyllaceae
6	Kolukkattai Pill	*Cenchrus ciliaris*	Poaceae
7	Pulapoo	*Aerva lanata*	Amaranthaceae
8	American mint	*Hyptis suaveolens*	Lamiaceae
9	Tumbai	*Leucas aspera*	Lamiaceae
10	Red Natal grass	*Melinis repens*	Poaceae
11	Congress weed	*Parthenium hysterophorus*	Asteraceae
12	Unakodi	*Ipomoea pes carina*	Convolvulaceae

Flora within 300 m radius buffer zone

The 300m radius area is containing a total of 43 species belonging to 25 families have been recorded from the buffer zone. 15 Trees, 7 Shrubs and 21 Herbs and Climbers were identified. Details of flora with the scientific name details and of diversity species Richness index were mentioned in Table 3.22-3.24 and Figure 3.26. There is no threat to the Flora species in 300 m radius.

Flora within 10 km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area. It contains a total of species belonging to 39 families have been recorded from the buffer zone. The floral (80) varieties among them 31 Trees, 11 Shrubs, Herbs and Climbers, Creeper, Grass & Cactus, 38 were identified. Details of flora with the scientific name details of diversity species rich ness index were mentioned in Table 3.25-3.38.

Table 3.22 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
Tree													
1	Velikathan maram	*Prosopis juliflora*	Fabaceae	6	4	5	1.2	80.0	0.1	2.4	50.0	52.4	Not Listed
2	Pongam oiltree	*Pongamia pin nata*	Fabaceae	4	3	5	0.8	60.0	1.3	6.7	7.1	13.8	Not Listed
3	Panai maram	*Borassus flabellifer*	Arecaceae	1	1	5	0.2	20.0	1.0	1.7	2.4	4.0	Not Listed
4	Nuna maram	*Morinda citrifolia*	Rubiaceae	4	3	5	0.8	60.0	1.3	6.7	7.1	13.8	Not Listed
5	Vembu	*Azadirachtaindica*	Meliaceae	7	4	5	1.4	80.0	1.8	11.7	9.5	21.2	Not Listed
6	Manga maram	*Mangifera indica*	Anacardiaceae	4	3	5	0.8	60.0	1.3	6.7	7.1	13.8	Not Listed
7	Thennai maram	*Cocos nucifera*	Arecaceae	6	3	5	1.2	60.0	2.0	10.0	7.1	17.1	Not Listed
8	Wetpalai maram	*Wrightia tinctoria*	Apocynaceae	2	2	5	0.4	40.0	1.0	3.3	4.8	8.1	Not Listed
9	Unjai maram	*Albizia amara*	Fabaceae	8	4	5	1.6	80.0	2.0	13.3	9.5	22.9	Not Listed
10	Neruppu Kondrai	*Delonix regia*	Fabaceae	2	2	5	0.4	40.0	1.0	3.3	4.8	8.1	Not Listed
11	Kodukkapuli maram	*Pithecellobium dulce*	Fabaceae	1	1	5	0.2	20.0	1.0	1.7	2.4	4.0	Not Listed
12	Teak	*Tectona grandis*	Lamiaceae	4	2	5	0.8	40.0	2.0	6.7	4.8	11.4	Not Listed
13	Savukku	*Casuarina equisetifolia*	Casuarinaceae	5	2	5	1.0	40.0	2.5	8.3	4.8	13.1	LC
14	Thailamaram	*Eucalyptus*	Myrtaceae	6	3	5	1.2	60.0	2.0	10.0	7.1	17.1	Not Listed
15	Puliyamaram	*Tamarindus indica*	Fabaceae	2	1	5	0.4	20.0	2.0	3.3	2.4	5.7	LC
Shrubs													
1	Unichedi	*Lantana camara*	Verbenaceae	10	8	10	1.0	80.0	0.2	2.4	60.0	62.4	Not Listed
2	Sundaika	*Solanum torvum*	Solanaceae	5	5	10	0.5	50.0	1.0	8.3	11.9	20.2	Not Listed
3	Erukku	*Calotropis gigantea*	apocynaceae	13	9	10	1.3	90.0	1.4	21.7	21.4	43.1	Not Listed

4	Avarai	*Senna auriculata*	Fabaceae	6	4	10	0.6	40.0	1.5	10.0	9.5	19.5	Not Listed
5	Sappathikalli	*Cereus pterogonus*	Cactus	8	7	10	0.8	70.0	1.1	13.3	16.7	30.0	Not Listed
6	Kattamanaku	*Jatropha gossypiifolia L*	Euphorbiaceae	13	6	10	1.3	60.0	2.2	21.7	14.3	36.0	Not Listed
7	Nochi	*Vitex negundo*	Lamiaceae	5	3	10	0.5	30.0	1.7	8.3	7.1	15.5	Not Listed
Herbs, Climbers & Grass													
1	Ponnangani	*Alternanthera pungens*	Amaranthaceae	9	8	10	0.9	80.0	1.1	3.9	6.3	10.2	Not Listed
2	wild thulasi	*Hyptis suaveolens (L.)*	Lamiaceae	12	6	10	1.2	60.0	2.0	5.2	4.8	9.9	Not Listed
3	Gopuram Tangi	*Andrographis echioides*	Acanthaceae	10	5	10	1.0	50.0	2.0	4.3	4.0	8.3	Not Listed
4	Amman Paccharisi	*Euphorbia hirta*	Euphorbiaceae	16	9	10	1.6	90.0	1.8	6.9	7.1	14.0	Not Listed
5	Paca poondu	*Pavonia gallaensis*	Malvaceae	8	6	10	0.8	60.0	1.3	3.4	4.8	8.2	Not Listed
6	Perandai	*Cissus quadrangularis*	Vitaceae	6	4	10	0.6	40.0	1.5	2.6	3.2	5.8	Not Listed
7	Vishnukrandai	*Evolvulus alsinoides*	Convolvulaceae	12	4	10	1.2	40.0	3.0	5.2	3.2	8.3	Not Listed
8	Musumusukkai	*Mukia maderaspatana*	Cucurbitaceae	4	3	10	0.4	30.0	1.3	1.7	2.4	4.1	Not Listed
9	Sirupunaikkali	*Passiflora foetida*	Passifloraceae	7	4	10	0.7	40.0	1.8	3.0	3.2	6.2	Not Listed
10	Nagathali	*Opuntia dillenii*	Cactaceae	5	3	10	0.5	30.0	1.7	2.2	2.4	4.5	Not Listed
11	Thumbai	*Leucas aspera*	Lamiaceae	18	7	10	1.8	70.0	2.6	7.8	5.6	13.3	Not Listed
12	Kantang kathrikai	*Solanum virginianum*	Solanaceae	24	10	10	2.4	100.0	2.4	10.3	7.9	18.3	Not Listed
13	Arugampul	*Cynodon dactylon*	Poaceae	27	10	10	2.7	100.0	2.7	11.6	7.9	19.6	Not Listed
14	Poolai poondu	*Aerva lanata*	Amaranthaceae	7	6	10	0.7	60.0	1.2	3.0	4.8	7.8	Not Listed
15	Korai	*Cyperus rotundus*	Cyperaceae	13	7	10	1.3	70.0	1.9	5.6	5.6	11.2	Not Listed
16	Nerunji	*Tribulus terrestris*	Zygophyllales	9	6	10	0.9	60.0	1.5	3.9	4.8	8.6	Not Listed
17	Nayuruvi	*Achyranthes aspera*	Amaranthaceae	8	7	10	0.8	70.0	1.1	3.4	5.6	9.0	Not Listed
18	Thottalchinungi	*Mimosa pudica*	Mimosaceae	9	6	10	0.9	60.0	1.5	3.9	4.8	8.6	Not Listed
19	Anachundaikai	*Solanum violaceum Ortega*	Solanaceae	6	4	10	0.6	40.0	1.5	2.6	3.2	5.8	Not Listed
20	Kombumul	*Acanthospermum hispidum*	Asteraceae	19	8	10	1.9	80.0	2.4	8.2	6.3	14.5	Not Listed
21	Agave	*Agave sisalana*	Asparagaceae	3	3	10	0.3	30.0	1.0	1.3	2.4	3.7	Not Listed

Table 3.23 Calculation of Species Diversity in 300 m Radius

S. No	Common name	Scientific name	No. of Species	Pi	In (Pi)	Pi x in (Pi)
Tree						
1	Velikathan maram	*Prosopis juliflora*	6	0.10	-2.34	-0.23
2	Pongam oiltree	*Pongamia pin nata*	4	0.06	-2.74	-0.18
3	Panai maram	*Borassus flabellifer*	1	0.02	-4.13	-0.07
4	Nuna maram	*Morinda citrifolia*	4	0.06	-2.74	-0.18
5	Vembu	*Azadirachtaindica*	7	0.11	-2.18	-0.25
6	Manga maram	*Mangifera indica*	4	0.06	-2.74	-0.18
7	Thennai maram	*Cocos nucifera*	6	0.10	-2.34	-0.23
8	Wetpalai maram	*Wrightia tinctoria*	2	0.03	-3.43	-0.11
9	Unjai maram	*Albizia amara*	8	0.13	-2.05	-0.26
10	Neruppu Kondrai	*Delonix regia*	2	0.03	-3.43	-0.11
11	Kodukkapuli maram	*Pithecellobium dulce*	1	0.02	-4.13	-0.07
12	Teak	*Tectona grandis*	4	0.06	-2.74	-0.18
13	Savukku	*Casuarina equisetifolia*	5	0.08	-2.52	-0.20
14	Thailamaram	*Eucalyptus*	6	0.10	-2.34	-0.23
15	Puliyamaram	*Tamarindus indica*	2	0.03	-3.43	-0.11
H (Shannon Diversity Index) = 2.56						
Shrubs						
1	Unichedi	*Lantana camara*	10	0.17	-1.79	-0.30
2	Sundaika	*Solanum torvum*	5	0.08	-2.48	-0.21
3	Erukku	*Calotropis gigantea*	13	0.22	-1.53	-0.33
4	Avarai	*Senna auriculata*	6	0.10	-2.30	-0.23
5	Sappathikalli	*Cereus pterogonus*	8	0.13	-2.01	-0.27
6	Kattamanaku	*Jatropha gossypiifolia L*	13	0.22	-1.53	-0.33
7	Nochi	*Vitex negundo*	5	0.08	-2.48	-0.21
H (Shannon Diversity Index) =1.87						
HERBS						
1	Thumbai	*Leucas aspera*	9	0.04	-3.25	-0.13
2	Kantang kathrikai	*Solanum virginianum*	12	0.05	-2.96	-0.15
3	Arugampul	*Cynodon dactylon*	10	0.04	-3.14	-0.14
4	Poolai poondu	*Aerva lanata*	16	0.07	-2.67	-0.18
5	Korai	*Cyperus rotundus*	8	0.03	-3.37	-0.12
6	Nerunji	*Tribulus terrestris*	6	0.03	-3.65	-0.09
7	Nayuruvi	*Achyranthes aspera*	12	0.05	-2.96	-0.15
8	Thottalchinungi	*Mimosa pudica*	4	0.02	-4.06	-0.07
9	Anachundaikai	*Solanum violaceum Ortega*	7	0.03	-3.50	-0.11
10	Kombumul	*Acanthospermum hispidum*	5	0.02	-3.84	-0.08
11	Ponnangani	*Alternanthera pungens*	18	0.08	-2.56	-0.20

12	wild thulasi	*Hyptis suaveolens (L.)*	24	0.10	-2.27	-0.23
13	Gopuram Tangi	*Andrographis echioides*	27	0.12	-2.15	-0.25
14	Amman Paccharisi	*Euphorbia hirta*	7	0.03	-3.50	-0.11
15	Paca poondu	*Pavonia gallaensis*	13	0.06	-2.88	-0.16
16	Perandai	*Cissus quadrangularis*	9	0.04	-3.25	-0.13
17	Vishnukrandai	*Evolvulus alsinoides*	8	0.03	-3.37	-0.12
18	Musumusukkai	*Mukia maderaspatana*	9	0.04	-3.25	-0.13
19	Sirupunaikkali	*Passiflora foetida*	6	0.03	-3.65	-0.09
20	Nagathali	*Opuntia dillenii*	19	0.08	-2.50	-0.20
21	Agave	*Agave sisalana*	3	0.01	-4.35	-0.06
H (Shannon Diversity Index) =						

Table 3.24 Species Richness (Index) in 300 m Radius

Details	H	H max	Evenness	Species Richness
Tree	2.56	2.71	0.95	3.39
Shrubs	1.87	1.95	0.96	1.47
Herbs	2.90	3.04	0.95	3.67

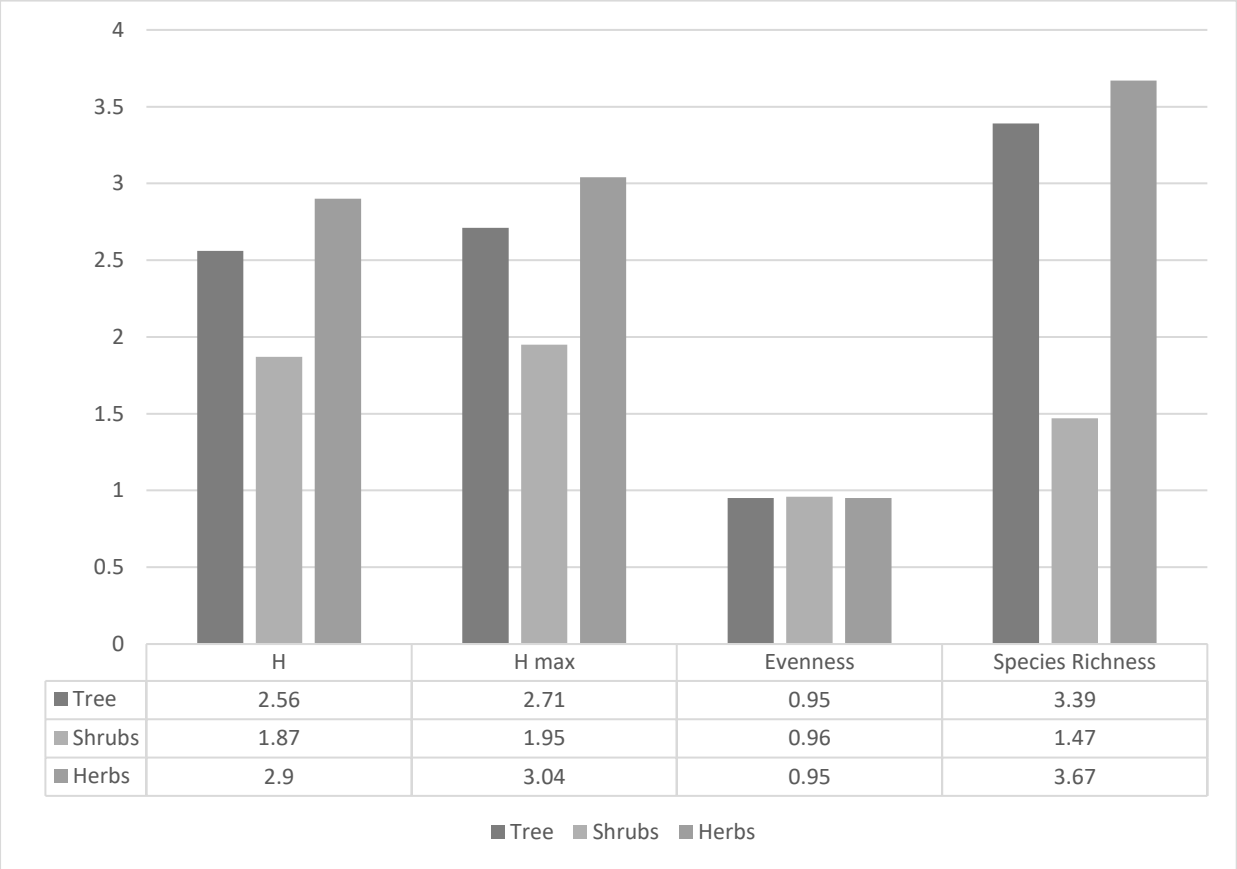


Figure 3.26 Species Richness (Index) in 300 m Radius

Table 3.25 Flora in Buffer Zone

S. No	Local Name	Scientific name	Family name
Tree			
1	Vembu	*Azadirachta indica*	Meliaceae
2	Pongam oiltree	*Pongamia pinnata*	Fabaceae
3	Karuvelam	*Acacia nilotica*	Mimosaceae
4	Thennai maram	*Cocos nucifera*	Arecaceae
5	Arasanmaram	*Ficus religiosa*	Moraceae
6	Puliyamaram	*Tamarindus indica*	Legumes
7	Punnai	*Calophyllu inophyllum*	Calophyllaceae
8	Athi	*Ficus recemosa*	Moraceae
9	Vazhaimaram	*Musa*	Musaceae
10	Kadukka puli	*Terminalia chebula*	Combretaceae
11	Nettilinkam	*Polylathia longifolia*	Annonaceae
12	Perumungil	*Bambusa bambos*	Poaceae
13	Sapota	*Manilkara zapota*	Sapotaceae
14	Eucalyptus	*Eucalyptus globules*	Myrtaceae
15	Navalmaram	*Sygygium cumini*	Myrtaceae
16	Ezhumuchai maram	*Citrus lemon*	Rutaceae
17	Alamaram	*Ficus benghalensis*	Moraceae
18	Panai maram	*Borassus flabellifer*	Arecaceae
19	Manga	*Mangifera indica*	Anacardiaceae
20	Thekku	*Tectona grandis*	Verbenaceae
21	Nelli	*Emblica officinalis*	Phyllanthaceae
22	Nettilinkam	*Polylathia longifolia*	Annonaceae
23	Vellai Karuvelam	*Vachellia nilotica*	Fabaceae
24	Palamaram	*Artocarpus heterophyllus*	Moraceae
25	Vadanarayani	*Delonix elata*	Fabaceae
26	Savukku	*Casuarina equisetifolia*	Casuarinaceae
27	Pappali maram	*Carica papaya L*	Caricaceae
28	Nuna maram	*Morinda citrifolia*	Rubiaceae
29	Koyya	*Psidium guajava*	Myrtaceae
30	Seethapazham	*Annona reticulata*	Annonaceae
31	Moonghil	*Bambusa bambo*	Poaceae
Shrubs			
1	Avarai	*Senna auriculata*	Fabaceae
2	Sundaika	*Solanum torvum*	Solanaceae
3	Arali	*Nerium indicum*	Apocynaceae
4	Idlipoo	*xoracoc cinea*	Rubiaceae
5	Neermulli	*Hydrophila auriculata*	Acanthaceae
6	Icham	*Phoenix pusilla*	Arecaceae
7	Chaturakalli	*Euphorbia antiquorum*	Euphorbiaceae
8	Kattamanakku	*Jatropha curcas*	Euphorbiaceae
9	Thuthi	*Abutilon indicum*	Meliaceae
10	Chemparuthi	*Hibiscu rosa-sinensis*	Malvaceae
11	Erukku	*Calotropis gigantea*	Apocynaceae
Herbs, Climber, Creeper, Grass & Cactus			
1	Thumbai	*Leucas aspera*	Lamiaceae

2	Parttiniyam	*Parthenium*	Asteraceae
3	Thoiya keerai	*Digeria muricata*	Amarantheceae
4	Pulliyari	*Oxalis corniculata*	Oxalidaceae
5	Mukuratthai	*Boerhavia diffusa*	Nyctaginaceae
6	Thulasi	*Ocimum tenuiflorum*	Lamiaceae
7	Arugampul	*Cynodon dactylon*	Poaceae
8	Manjal	*Curcuma longa*	Zingiberaceae
9	Manathakkali	*Solanumnigrum*	Solanaceae
10	Nai kadugu	*Celome viscosa*	Capparidaceae
11	Koraikkilangu	*Cyperus articulates*	Cyperaceae
12	Karisilanganni	*Eclipta prostata*	Asteraceae
13	Korai	*Cyperus rotundus*	Cyperaceae
14	Kunnakora	*Cyperus compressus*	Cyperaceae
15	Mukurattai	*Boerhavia diffusa*	Nyctaginaceae
16	Kovai	*Coccinia grandis*	Cucurbitaceae
17	Perandai	*Cissus quadrangularis*	Vitaceae
18	Mudakkotan	*Cardiospermum helicacabum*	Sapindaceae
19	Sangupoo	*Clitoriaternatia*	Fabaceae
20	Malli	*Jasminum augustifolium*	Oleaceae
21	Vallikeerai	*Ipomoea aquatica*	Convolvulaceae
22	Siru puladi	*Desmodium triflorum*	Fabaceae
23	Sithrapaalavi	*Euphorbia prostrata*	Euphorbiaceae
24	mookuthi poondu	*Wedelia trilobata*	Asteraceae
25	Pullu	*Eragrostis ferruginea*	Poaceae
26	Chevvarakupul	*Chloris barbata*	Amaranthaceae
27	Nagathali	*Opuntia dillenii*	Nagathali
28	Nayuruvi	*Achyranthes aspera*	Amaranthaceae
29	Veetukaayapoondu	*Tridax procumbens*	Asteraceae
30	Kaattu piral	*Hibiscus hispidissimus*	Malvaceae
31	Kuppaimeni	*Acalypha indica*	Euphorbiaceae
32	Karisilanganni	*Eclipta prostata*	Asteraceae
33	Korai	*Cyperus rotundus*	Cyperaceae
34	Kumattikkirai	*Allmania nodiflora*	Amaranthaceae
35	Kunnakora	*Cyperus compressus*	Cyperaceae
36	Keelaneeli	*Phyllanthus niruri*	Phyllanthaceae
37	Kanamvazhalai	*Commelina benghalensis*	Commelinaceae
38	Thottalchinungi	*Mimosa pudica*	Mimosaceae

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 3.26.

Table 3.26 Aquatic Vegetation

S. No.	Scientific name	Common Name	IUCN Red List Status
1	*Eichornia crassipes*	Water hyacinth	NA
2	*Aponogetonnatans*	Floating lace plant	NA
3	*Carex cruciata*	Cross Grass	NA
4	*Cynodon dactylon*	Scutch grass	LC

Aquatic fauna			
5	*Oreochromis mossambicus*	Jalebi	VU
6	*Labeo catla*	Catla catla	LC
7	*Channa striata*	Korava meen	LC

*LC- Least Concern, NA-Not yet assessed

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. Table 3.29 lists the aquatic plants and animals commonly found in rivers, ponds and lakes within a radius of 5 km from the quarry. Phytoplankton, zooplankton, fish and Artiola form this food chain.

Eg: Phytoplankton→zooplankton→small fish→large fish

Forest details

There are no or Biosphere Reserves or Wildlife Sanctuaries or National Parks or Bird Areas (IBAs) and faunal migration routes within 10 km radius. The area under study (mining lease area and 10 km buffer zone) is not ecologically sensitive. There is no reserve forest in 1km radius and reserve forest details mention in Table 3.40

Endangered and endemic species as per the IUCN Red List

There are no rare, endangered and endemic species found in the study area. There are no biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), ecologically sensitive zone in 10km radius.

3.5.2 Fauna

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

Fauna Methodology

Table 3.27 Methodology Applied during Survey of Fauna

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

Fauna in Core Zone

A total of 26 varieties of species observed in the Core zone of Irudukottai Village, among them numbers of Insects 10, Reptiles 3, Mammals 4 and Avian 9. A total of 26 species belonging to 18 families have been recorded from the core Zone. There is no schedule I and II species. A total of 10 species of bird were sighted in the study area. Details of fauna in core zone with the scientific name were mentioned in Table. 3.28.

Fauna in Buffer Zone

Taxonomically a total of 82 species belonging to 49 families have been recorded from the buffer zone area. Based on habitat classification the majority of species were Birds 50, followed by insects 13, reptiles 11, mammals 5 and amphibians 3. A total of 50 species of bird were sighted in the buffer zone. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna in buffer zone with the scientific name were mentioned in Table. 3.31. The data collation on Primary and secondary data.

Table 3.28 Fauna in Core Zone

S.no	Common Name/English Name	Scientific Name	Family name	IUCN Red List data
Insects				
1	Chocolate pansy	*Junonia iphita*	Nymphalidae	NA
2	Lime swallowtail	*Papilio demoleus*	Papilionidae	NA
3	Common Mormon	*Papilio polytes*	Papilionidae	NA
4	Crimson dropwing	*Trithemis aurora*	Libellulidae	LC
5	Lemon pansy	*Junonia lemonias*	Nymphalidae	NA
6	Tawny coster	*Acraea terpsicore*	Nymphalidae	NA
7	Slender skimmer	*Orthetrum sabina*	Libellulidae	LC
8	Plaina tiger butterfly	*Danaus chrysippus*	Nymphalidae	LC
9	Mottled emigrant	*Catopsilia pyranthe*	Pieridae	LC
10	Spotted locust	*Aularches miliaris*	Pyrgomorphidae	LC
Reptiles				
1	Oriental garden lizard	*Calotes uersicolor*	Agamidae	LC
2	Fan-Throated Lizard	*Sitanaponticeriana*	Agamidae	LC
3	Common skink	*Mabuya carinatus*	Scincidae	LC
Aves				
1	Baya weaver	*Ploceus philippinus*	Ploceidae	LC
2	White – browed Wagtail	*Motacilla maderaspatensis*	Motacillidae	LC
3	Great cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	LC
4	Indian robin	*Copsychus fulicatus*	Muscicapidae	LC
5	Indian Roller	*Coracias benghalensis*	Coraciidae	LC
6	Indian paradise flycatcher	*Terpsiphone paradisi*	Monarchidae	LC
7	Common myna	*Acridotheres tristis*	Sturnidae	LC
8	European bee- eater	*Merops apiaster*	Meropidae	LC

9	Black drongo	*Dicrurus macrocercus*	Dicruridae	LC
Mammals				
1	House mouse	Mus musculus	Muridae	LC
2	Indian hare	Lepus nigricollis	Leporidae	LC
3	Cow	Bos taurus	Bovidae	NA
4	Goat	Capra hircus	Bovidae	NA

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

Table 3.29 Fauna in Buffer Zone

S. No	Common Name/English Name	Scientific Name	Family name	IUCN Red List data
Insects				
1	Chocolate pansy	*Junonia iphita*	Nymphalidae	NA
2	Lime swallowtail	*Papilio demoleus*	Papilionidae	NA
3	Common Mormon	*Papilio polytes*	Papilionidae	NA
4	Crimson dropwing	*Trithemis aurora*	Libellulidae	LC
5	Lemon pansy	*Junonia lemonias*	Libellulidae	NA
6	Tawny coster	*Acraea terpsicore*	Nymphalidae	NA
7	Slender skimmer	*Orthetrum sabina*	Libellulidae	LC
8	Plaina tiger butterfly	*Danaus chrysippus*	Nymphalidae	LC
9	Danaid eggfly	*Hypolimnas misippus*	Nymphalidae	LC
10	Bark blue tiger butterfly	*Tirumala septentrionis*	Nymphalidae	NA
11	Mottled emigrant	*Catopsilia pyranthe*	Pieridae	NA
12	Spotted locust	*Aularches miliaris*	Pyrgomorphidae	NA
13	Ditgh jewel	*Brachythemis contaminata*	Libellulidae	LC
Reptiles				
1	Oriental garden lizard	*Calotes uersicolor*	Agamidae	NA
2	Fan-Throated Lizard	*Sitanaponticeriana*	Agamidae	NA
3	Common skink	*Mabuya carinatus*	Scincidae	NA
4	Buff striped keelback	*Amphiesma stolatum*	Colubridae	LC
5	Common bronzeback tree snake	*Dendrelaphis tristis*	Colubridae	LC
6	Common krait	*Bungarus caeruleus*	Elapidae	LC
7	Russells wolf snake	*Lycodon fasiolatus*	Colubridae	LC
8	Brahminy blindsnake	*Indotyphlope braminus*	Typhlopidae	LC
9	Rock dragon	*Psammophilus dorsalis*	Agamidae	LC
10	Indian vine snake	*Ahaetulla oxyrhynca*	Colubridae	NA
11	Blotched house gecko	*Hemidactylus triedrus*	Gekkonidae	LC
Aves				
1	Baya weaver	*Ploceus philippinus*	Ploceidae	LC
2	White – browed Wagtail	*Motacilla maderaspatensis*	Motacillidae	LC
3	Great cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	LC
4	Indian robin	*Copsychus fulicatus*	Muscicapidae	LC
5	Indian Roller	*Coracias benghalensis*	Coraciidae	LC
6	Indian paradise flycatcher	*Terpsiphone paradisi*	Monarchidae	LC
7	Red junglefowl	*Gallus gallus*	Phasianidae	LC

8	Common myna	*Acridotheres tristis*	Sturnidae	LC
9	European bee- eater	*Merops apiaster*	Meropidae	LC
10	Black drongo	*Dicrurus macrocercus*	Dicruridae	LC
11	Black – winged stilt	*Himantopus Himantopus*	Recurvirostridae	LC
12	Crested serpent eagle	*Spilornis cheela*	Accipitridae	LC
13	Brahminy kite	*Haliastur indus*	Accipitridae	LC
14	Spotted owlet	*Athene brama*	Strigidae	LC
15	Black rumped flameback	*Dinopium benghalense*	Picidae	LC
16	White -browed bulbul	*Pycnonotus luteolus*	Pycnonotidae	LC
17	House sparrow	*Passer domesticus*	Passeridae	LC
18	Grey heron	*Ardea cinerea*	Ardeidae	LC
19	Indian peafowl	*Pavo cristatus*	Phasianidae	LC
20	Rose -ringed parakeet	*Psittacula krameri*	Psittaculidae	LC
21	Scaly – breasted munia	*Lonchura punctulata*	Estrildidae	LC
22	White -throated kingfisher	*Halcyon smyrnensis*	Alcedinidae	LC
23	House crow	*Corvus splendens*	Corvidae	LC
24	Asian koel	*Eudynamys scolopaceus*	Cuculidae	LC
25	Asian green bee- Eater	*Merops orientails*	Meropidae	LC
26	Little cormorant	*Microcarbo niger*	Microcarbo	LC
27	Painted stork	*Mycteria leucocephala*	Ciconiidae	NT
28	Shikra	*Accipiter badius*	Accipitridae	LC
29	Indian robin	*Copsychus fulicatus*	Muscicapidae	LC
30	Indian roller	*Coracias benghalensis*	Coraciidae	LC
31	Indian paradise flycatcher	*Terpsiphone paradisi*	Monarchidae	LC
32	Yellow – billed babbler	*Argya affinis*	Leiothrichidae	LC
33	Ashy – crowned sparrow lark	*Eremopterix griseus*	Alaudidae	LC
34	Small pratincole	*Glareola lactea*	Glareolidae	LC
35	Great egret	*Ardea alba*	Ardeidae	LC
36	Rock pigeon	*Columba livia*	Columbidae	LC
37	Eurasian collared – dove	*Streptopelia decaocto*	Columbidae	LC
38	Eurasian coot	*Fulica atra*	Rallidae	LC
39	Northern shoveler	*Spatula clypeata*	Anatidae	LC
40	Black kite	*Milvus migrans*	Accipitridae	LC
41	Red junglefowl	*Gallus gallus*	Phasianidae	LC
42	Common kingfisher	*Alcedo atthis*	Alcedo atthis	LC
43	Commen sandpiper	*Actitis hypoleucos*	Scolopacidae	LC
44	Striated heron	*Butorides striata*	Ardeidae	LC
45	Laughine dove	*Spilopelia senegalensis*	Columbidae	LC
46	Red vented bulbul	*Pycnonotus cafer*	Pycnonotidae	LC
47	Black winked kite	*Elanus caeruleus*	Accipitridae	LC

48	Common tailorbire	*Orthotomus sutorius*	Cisticolidae	LC
49	Indian pond -heron	*Ardeola grayii*	Ardeidae	LC
50	Greater racket tailed drongo	*Dicrurus paradiseus*	Dicruridae	LC
Mammals				
1	House mouse	*Mus musculus*	Muridae	LC
2	Indian hare	*Lepus nigricollis*	Leporidae	LC
3	Jungle cat	*Felis chaus*	Felidae	LC
4	Cow	*Bos taurus*	Bovidae	NA
5	Goat	*Capra hircus*	Bovidae	NA
Amphibians				
1	Asian common toad	*Duttaphrynus melanostictus*	Bufonidae	LC
2	Chunam tree frog	*Polypedates maculatus*	Rhacophoridae	LC
3	Common skittering frog	*Euphlycits cyanophlyctis*	Dicroglossidae	LC

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

3.5.3 Agriculture & Horticulture in Krishnagiri district

Krishnagiri district is one of the potential districts for cultivation of agricultural and horticultural crops. Total cultivated area of 224767 Hectares, out of which 180902 Ha Net cultivated area against the 5,14,325 Ha. of total geographical area. The total normal area cultivated under all crops is 224767 Hectares out of which 73046 Ha is under irrigated and 151720 ha area under rained crops. The major agricultural crops in the district are grown Paddy, Ragi, Redgram, Cowpea, Maize, Cumbu, Groundnut, Horsegram and minor millets. The major cultivated area of agricultural crops occupied by rained agriculture. The total number of 2,81,733 famers engaged in agriculture out of which 213023 are Marginal farmers (76%), 45970 are small farmers (16%), remaining 4615 farmers (8%) are medium and large farmers. Details of major field crops and horticulture within 1 km radius are given below.

Major Agricultural Crops

Major horticulture crops cultivated in this district are fruit crops like mango, banana, Sapota and guava, vegetables like tomato, brinjal, chillies, onion and turmeric. Details of major field crops and horticulture in 1km radius is given in Table. 3.30. Agricultural land in the study area.

Table 3.30 Major Crops in 1km radius

S. No	Major crops	Scientific name	Families
1	Sorghum	*Sorghum bicolor*	Poaceae
2	Gingelly	*Sesamum indicum*	Pedaliaceae
3	Groundnut	*Arachis hypogaea*	Legumes
4	Sugarcane	*Saccharum officinarum*	Poaceae
5	Millets	*Panicum miliaceum L*	Poaceae
6	Sesame	*Sesamum indicum*	Pedaliaceae

Major Horticulture Crops

Horticulture includes cultivation of fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. It also includes plant conservation, landscape restoration, landscape and garden design.

Horticulture

Major horticulture crops cultivated in this district are fruit crops like mango, banana, Sapota and guava, flowers like Rose & Jathi Malli, Samanthi poo, Jasmine, vegetables like tomato, brinjal, Veandai, chillies, onion and tapioca, spices like turmeric. Details of major field crops and horticulture cultivation in 1km radius is given in Table 3.31.

Table 3.31 Major Field Crops & Horticulture cultivation in 1km radius.

S. No	Common Name	Scientific Name	Family
Major Horticultural Crops			
1	Banana	*Musa*	Musaceae
2	Mango	*Mangifera indica*	Anacardiaceae
4	Guava	*Psidium guajava*	Myrtaceae
5	Sapota	*Manilkara zapota*	Sapotaceae
6	Lemon	*Citrus × limon*	Rutaceae
7	Papaya	*Carica papaya*	Caricaceae
Vegetables			
8	Onion	*Allium cepa*	Amaryllidaceae
9	Tapioca	*Manihot esculenta*	Spurges
10	Brinjal	*Solanum melongena*	Nightshade
11	Tomato	*Solanum lycopersicum*	Nightshade
12	Bottle Gourd	*Lagenaria siceraria*	Cucurbits
13	Veandai kai	*Abelmoschus esculentus*	Mallows
14	Moringa	*Moringa oleifera*	Moringaceae
15	Mullangi	*Raphanus sativus*	Brassicaceae
Flowers			
18	Jasmine	*Jasminum*	Jasminaceae
20	Samanthi poo	*Crysanthimum*	Asteraceae
21	Rose & Jathi	*Rosa*	Rosaceae
22	Tuberose	*Polianthes tuberosa*	Asparagus
Spices and Condiments			
23	Chillies	*Capsicum frutescens*	Solanaceae
24	Turmeric	*Curcuma longa*	Zingiberaceae
25	Tamarind	*Tamarindus indica*	Legumes
26	Curry leaf	*Murraya koenigii*	Rutaceae

Results

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

3.6 SOCIO ECONOMIC ENVIRONMENT

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

3.6.1 Objectives of the Study

The main objectives of the study are as follows:

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

3.6.2 Scope of Work

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

3.6.3 Socio-Economic Status of Study area

The study area covers 5 villages including Bilalam, Hanumanthapuram, Kolatti, Santhanapalli. Irudukottai is the village in which the proposed project site is located, the summary of population facts for the village is exclusively provided in Table 3.32 and for other 4 villages in Tables 3.32 - 3.35

Table 3.32 Irudukottai, Village Population Facts

Irudukottai Village	
Number of Households	1190
Population	5563
Male Population	2914
Female Population	2649
Children Population	685
Sex-ratio	909
Literacy	54.04%
Male Literacy	61.34%
Female Literacy	45.96%
Scheduled Tribes (ST) %	29
Scheduled Caste (SC) %	821
Total Workers	2862
Main Worker	2242
Marginal Worker	620

Table 3.33 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**
Bilalam	154	774	414	360	256	174	82	518	240	278
Hanumanthapuram	1125	5241	2712	2529	2667	1578	1089	2574	1134	1440
Kolatti	500	2223	1118	1105	1238	698	540	985	420	565
Santhanapalli	1433	6545	3417	3128	3400	1974	1426	3145	1443	1702

Table 3.34 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
Bilalam	0	0	0	1	2	2	2	2	1	2	2	1	1	1	1
Hanumanthapuram	0	0	1	1	1	2	2	1	1	2	2	1	1	1	1
Kolatti	0	0	0	1	2	1	1	1	1	2	2	1	1	1	1
Santhanapalli	0	0	0	1	2	2	1	1	1	2	2	1	1	1	1

Table 3.35 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
Bilalam	423	223	200	333	173	160	184	15	123	351
Hanumanthapuram	2983	1653	1330	2694	1497	1197	1011	1367	299	2258
Kolatti	1035	721	314	960	687	273	713	18	214	1188
Santhanapalli	3697	2158	1539	3330	2032	1298	1426	1340	528	2848

3.6.4 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.
- Based on 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. Therefore, that special attention can be given to these groups with special provisions while making action plans.

3.6.5 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 Black Granite is proposed to be transported mainly through Village Rode and Denkanikottai to Kundhukottai village road as shown in Table 3.36-3.39 and in Figure 3.27.and 500-meter radius residential map shown in Figure 3.27. 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 3.36 Traffic Survey Locations

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Village Rode	0.14 Km N	Village Road
TS2	Denkanikottai to Kundhukottai	1.64 km SW	Denkanikottai to Kundhukottai

Source: On-site monitoring by GTMS FAE & TM

Table 3.37 Existing Traffic Volume

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	15	45	19	19	32	16	110
TS2	47	141	53	53	67	34	228

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 3.38 Black Granite and Granite waste Transportation Requirement

Transportation of Black Granite per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
15 tonnes	4	12

Source: Approved Mining Plan

Table 3.39 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	110	12	122	1200
Denkanikottai to Kundhukottai	228	12	240	1500

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

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

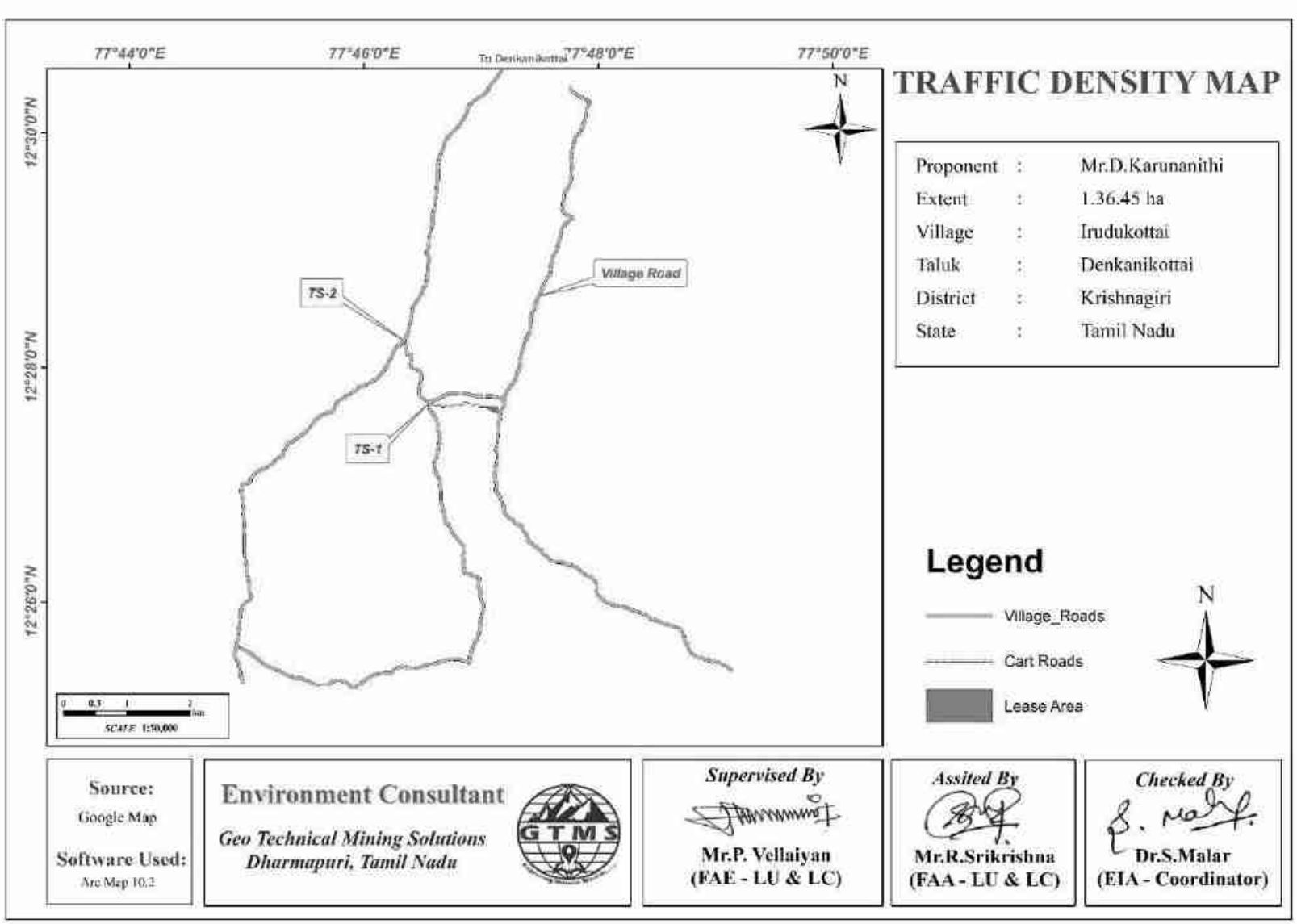


Figure 3.27 Traffic Density Map

3.8 SITE SPECIFIC FEATURES

The Details of environmental sensitivity zone, reserve forest, wild life sanctuary and water bodies around the proposed mining lease area are given in Table 3.40.

Table 3.40 Details of Environmentally Sensitive Ecological Features in the Study Area

S. No	Sensitive Ecological Features	Name	Areal Distance in km from cluster
1	National Park / Wild life Sanctuaries	Cauvery north wild life sanctuary	5.3km SE
2	Reserve Forest	Noganur R.F	0.44km – NW
		Denkanikotta R.F	7.02km – NE
		Kolatti R.F	4.93km – SE
		Aiyur Extn I	7.49km – E
		Panai R.F	6.44km – SW
		Jawalagiri R.F	13.14km – W
		Udedurgam R.F	9.41km – NE
		Manchi R.F	10.06km – S
		Aiyur R.F	9.31km – SE
		NS Agraharam	10.67km SE
3	Lake's/Reservoirs/ Dams/Streams/Rivers	Duglipuram lake	0.12km NE
		Karandapalli lake	2.87km W
		Namrelli lake	6.61km SE
		River	13.37km NE
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	None	Nil within 10 km radius
9	Industries/ Thermal Power Plants	None	Nil within 10 km radius
10	Defence Installation	None	Nil within 10km radius

Source: Survey of India Toposheet.

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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. This chapter discusses the anticipated impacts on soil, land, water, air, noise, biological, and socioeconomic environments.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

- Permanent change on land use and land cover.
- Change in topography of the mine lease area.
- 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 agricultural fields during the rainy season
- Increase in agricultural productivity of land when mine water is discharged to the surrounding lands for irrigation.

4.1.2 Common Mitigation Measures from Proposed Project

- 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
- 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 and 10m 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

4.2.1 Anticipated Impact on Soil Environment

- Deterioration of soil quality in the surrounding area due to runoff from the project area
- Decrease in the agricultural productivity of the surrounding land due to soil quality degradation
- Top soil will be removed in this project.

4.2.2 Common Mitigation Measures from proposed project

- Construction of garland drains, settling pits, and check dams to prevent runoff and siltation
- 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 the settling tanks to reduce suspended sediment loads before runoff is discharged from the quarry site.
- Retain existing or re-plant the vegetation will be retained 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

4.3.1 Anticipated Impact

- Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- As the proposed project acquires 3.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

4.3.2 Common Mitigation Measures for the Proposed Project

- Rain water from mine pit will be treated in settling tanks before being used for dust suppression and tree plantation purposes
- Domestic sewage from site office will be discharged in septic tank and then directed to soak pits
- Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage

- ❖ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- ❖ Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program

4.4 AIR ENVIRONMENT

4.4.1 Anticipated Impact from proposed project

- ❖ During mining at various stages of activities such as excavation 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.

4.4.1.1 Emission Estimation

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

Table 4.1 Empirical Formula for Emission Rate from Overall Mine

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

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. 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_{10} and PM2.5 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	$PM_{2.5}$	1.155597321	13645	8.46902E-05
Overall Mine	PM_{10}	0.173339598	13645	1.27035E-05

4.4.1.2 Modelling of Incremental Concentration

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

4.4.1.3 Model Results

The post project Resultant Concentrations of PM10, PM2.5 is given in the table shown below:

Mitigation Measures

- 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
- 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
- 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
- The un-metaled haul roads will be compacted weekly before being put into use
- 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
- Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- Dust mask will be provided to the workers and their use will be strictly monitored

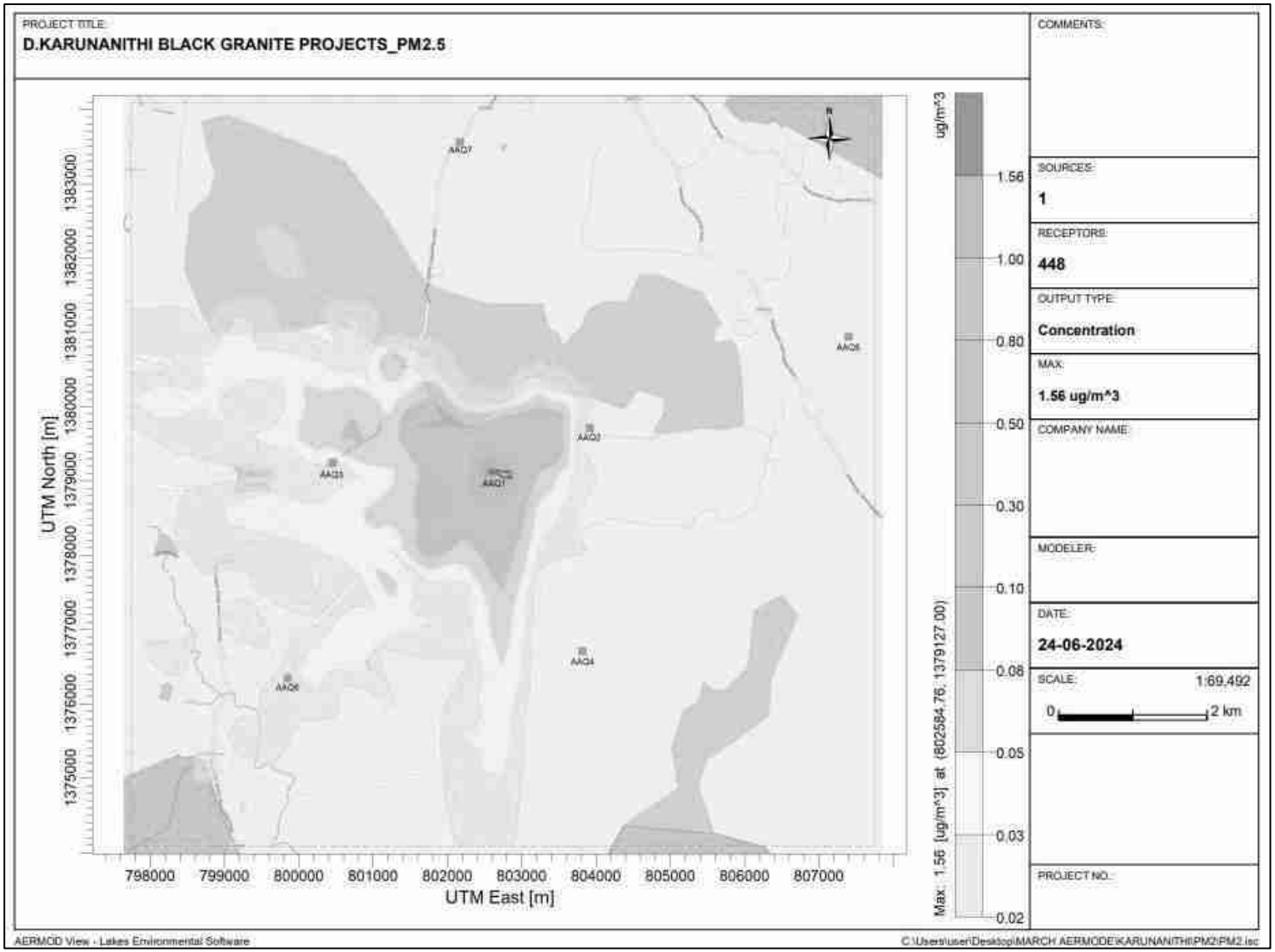


Figure 4.1 Predicted Incremental Concentration of $PM_{2.5}$

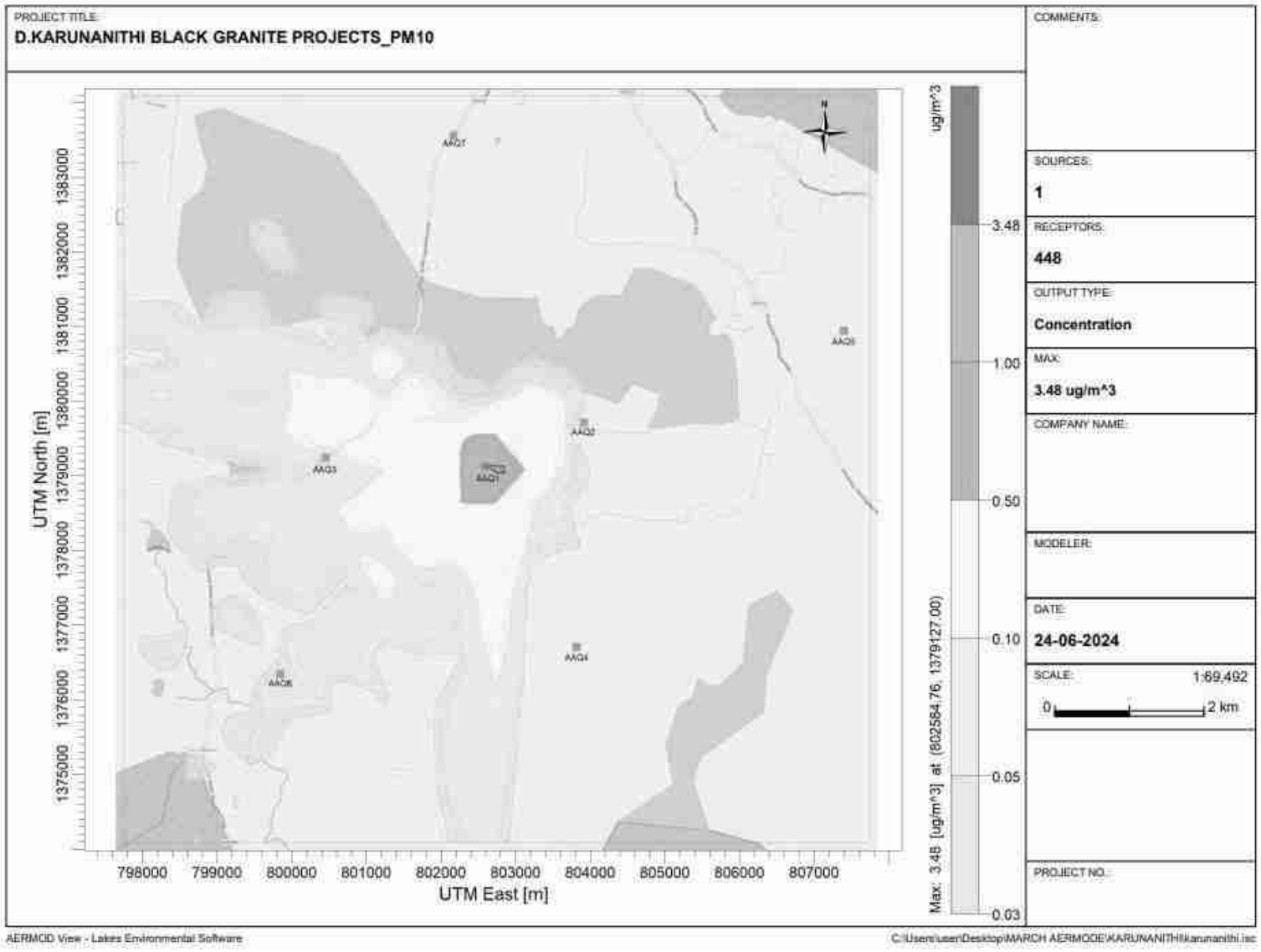


Figure 4.2 Predicted Incremental Concentration of PM_{10}

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

Station ID	Distance to core area	Direction	$PM_{2.5}$ concentrations(µg/m³)			Comparison against air quality standard	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	13.6	1.56	15.16	Below standard	11.47	Not significant
AAQ2	1.21	NE	15.7	0	15.7		0.00	
AAQ3	2.12	W	14.6	0.05	14.65		0.34	
AAQ4	2.57	SE	15.1	0	15.1		0.00	
AAQ5	4.84	NE	15.7	0	15.7		0.00	
AAQ6	3.90	SW	13.5	0.03	13.53		0.22	
AAQ7	4.43	N	14.6	0	14.6		0.00	

Table 4.4 Incremental & Resultant GLC of PM_{10}

Station ID	Distance to core area	Direction	PM_{10} concentrations(µg/m³)			Comparison against air quality standard	Magnitude of change (%)	Significance
			Baseline	Predicted	Total			
AAQ1	--	--	34.0	3.48	37.48	Below standard	10.24	Not significant
AAQ2	1.21	NE	39.3	0	39.3		0.00	
AAQ3	2.12	W	41.2	0.1	41.3		0.24	
AAQ4	2.57	SE	37.7	0	37.7		0.00	
AAQ5	4.84	NE	39.3	0	39.3		0.00	
AAQ6	3.90	SW	38.0	0.1	38.1		0.26	
AAQ7	4.43	N	41.2	0	41.2		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.

4.5 NOISE ENVIRONMENT

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.

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

4.5.1 Anticipated Impact

The attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. 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, and attenuation factor. Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.5

Table 4.5 Activity and Noise Level Produced by Machinery

S.No.	Machinery / Activity	Impact on Environment	Noise Produced in dB(A) at 50 ft from source*
1	Jack Hammer	Yes	88
2	Compressor	No	81
3	Tipper	No	84
4	Diamond wire Saw	No	79
Total Noise Produced			**90.0**

*50 feet from source = 15.24 meters

The total noise to be produced by mining activity is calculated to be 90.0 dB (A). Therefore, we have considered equipment and operation noise levels (max) to be approx. 90.0 dB (A) for noise prediction modelling. The results of noise prediction modelling are shown in Table 4.6.

Table 4.6 Predicted Noise Incremental Values

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA)m During Day Time	Predicted Noise Level(dBA)	Total(dBA)
Core	100	39.8	38.16	42.07
Giriyanapalli	1210	41.6	16.50	41.61
Karandapalli	2120	44.2	11.63	44.20

Bikkanapally	2570	39	9.96	39.01
Santhanapalli	4840	40.2	4.46	40.20
Kundhukottai	3900	41.2	6.34	41.20
Noganoor	4430	42.6	5.23	42.60
NAAQ Standards	Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A) Residential Day Time -55 dB (A) & Night Time- 45 dB (A)			

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

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
- 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

Major source of ground vibrations due to mining activities is blasting. It is an eco-friendly quarry operation no blasting is proposed diamond wire saw cutting method is adopted by the lessee. Therefore, it is not necessary to calculate peak particle velocity.

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

- 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.
- The mine lease area contains total of 17 species belonging to 13 families have been recorded from the mine lease area. 5 shrubs, 12 herbs were identified. The survival rate of uprooted trees is 30% Quarry so instead of one tree 10 saplings are bought and planted in 7.5 conservation zone.
- Carbon released from quarrying machineries and tippers during quarrying would be 35 kg per day, 9389 kg per year and 46945 kg over five years, as provided in Table 4.7.

Table 4.7 Carbon Released During Five Years of Black Granite Production

	Per day	Per year	Per five years
Fuel consumption of excavator	3	804	4020
Fuel consumption of tipper	10	2699	13497
Total fuel consumption in litters	13	3503	17517
Co_2 emission in kg	35	9389	46945

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 16358 kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 682 trees will be planted within three months from the beginning of mining. The trees which are planted in the mine lease area can sequestration 61kg of carbon per day but the carbon which is emitted is of about 35kg and these trees are enough to sequestrate the carbon.

Table 4.8 CO_2 Sequestration

	Per day	Per year	Per five years
CO_2 sequestration in kg	61	16358	81788

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 4.9-4.11. For greenbelt development, species are recommended, as shown in Table 4.9 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 4.9 Recommended Species for Greenbelt Development Plan

S. No.	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	*Azadirachta indica*	Meliaceae	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	*Polyalthialongifolia*	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 4.10 Greenbelt Development Plan

	No. of trees proposed for plantation	No. of trees expected to survive @ 80%	Area to be covered(m^2)
Plantation in the construction phase (3 months)	Number of plants inside the mine lease area		
	273	218	2456
	Number of plants outside the mine lease area		
	409	327	3684
Total	**682**	**546**	**6140**

Table 4.11 Budget for Greenbelt Development Plan

Activity	Plantation in the construction phase(3Months)	Cost	Capital Cost (Rs.)	Recuring Cost-per annum
Plantation inside the mine lease area (in safety margins)	273	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))"	54580	8187
Plantation outside the area	409	Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	122805	12281
Total			**177385**	**20468**

Source: EMP budget

Figure 4.3 Green Belt and Fencing Photos

4.6.3. Anticipated Impact on Fauna

- ❖ Direct impact is anticipated on fauna of core zone
- ❖ Insignificant impact is anticipated on fauna in the buffer area due to air emissions, noise, vibration, transportation, waste water discharges, and changes in land use

Mitigation Measures on Fauna

- ❖ Fencing will be constructed around the proposed mine lease area to restrict the entry of stray animals
- ❖ The workers shall be trained not to harm any wildlife near the project site

4.6.4. Impact on Aquatic Biodiversity

- ❖ Problems to agricultural and horticulture land due to dust caused by movement of heavy vehicles.
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season.
- ❖ The fugitive dust released from the mining operations may cause effect on the agricultural and horticulture land who are directly exposed to the fugitive dust.
- ❖ Dust from the quarries is likely to affect reproductive systems in nearby agricultural and horticulture lands.
- ❖ Dust from quarries can affect plant growth and reduce vegetable yields.

4.6.5 Mitigation Measures on agriculture and horticulture crops.

- ❖ The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- ❖ It is a Black granite quarry, no explosives are used, there is no possibility of vibration and dust, thus there is no possibility of damage to the adjacent agricultural land.
- ❖ Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled.
- ❖ A green belt will be created in 7.5m and 10m safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

4.7 SOCIO ECONOMIC ENVIRONMENT

The socio-economic impacts of mining are many. Impacts of a mine project may be positive or Negative. The adverse impacts attribute to physical displacement due to land acquisition, which is followed by loss of livelihood, mental agony, changes in social structure,

and risk to food security etc., People are also directly affected due to pollution. Social Impact Assessment (SIA) is a process of analysis, monitoring and managing the social consequences of a project. Study on Socio-economic status has already been carried out using primary socio-economic survey for generating the baseline data of Socio-economic status.

4.7.1 Anticipated Impact

From the primary Socio-economic survey & through secondary data available from established literature and census data 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area. There is no habitation within 300 m of the proposed mining lease area. Therefore, no major impact is anticipated on the nearby habitation during the entire life of the mine.

4.7.2 Mitigation Measures

- Good maintenance practices will be adopted for plant machinery and equipment, which will help to avert potential noise problems
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines
- 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 will occur during the operational phase of mining and primarily include the following:

- Respiratory hazards
- Noise
- Physical hazards
- Occupational Health Survey

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

- 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)
- 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
- 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 general physical tests, audiometric tests, full chest, X-ray, lung function tests, spiro metric tests, periodic medical examination – yearly, Lung function/ Silicosis test – yearly, those who are exposed to dust and eye test.

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

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 mineral mining projects. 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.

Objective of Mine closure

- 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 discharges 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, e.g., planning for agriculture
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not a limiting factor e.g., development of green barriers
- The Mine closure plan should be as per the approved mining plan. The mine closure is a part of approved mining plan and activities of closure shall be carried out as per the process described in mine closure plan (Annexure III).

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 II, 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

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/tippers 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 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.

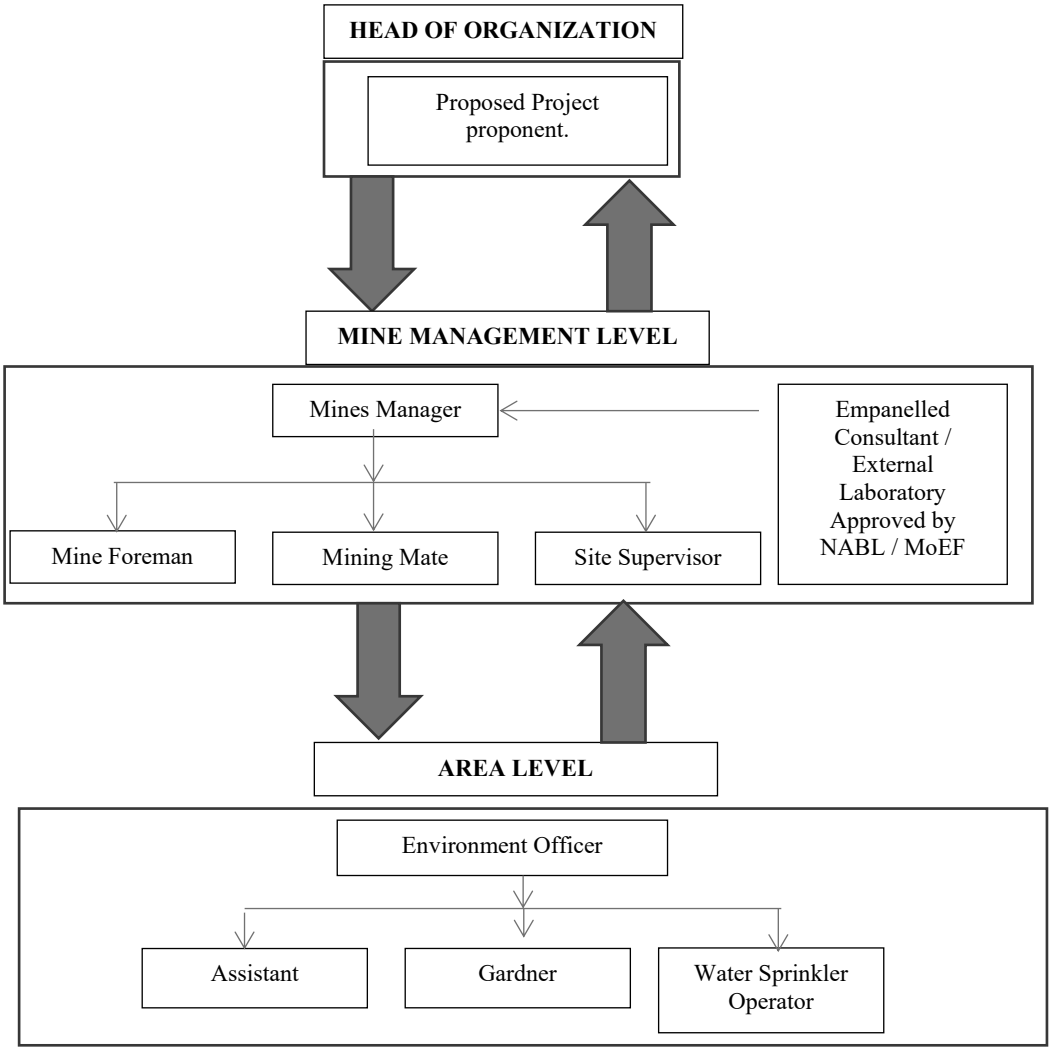


Figure 6.1 Proposed environmental monitoring chart

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 quarry 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

The following Additional Studies were done as per items identified by project proponent and items identified by regulatory authority. And items identified by public and other stakeholders will be incorporated after Public Hearing.

- Public Consultation
- Risk Assessment
- Disaster Management Plan
- Open Pit Slope Stability Analysis
- CAG Action 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; ▪ Entry of unauthorized persons will be prohibited; ▪ Firefighting 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 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 guidelines.
2	OB / Waste Dump	Sliding of benches Height and slope of the benches Drainage facilities	▪ Dumps benches are maintained with proper 3 m height and 37° slope to prevent slope failure and terraced. ▪ Dumping in the waste dump in layers and dozing daily. ▪ Vegetation of the top and slopes of the dump to prevent erosion and providing water drainage channels

			▪ Providing proper drainage facilities in mine and dump area. ▪ Construction of retaining wall around dump area to stop sliding of material. ▪ Garland drains to be made around OB dump area
3	Drilling& Wire Saw Cutting	Due to 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. ▪ Drill& Wire saw operator shall examine the drilling and wire saw equipment and satisfy himself ▪ Drilling & cutting operations 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 and wire saw equipment as per operator manual. ▪ All drills and wire saw unit shall be provided with wet drilling and cutting arrangement and it shall be maintained in efficient working in condition. ▪ Operator shall regularly use all the personal protective equipment.
4	Transportation	Potential hazards and unsafe workings contributing to accident and injuries Overloading of material While reversal	▪ Before commencing work, drivers personally check the dumper/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

		& overtaking of vehicle Operator of truck leaving his cabin when it is loaded.	▪ 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
5	Natural calamities	Unexpected happenings	▪ Escape Routes will be provided to prevent inundation of storm water ▪ Garland drains will be provided at the toe of dump ▪ Fire Extinguishers & Sand Buckets
6	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.

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 II. The area is far away from the sea. Hence, the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

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

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

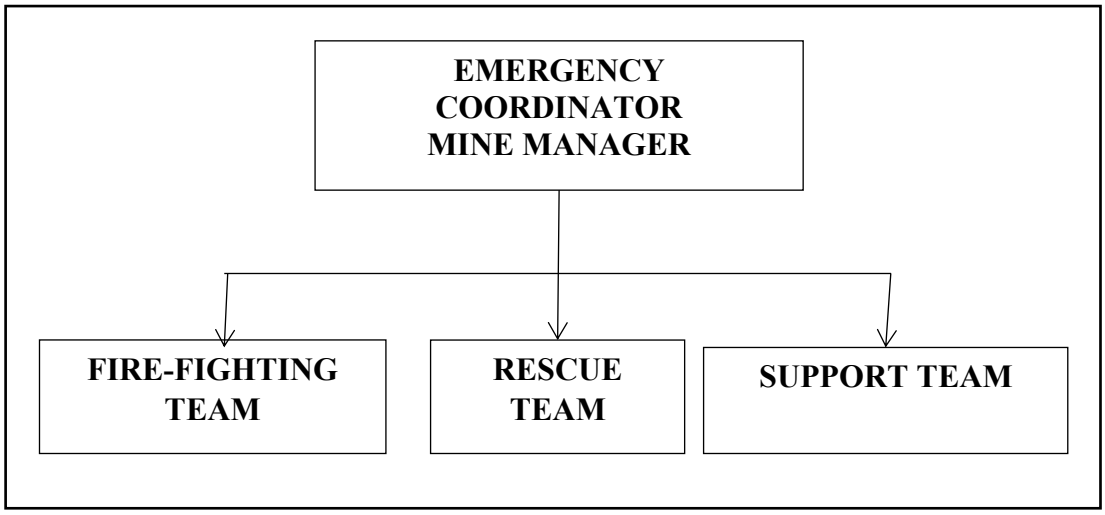


Figure 7.1 Disaster management team layout for proposed project

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.

7.3.1 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.

7.4 CUMULATIVE IMPACT STUDY

The cumulative impact on air & noise environment is mainly anticipated due to drilling, excavation, movement of HEMM and transportation activities in all the quarries (proposed and existing) within the cluster. For this cumulative study, only one proposed project, known as P1 is taken into consideration. The details of P1 have been given in Table 1.3.

7.4.1 Air Environment

Calculation of the cumulative production load of black granite from the proposed project within the cluster have been given in the Table.7.2

Table 7.2 Cumulative Production Load of Black Granite

Quarry	Black Granite @15% recovery in m^3				Granite Waste @ 85% in m^3				Weathered Rock in m^3			
	5 years in m^3	Per Year in m^3	Per Day in m^3	Lorry Load Per day	5 years in m^3	Per Year in m^3	Per Day in m^3	Lorry Load Per day	3 years in m^3	Per Year in m^3	Per Day in m^3	Lorry Load Per day
P1	4049	810	3	1	22951	4590	17	3	8568	2856	11	2
Total	**4049**	**810**	**3**	**1**	**22951**	**4590**	**17**	**3**	**8568**	**2856**	**11**	**2**

The overall production of proposed project about granite recovery is $3m^3$ per day with a capacity of 1trips per day, about granite waste is $17m^3$ per day with a capacity of 3trips and weathered rock is of $11m^3$ per day with a capacity of 2 trips per day.

7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact from the proposed project on air environment of the cluster have been provided in Table 7.3 The cumulative values resulting from the project for each pollutant do not exceed the permissible limits set by CPCB.

Table 7.3 Incremental and Resultant Ground Level Concentration from the three Quarry

Pollutants	Baseline Data(µg/m^3)	Incremental Values(µg/m^3)	Cumulative Value (µg/m^3)
		P1	
$PM_{2.5}$	13.6	1.56	15.16
PM_{10}	34.0	3.48	37.48

Source: Emission Calculations

7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling plying of trucks & HEMM. Cumulative 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 different quarries within the 500 m radius.

Table 7.4 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	1210	NE	41.60	45.78	47.18	
Cumulative Noise (dB(A))					**47.18**	

Source: Lab Monitoring Data

The cumulative analysis of noise due to the proposed project shows that habitation near P1 will receive about 47.18dB (A), as shown in Table 7.4. 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 Socio Economic Environment

Socio Economic benefits of the proposed project were calculated and the results have been shown in Table 7.5 and the proposed project together will contribute Rs.10,00,000 towards CER fund.

Table 7.5 Socio Economic Benefits from the proposed project

Location ID	Project Cost	CER Cost
P1	Rs.69,92,800	Rs. 10,00,000
Grand Total	**Rs. 69,92,800**	**Rs. 10,00,000**

Table 7.6 Employment Benefits from Quarries

Location ID	Employment
P1	22
Grand Total	**22**

A total of 22people will get direct employment due to the proposed project

7.4.4 Ecological Environment

Table 7.7 Greenbelt Development Benefits

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	682	6140	Neem, Pongamia, Teak, etc.,	546
Total	**682**	**6140**		**546**

Cumulative studies show that the proposed project will plant about 682 native tree species like Neem, Teak, etc both inside and outside the lease area. It is expected that 80 % of trees, i.e., 546 trees will survive in this green belt development program.

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 7.8.

Table 7.8Action 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

CHAPTER VIII
PROJECT BENEFITS

8.0 GENERAL

The proposed project at Irudukottai Village aims to produce **4049m^3** of black granite 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 22 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 about 17 persons in the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

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

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

8.4 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, Green fund 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 mainly contributing to education, health, training of women self-help groups and infrastructure etc., will be taken up in the Irudukottai Village. CSR budget is allocated.

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 on the basis of the extent of the project. Therefore, **Rs. 1000000** 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.1000000
	Total	**Rs.1000000**

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

8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about **Rs.2,76,01,931** to the state government through various ways, as provided in Table 8.2.

Table 8.2 Project Benefits to the State Government

Particulars	Budget (Rs.)	
	@ 15% Granite Recovery	**@ 85% Granite Wastage**
CER	10,00,000	---
Seigniorage @ Rs.5210/m^3 of Black Granite recovery & Rs.265/m^3 of Black Granite wastage	2,10,95,290	10,72,985
District Mineral Foundation Tax @ 10% of Seigniorage	21,09,529	1,07,299
Green Tax @ 10% of Seigniorage	21,09,529	1,07,299
Total	**2,63,14,348**	**12,87,583**

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, **Thiru. D.Karunanidhi, Black Granite** 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.

10.1.2 Budgetary Provision for Environmental Management

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

Table 10.1 EMP Budget for Proposed Project

Attribute	Mitigation measures	Provision for Implementation	Capital Cost (Rs.)	Recurring Cost/annum (Rs.)
Air Environment	Compaction, gradation and drainage on both sides	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare	13645	13645
	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	10000	0
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of exhaust fumes	0	2500
	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.10,000/labour (Contractual)	0	27290
	Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	50000	20000
Total Air Environment			**973645**	**193435**
Noise Environment	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.	Provision made in Operating Cost	0	0

	Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
	It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	Provision made in Operating Cost	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Blowing Whistle by Mining Mate / Blaster / Competent Person	0	0
	Provision for portable blaster shed	Installation of portable blasting shelter	0	0
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 tons of blasted material	0	0
Total Noise Environment			**0**	**0**
Water Environment	Water Management	Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum	13645	6823
Total Water Environment			**13645**	**6823**

Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal).	25000	20000
		Installation of dust bins	5000	2000
	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
Total Waste Environment			**30000**	**22000**
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed display board at the quarry entrance as permanent structure	10000	1000
Total Implementation of EC, Mining Plan			**10000**	**1000**
Occupational Health and Safety	Workers will be provided with Personal Protective Equipment	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee)	88000	22000
	Health checkup for workers will be provisioned	IME & PME Health checkup @ Rs. 1000/- per employee	0	22000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	5458
	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	272900	13645

	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	68225	13645
	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1st Class / 2nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
Total Occupational Health and Safety			**469125**	**863748**
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))"	54580	8187
		Avenue plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	122805	12281
Total Development of Green Belt			**177385**	**20468**

Mine Closure Activity	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)		46393	0
Green fund	G.O.(Ms). No.23, Dated: 28.09.2021	Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for granite waste = Rs.3133 and for granite recovery = Rs.265)	2109529	0
Total EMP Budget			**3829722**	**1107474(Exclude. Mine Closure Cost)**

Table 10.2 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 Recurring Cost**	**Total EMP Cost**
1107474	1162848	1220990	1282040	1346142	6119494	9949216

In order to implement the environmental protection measures, an amount of **Rs.3829722** as capital cost and **Rs. 1107474** 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 total recurring cost over 5 years is Rs. 6119494 and the overall EMP cost for 5 years will be Rs. 9949216, as shown in Table 10.2.

10.2 CONCLUSION

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

CHAPTER XI
SUMMARY AND CONCLUSION

11.1 INTRODUCTION

As the proposed Black granite mining project (P1) falls within the quarry cluster of 500 m radius with the total extent of 5.25.95ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. 720/3(B), 725/1(P), 725/2A, 726/B1(P) & 726/B2A over the extent of 1.36.45ha is situated in the cluster falling in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu. The quarries involved in the calculation of cluster extent are one proposed quarry and one existing quarry.

11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes from 12°27'36.97907"N to 12°27'40.50501"N Longitudes from 77°47'0.03493"E to 77°47'9.65484"E in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District and Tamil Nadu. According to the approved mining plan, about 4049m^3 of Black granite 15% recovery and Granite waste 85% of 22951m^3 will be mined up to the depth of 13m BGL in the five years. The quarrying operation is proposed to be carried out by open cast manual mining method involving drilling and formation of benches of the prescribed dimensions.

11.3 DESCRIPTION OF THE ENVIRONMENT

Baseline data were collected to evaluate the existing environmental condition in the core and buffer areas during March – May 2024 as per CPCB guidelines. The data were collected by both the FAEs and NABL accredited and MoEF notified ***Greenlink Analytical and Research Laboratory (India) Private Ltd*** for the environmental attributes including soil, water, noise, air and by FAEs for ecology and biodiversity, traffic, and socio-economy.

11.3.1 Land Environment

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

Table.11.1 LULC Statistics of the Study Area

S. No	Classification	Extent (ha)	Area (%)
1	Crop Land	4009.10	52.52
2	Dense Forest	226.94	2.97
3	Fallow land	2497.06	32.67
4	Land with or without scrub	590.93	7.74
5	Mining / Industrial lands	6.84	0.09

6	Plantations	121.01	1.59
7	Settlements	123.30	1.62
8	Water Bodies	65.71	0.86
Total		**7634.04**	**100**

11.3.2 Soil Characteristics

The soil samples in the study area show loamy textures varying between silty clay loam, silty loam and sandy loam. pH of the soil varies from 6.4 to 7.9 indicating slightly acidic to slightly alkaline nature. Electrical conductivity of the soil varies from 43.85 to 119.2 µs/cm. Potassium ranges between 1334 and 5632, Calcium ranges between 4455 and 7508 mg/kg. Organic matter content ranges between 0.07 and 0.23%.

Soil erosion

Soil erosion map shows that:

- Soil erosion is low moderate in the proposed lease area

11.3.3 Water Environment

Surface Water Resources and Quality

Duglipuram lake are the one prominent surface water resources present in the study area. These are ephemeral in nature, which convey water only after rainfall events. one surface water samples, known as SW1 were collected from the one surface water bodies to assess the baseline water quality.

Ground Water Resources and Quality

Groundwater in the study area occurs in the Study area is mainly composed of biotite hornblende genesis and grey hornblende biotite genesis. 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. Five groundwater samples, known as BW1, BW2, OW1, OW2 and OW3 were collected from open well and bore well and analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess baseline quality of ground water.

11.3.4 Air Environment

As per the monitoring data, $PM_{2.5}$ ranges from 13.8 µg/m^3 to 15.8 µg/m^3; PM_{10} from 36.4 µg/m^3 to 41.6µg/m^3; SO_2 from 2.6µg/m^3 to 4.0µg/m^3; NO_X from 7.2 µg/m^3 to 11.1 g/m^3. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

11.3.5 Noise Environment

Noise level in core zone was 39.8dB (A) Leq during day time and 33.4dB (A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 39.0 to 44.2 dB (A) Leq and during night time from 36.8 to 39.4 dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB.

11.3.6 Biological Environment

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

Flora in core zone

The mine lease area contains total of 17 species belonging to 13 families have been recorded from the mine lease area. 5 shrubs, 12 herbs were identified. It is a grassy land. There are trees in mine lease area. There are no endangered species in mine lease area

Flora in 300m radius zone

The 300m radius area is containing a total of 43 species belonging to 25 families have been recorded from the buffer zone. 15 Trees, 7 Shrubs and 21 Herbs and Climbers were identified.

Flora in 10km radius buffer zone

Similar type of environment also in buffer area but with more flora diversity compare than core zone area. It contains a total of species belonging to 39 families have been recorded from the buffer zone. The floral (80) varieties among them 31 Trees, 11 Shrubs, Herbs and Climbers, Creeper, Grass & Cactus, 38 were identified

Fauna in Core Zone

A total of 26 varieties of species observed in the Core zone of Irudukottai Village, among them numbers of Insects 10, Reptiles 3, Mammals 4 and Avian 9. A total of 26 species belonging to 18 families have been recorded from the core Zone. There is no schedule I and II species. A total of 10 species of bird were sighted in the study area

Fauna in Buffer Zone

Taxonomically a total of 82 species belonging to 49 families have been recorded from the buffer zone area. Based on habitat classification the majority of species were Birds 50, followed by insects 13, reptiles 11, mammals 5 and amphibians 3. A total of 50 species of bird

were sighted in the buffer zone. There are no critically endangered, endangered, vulnerable and endemic species were observed.

11.3.7 Socio Economic Environment

The proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of people's standard of living.

11.4 Anticipated Environmental Impacts and Mitigation Measures

11.4.1 Land Environment

Anticipated Impact

- Permanent change on land use and land cover.
- Change in topography of the mine lease area.
- 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 agricultural fields during the rainy season
- Increase in agricultural productivity of land when mine water is discharged to the surrounding lands for irrigation.

Mitigation Measures

- 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
- 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.

11.4.2 Water Environment

Anticipated Impact

- Surface and ground water resources may be contaminated due to pit water discharge, domestic sewage, discharge of oil and grease bearing waste water from washing of vehicles and machineries, and washouts from surface exposure or working areas
- As the proposed project acquires 3.0 KLD of water from water vendors, it will not extract water by developing abstraction structures in the lease area. Therefore, the project will not have impact on depletion of aquifer beneath the lease area.

Mitigation Measures

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

11.4.3 AIR ENVIRONMENT

Anticipated Impact

- 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

Mitigation Measures

- 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
- Dust mask will be provided to the workers and their use will be strictly monitored
- 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
- The un-metaled haul roads will be compacted weekly before being put into use
- 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
- Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- Dust mask will be provided to the workers and their use will be strictly monitored

11.4.4 Noise Environment

Anticipated Impact

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas.

Mitigation Measures

- Usage of sharp drill bits while drilling which will help in reducing noise;
- 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 will be developed around the project areas 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.

11.4.5 Biological Environment

Anticipated Impact

- There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region.
- The mine lease area contains total of 17 species belonging to 13 families have been recorded from the mine lease area. 5 shrubs, 12 herbs were identified. It is a grassy land. There are trees in mine lease area.The survival rate of uprooted trees is 30% Quarry so instead of one tree 10 saplings are bought and planted in 7.5 conservation zone.
- Carbon released from quarrying machineries and tippers during quarrying would be 35 kg per day, 9389 kg per year and 4020 kg over five years, as provided in Table 4.7.

Mitigation Measures

- During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 682 trees will be planted within three months from the beginning of mining. The trees which are planted in the mine lease area can sequestration 61kg of carbon per day but the carbon which is emitted is of about 35kg and these trees are enough to sequestrate the carbon, as provided in Table 4.10.

11.4.6 Socio Economic Environment

Anticipated Impact

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

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

Mitigation Measures

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

11.4.7 Occupational Health

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

11.5 Environment Monitoring Program

Table 11.2 Environment Monitoring Program

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

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

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

11.6 ADDITIONAL STUDIES

11.6.1 Risk Assessment

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

11.6.2 Disaster Management Plan

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

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

11.6.3 Cumulative Impact Study

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

- The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- PPV resulting from the proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- The proposed project will allocate Rs.10,00,000/- towards CER as recommended by SEAC
- The proposed project will directly provide jobs to 22local people, in addition to indirect jobs.
- The proposed project will plant 682 about trees in and around the lease area
- The proposed project will add 18 PCU per day to the nearby roads.

11.7 Project Benefits

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 22 local people.
- Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- Strengthening of existing community facilities through the Community Development Program.
- Skill development & capacity building like vocational training.
- Rs, 10,00,000 will be allocated for CER

11.8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.3829722** as capital cost and **Rs. 1107474** 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 total recurring cost over 5 years is Rs. 6119494 and the overall EMP cost for 5 years will be Rs. 9949216,

CHAPTER XII

DISCLOSURES OF CONSULTANT

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

Address of the consultancy:

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

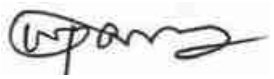
The accredited experts and associated members who were engaged in this EIA study are given below:

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

12.	Dr. R. Arunbalaji	In-house, FAE	1(a)(i)	AQ,AP,NV	B
Approved Functional Area Associates					
13.	R.Srikrishna	FAA	1(a)(i)	LU	B
14.	K.Prithivi	FAA	1(a)(i)	GEO	B
15.	K.Ravichandiran	FAA	1(a)(i)	HG	B
16.	E.Kavitha	FAA	1(a)(i)	SC,EB	B
17.	M.Arunkumar	FAA	1(a)(i)	WP,HW	B
18.	P.Moorthy	FAA	1(a)(i)	AP	B
19.	P.Dhatchayini	FAA	1(a)(i)	AQ	B
20.	V.Malavika	FAA	1(a)(i)	NV,HW	B
Team Members					
21.	G. Umamaheswaran	In-house, FAE	1(a)(i)	TM for EC	B

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP

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

Signature : 

Date :

Name : **Dr. S. Karuppannan**

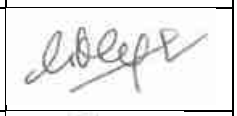
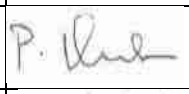
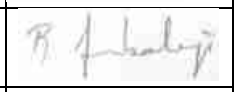
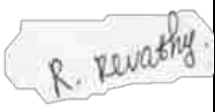
Designation : EIA Coordinator

Name of the EIA Consultant Organization : Geo Technical Mining Solutions

Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **Mr.D.Karunanithi**, black granite project with the extent of 1.36.45ha situated in the cluster with the extent of 5.25.95ha in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District and 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	
			Dr.R. Arun Balaji	
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.	R.Revathi	
3	HG	○ Interpretation of ground water table and predict impact and propose mitigation measures. ○ Analysis and description of aquifer Characteristics	Dr. M. Vijay Prabhu	
4	GEO	○ Field Survey for assessing the regional and local geology of the area. ○ Preparation of mineral and geological maps. ○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.	G.Umamaheswaran	
5	SE	○ Revision in secondary data as per Census of India, 2011. ○ Impact Assessment & Preventive Management Plan ○ Corporate Environment Responsibility.	Dr. G. Prabhakaran	
6	EB	○ Collection of Baseline data of Flora and Fauna. ○ Identification of species labelled as Rare, Endangered and threatened as per IUCN list. ○ Impact of the project on flora and fauna.	R. Elavarasan	

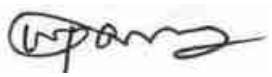
		○ Suggesting species for greenbelt development.		
7	RH	○ Identification of hazards and hazardous substances ○ Risks and consequences analysis ○ Vulnerability assessment ○ Preparation of Emergency Preparedness Plan ○ Management plan for safety.	J.N. Manikandan	
8	LU	○ Construction of Land use Map ○ Impact of project on surrounding land use ○ Suggesting post closure sustainable land use and mitigative measures.	G. Prithiviraj	
9	NV	○ Identify impacts due to noise and vibrations ○ Suggesting appropriate mitigation measures for EMP.	C. Kumaresan	
10	AQ	○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. ○ 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. 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	R.Srikrishna	LU	o Site visit with FAE o Provide inputs & Assisting FAE for LU	
	K.Prithivi	GEO	o Field visits along with FAE o Assistance to FAE in both primary and secondary data collection	
2	K.Ravichandiran	HG	o Site visit with FAE o Provide inputs & Assisting FAE for HG	
3	E.Kavitha	SC,EB	o Field visits along with FAE o Assistance to FAE in both primary data collection	
4	M.Arunkumar	WP,HW	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
5	P.Moorthy	AP	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
4	P. Dhatchayini	AQ	o Site visit with FAE o Assistance to FAE in collection of both primary and secondary data	
5	V. Malavika	NV, SHW	o Site visit along with FAE o Assistance in report preparation	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, **Dr. S. KARUPPANNAN,** Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **Mr.D.Karunanithi**, black granite quarry project with the extent of 1.36.45ha located within the cluster of 5.25.95ha in Irudukottai Village, Denkanikottai Taluk, Krishnagiri District and Tamil Nadu is true and correct to the best of my knowledge.

Signature	:	
Date	:	
Name	:	**Dr. S. Karuppannan**
Designation	:	Managing Partner
Name of the EIA Consultant Organization	:	Geo Technical Mining Solutions
NABET Certificate No & Issue Date	:	NABET/EIA/23-26/RA 0319
Validity	:	Till 31.12.2026

File No: 10853
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated **25/06/2024**

To,

DHARUMAN KARUNANIDHI
DHARUMAN KARUNANIDHI
Thiru.D.karunanithi, S/o. M.Dharman, Valasagoundanoor Village, Puliampatti Post, Pochampalli Taluk, Krishnagiri District., Puliyampatti, KRISHNAGIRI, TAMIL NADU, 635206
karunanithibgranite@gmail.com

Subject: Grant of Terms of Reference with Public Hearing under the provision of the EIA Notification 2006,as amemded-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Proposed Black Granite Quarry lease over an extent of 1.36.45Ha at SF. Nos. 720/3B, 725/1(Part), 725/2A, 726/B1 (Part) & 726/B2A of Irudukottai Village, Denkanikottai Taluk, Krishnagiri District, submitted to SEIAA-TN vide proposal number SIA/TN/MIN/469362/2024 dated 23/04/2024.

Ref:

1. Online Proposal No. SIA/TN/MIN/469362/2024, dated: 23.04.2024.
2. Your application submitted for Terms of Reference dated:06.05.2024.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B0108TN5105918N
(ii) File No.	10853
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Irudhukottai Village Black granite Mining project
(viii) Name of Company/Organization	DHARUMAN KARUNANIDHI
(ix) Location of Project (District, State)	KRISHNAGIRI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

1.In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the (SEIAA) under the provision of EIA notification 2006 and its subsequent amendments.
2.The above-mentioned proposal has been considered by (SEIAA) Appraisal Committee of SEIAA in the meeting held on 19/06/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B,] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
3.The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).
4.The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to grant Terms of Reference for instant proposal of Thiru.DHARUMAN KARUNANIDHI under the provisions of EIA Notification, 2006 and as amended thereof.
5.The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
6.The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
7.This issues with the approval of the Competent Authority.
8.The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

Copy To

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

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seac Conditions - Site Specific

S. No	Terms of Reference
1.1	1. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc. Besides, the PP shall furnish a comprehensive report on the impacts of quarrying operations on the residents in the village located at a distance of 160m and mitigation measures for the same.

S. No	Terms of Reference
	2. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.

2. Seac Standard Conditions

S. No	Terms of Reference
2.1	1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (i) Original pit dimension (ii) Quantity achieved Vs EC Approved Quantity (iii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (v) Details of illegal/illicit mining (vi) Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m. 2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site. 3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc. 4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry. 5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report. 6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site. 7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC. 8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level. 9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent. 10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground

S. No	Terms of Reference
	vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site. 11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences. 12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines, 13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? 14. Quantity of minerals mined out. ● Highest production achieved in any one year ● Detail of approved depth of mining. ● Actual depth of the mining achieved earlier. ● Name of the person already mined in that leases area. ● If EC and CTO already obtained, the copy of the same shall be submitted. ● Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches. 15. 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). 16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc., 17. 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. 18. 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. 19. 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 the 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. 20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. 21. 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. 22. 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. 23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted. 24. 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

S. No	Terms of Reference
	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. 25. 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. 26. 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. 27. 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. 28. Impact on local transport infrastructure due to the Project should be indicated. 29. 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. 30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific. 31. 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. 32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. 33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly 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 34. 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. 35. 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. 36. 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. 37. 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. 38. 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. 39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. 40. 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.

S. No	Terms of Reference
	41. 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. 42. 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 43. 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.

3. Seiaa Standard Conditipons

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

S. No	Terms of Reference
	Agriculture & Agro-Biodiversity 13. Impact on surrounding agricultural fields around the proposed mining Area. 14. Impact on soil flora & vegetation around the project site. 15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP. 16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem. 17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services. 18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock. **Forests** 19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife. 20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna. 21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection. 22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site. **Water Environment** 23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. 24. Erosion Control measures. 25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas. 26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. 27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities. 28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts. 29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components. 30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites. **Energy** **Climate Change** 32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. 33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock. **Mine Closure Plan** **EMP** 35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies

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

4. Seiaa Specific Conditipons

S. No	Terms of Reference
4.1	. After detailed discussions, the Authority accepted the recommendation of SEAC and decided to **grant of Terms of Reference (ToR) along with with Public Hearing for the quanity of 4049 m^3 of Black Granite @ 15% Recovery & 22951 m^3 of Granite waste @ 85% with a depth of mining is 13 m BGL** as per the approved mining plan,under cluster of undertaking the combined Environmental Impact Assesment Study and Preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions & the conditions mentioned in 'Annexure B' of this minutes & in addition to the following conditions: 1. The PP shall carry out the scientific studies to design the **controlled blast parameters** for reducing the blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations carried out in the quarry, by involving anyone of these reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation. 2. The PP shall carry out the scientific studies to assess the **hydrogeological condition** of the quarry by involving any one of the reputed Research and Academic Institution - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, University of Madras – Centre for Environmental Studies, and Anna University Chennai-Dept of Geology, CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation. 3. For the safety of the persons employed in the quarry, the PP shall carry out the scientific studies to assess the **slope stability** of the working benches by involving any one of the reputed

S. No	Terms of Reference
	Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. A copy of such scientific study report shall be submitted to the SEIAA, MoEF, TNPCB, AD/Mines-DGM and DMS, Chennai as a part of Environmental Compliance without any deviation.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	An EIA-EMP Report shall be prepared for peak capacity (…..MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
1.2	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of mineral production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
1.3	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
1.4	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also
1.5	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
1.6	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked,

S. No	Terms of Reference
	ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.
1.11	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.
1.12	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights S.N ML/Project Land use Area under Surface Rights(ha) Area Under Mining Rights(ha) (ha) Area under Both (ha) 1 Agricultural land 2 Forest Land 3 Grazing Land 4 Settlements 5 Others (specify) S.N. Details Area (ha) 1 Buildings 2 Infrastructure 3 Roads 4 Others (specify) Total
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna,

S. No	Terms of Reference
	or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laborartory and NABET accreditation of the consultant to be provided.
1.15	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
1.16	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
1.17	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
1.18	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
1.19	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report

S. No	Terms of Reference
	be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of mineral. The measures adopted to conserve energy or use of renewable sources shall be explored
1.27	PP to evaluate the green house emission gases from the mine operation and corresponding carbon absorption plan.
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
1.29	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, mineral handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
1.30	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
1.31	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.
1.32	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
1.33	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area

S. No	Terms of Reference
	and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
1.34	Adequate greenbelt nearby areas, mineral stock yard and transportation area of mineral shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route.
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.
1.36	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.
1.37	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.
1.38	Corporate Environment Responsibility:
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
1.41	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.
1.42	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.
1.43	e) Environment Managament Cell and its responsibilities to be clearly spleel out in EIA/ EMP report
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.
1.45	Status of any litigations/ court cases filed/pending on the project should be provided.
1.46	PP shall submit clarification from DFO that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.
1.47	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.

S. No	Terms of Reference
1.48	Details on the Forest Clearance should be given as per the format given: Total Project Area (ha) | ML Total Forest land (ha) If more than one provide details of each FC | Date of FC | Extent of Forest Land | Balance area for which FC is yet to be obtained | Status of appl For diversion of forest land
1.49	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report
1.50	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
1.51	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
1.52	Detailed Chronology of the project starting from the first lease deed alloted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
1.53	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET acrreditation) and Laboratory (NABL / MoEF & CC certification)
1.54	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.

From

Dr.P.Jayapal,M.Sc.,Ph.D.,
Deputy Director,
Dept of Geology and Mining,
Krishnagiri.

To

Thiru. D.Karunanidhi,
S/o. M.Dharman,
Valasagoundanoor Village,
Puliyampatti Post,
Pochampalli Taluk,
Krishnagiri District.

Roc.No.226/2020/Mines dated: 11.01.2024.

Sir,

Sub: Mines and Minerals – Minor Mineral – Black Granite – Krishnagiri District - Denkanikottai Taluk – Irudukottai village - Patta Lands in S.F. Nos. 720/3B (0.06.00), 725/1(P) (0.03.42), 725/2A (0.10.53), 726/B1(P) (0.42.00) and 726/B2A (0.74.50) over an extent of 1.36.45 Hect - Quarry lease granted to Thiru. D. Karunanidhi for Black granite - Mining Plan approved by the Commissioner of Geology & Mining, Krishnagiri – Applied for obtaining Environmental Clearance From SEIAA - Details of quarries situated within 500 mtrs radial distance -requested – furnished - reg.

Ref:
1. The District Collector, Krishnagiri proposal note file Rc. No. 226/2020/Mines under single file system dated 30.01.2023.
2. Mining Plan approved by the Commissioner of Geology & Mining, Krishnagiri vide letter No. 4811/MME.2/2023-1 Dated: 06.11.2023.
3. Thiru. D. Karunanidhi letter dated 20.12.2023.

-o0o-

Kind attention is invited to the references cited above.

2) A quarry lease has been granted in favour of Thiru. D. Karunanidhi for Black granite over an extent of 1.36.45 hects of patta lands in S.F. Nos. 720/3B (0.06.00), 725/1(P) (0.03.42), 725/2A (0.10.53), 726/B1(P) (0.42.00) and 726/B2A (0.74.50) over an extent of 1.36.45 Hectares in Irudukottai Village, Denkanikottai taluk, Krishnagiri District for a period of 20 years under the provisions of Rule 19(A) of Tamil Nadu Minor Mineral Concession Rules 1959.

3) The commissioner of Geology & Mining vide reference 2nd cited has accorded approval for Mining Plan in respect of the said quarry lease.

4) The applicant vide reference 3rd cited has requested the details of quarries situated within 500mts for the subject quarry for furnishing the same to SEIAA in orders to get Environmental Clearance. As requested by the applicant the details of quarries situated within 500m radius of the subject quarry lease is furnished as follows:

I. Details of Existing quarries.

Sl. No	Name of the Lessee and address	GO No & Date	Taluk & Village	S.F.No.	Extent in Hectares	Period of lease
1.	Thiru. D.Karunanidhi, S/o. M.Dharman, Valasagoundanoor Village, Puliyampatti Post, Pochampalli Taluk, Krishnagiri District.	G.O.(3D) No.29, Industries (MME.2) department dated: 01.12.2017.	Irudhukottai Village, Denkanikottai Taluk	715/3(P), 719/4(P), 721/1, 721/2A(P), 721/2B(P) & 722/1(P)	3.89.5	25.01.2018 to 24.01.2038

II. Details of abandoned/Old quarries.

Sl. No	Name of the Lessee and address	GO No & Date	Taluk & Village	S.F.No.	Extent in Hectares	Period of lease
1.	----------NIL----------					

III. Details of other Proposed/applied quarries

Sl. No	Name of the Lessee and address	GO No & Date	Taluk & Village	S.F.No.	Extent in Hectares	Period of lease
1.	Thiru. D.Karunanidhi, S/o. M.Dharman, Valasagoundanoor Village, Puliyampatti Post, Pochampalli Taluk, Krishnagiri District.	Roc.No. 226/2020/ Mines	Irudhukottai Village, Denkanikottai Taluk	720/3B, 725/1(P), 725/2A, 726/B1(P) & 726/B2A	1.36.45	Applied Area

11/01/24

Deputy Director,
Dept of Geology and Mining,
Krishnagiri.

11/1/24

Copy to :-

The Chairman, Tamil Nadu State Environment Impact Assessment Authority,
3rd Floor, Panakal Maligai,
No. 1 Jeenes Road, Saidapet, Chennai -15.

COMMISSIONERATE OF GEOLOGY AND MINING

From
Tmt. Pooja Kulkarni, I.A.S.
Commissioner,
Department of Geology and Mining,
Guindy, Chennai-32.

To
Thiru.D.Karunanidhi
S/o.Dharuman,
No.15, Valasagoundanur,
Puliyampatti Post,
Pochampalli Taluk,
Krishnagiri-635206.

Rc. No.1336/MM4/2021, dated:13.12.2023

Sir,

Sub: Mines and Minerals – Minor Mineral – Multi Colour Granite – Krishnagiri district - Denkanikottai taluk – Irudhukottai village - over an extent of 1.36.45 ha of patta lands – S.F.Nos.720/3B(0.06.00) 725/1(P)(0.03.42)725/2A(0.10.53),726/B1(P)(0.42.0)and 726/B2A(0.74.50) –Quarry lease application preferred by Thiru.D.Karunanidhi, Krishnagiri – Precise area communicated by the Government – Mining Plan submitted by Thiru.D.Karunanidhi, Krishnagiri - Recommended by the Deputy Director (G&M), Krishnagiri - Approval accorded.

Ref:
1. The Commissioner of Geology and Mining original file No. Rc.No.1336/MM4/2021 dated 27.03.2023 forwarded under single file system.
2. The Government letter No. 4811/MME.2/2023-1 dated 06.11.2023.
3. Draft Mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri dated.10.11.2023.
4. The Deputy Director of Geology and Mining, Krishnagiri letter Rc.No.226/2020 (Mines), dated 27.11.2023.

****

Kind attention is invited to the references cited above

2) A quarry lease application preferred by Thiru.D. Karunanidhi, Krishnagiri for quarrying black granite over an extent of 1.36.45 ha of patta lands in S.F.Nos.720/3B (0.06.00), 725/1(P) (0.03.42), 725/2A (0.10.53), 726/B1(P) and 726/B2A (0.74.50) of Irudhukottai village, Denkanikottai taluk, Krishnagiri district was forwarded to the Government by the

Commissioner of Geology and Mining vide reference 1st cited for grant of quarry lease under rule 19-A of TNMMCR, 1959. Now, the Government vide letter dated 06.11.2023 have communicated the precise area to an extent of 1.36.45 ha and requested the applicant to submit the approved mining plan through the Commissioner of Geology and Mining and to produce environmental clearance obtained from the competent authority for the subject area within a period of 3 months for grant of quarry lease.

3) Accordingly, the mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri has been forwarded and recommended by the Deputy Director, (G&M), Krishnagiri vide reference 4th for the subject area for approval.

4) On Scrutinizing the mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri and the report of the Deputy Director (G&M), Krishnagiri, the following are submitted.

i. The Deputy Director (G&M), Krishnagiri has reported that the draft mining plan has been prepared by the Recognized Qualified Person and the details such as geological, mineable reserves, year wise production and development program have been incorporated in the draft mining plan. The special conditions imposed by the Government in the precise area communication are incorporated in the draft mining plan.

ii. The Deputy Director (G&M), Krishnagiri has further reported that the mining plan submitted by Thiru.D. Karunanidhi has been verified with reference to field conditions by the Assistant Geologist(Mines) and Sub Inspector of Survey(Mines).

iii. The proposed year wise production:

Year	ROM (cbm)	Production Reserves In (m^3)	Production (m^3) @ 15% Recovery	Granite Waste @ 85% cbm
1st year	15225	5500	825	4675
2nd year	10054	5500	825	4675
3rd year	8105	5000	749	4251
4th year	6480	5500	825	4675
5th year	5500	5500	825	4675
Total	**45364**	**27000**	**4049**	**22951**

iv. As per the Mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri, the ROM for the mining plan period is 45364 cbm and the proposed production for the mining plan period is 4049 cbm @ 15% recovery for a depth of 13 m below the ground level.

v. As per the mining plan it has been proposed to dump on the west side of the lease boundary area.

vi. There are no archeological monuments situated within the radial distance of 300 m from the subject area and no wild life sanctuary in situated within 1 km radius which satisfies rule 36(1-A) of amended Tamil Nadu Minor Mineral Concession Rules, 1959.

vii. The Deputy Director (G&M), Krishnagiri has recommended and forwarded the mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri for quarrying Black Granite over an extent of 1.36.45 ha in S.F.Nos.720/3B (0.06.00), 725/1(P)(0.03.42), 725/2A(0.10.53), 726/B1(P)(0.42.00) and 726/B2A(0.74.50) of Irudhukottai village, Denkanikottai taluk, Krishnagiri district to the Commissioner of Geology and Mining, Chennai for approval.

5) The mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri and report of the Deputy Director (G&M), Krishnagiri have been examined with reference to the provisions of Rule 12, 13 and 15 of Granite Conservation and Development Rules, 1999 read with G.O.(Ms). No. 87, Industries (MMC.1), Department dated: 22.02.2001. Based on the recommendation of the Deputy Director (G&M), Krishnagiri the mining plan submitted by Thiru.D.Karunanidhi, Krishnagiri is hereby approved subject to the following conditions in addition to the conditions stipulated in the precise area communication issued by the Government.

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

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

iii. This mining plan including progressive mine closure plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.

iv. Provisions of the Mines Act, 1952 and the Rules and Regulations made there under including submission of notice of opening, appointment of manager and other statutory officials as required under Mines Act, 1952 shall be complied with.

v. Provisions made under Mines and Minerals (Development & Regulation) Act, 1957, MMDR Amendment Act, 2015 and Granite conservation and Development Rules, 1999 made there under shall be complied with.

vi. Relaxation to be obtained under Rule 106(2)(b) of Metalliferous Mines Regulations, 1961 from the Director of Mines Safety, if necessary.

vii. If anything is found to be concealed as required by the Granite Conservation and Development Rules, 1999 and Tamil Nadu Minor Mineral Concession Rules, 1959 and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

viii. A safety distance of 7.5 meters shall be maintained for the adjacent patta lands.

ix. A safety distance of 50 m shall be maintained for the electrical line situated 46 m away fiom the north-east corner passing in the East-west direction and 34 m away from the North-west corner of the applied area in S.F.Nos. 726/B2A and 14 km away from the East side of the applied area in S.F.No.725/2A.

x. A safety distance of 10 m shall be maintained for the Government land (Pathai) in S.F.No. 847 and 860 situated on the East side of the applied area in S.F.No.726/B2A and 725/2A(P).

xi. A safety distance of 10.0 mts shall be maintained for the Government land in S.F.No. 721/3 (Podugal) situated on the south west side of the applied area in S.F.No.720/3B.

xii. No blasting and transportation of materials in vehicles should be carried out from 6.00 PM to 6.00AM.

xiii. A green belt should be constructed to prevent sound and air pollution due to the proposed quarrying activity by planting at least 250 seedlings all along the boundary the area.

xiv. No hindrance shall be caused to the adjacent Patta lands and Government poramboke lands while quarrying and transportation of granite.

xv. The applicant shall strictly adhere to the statutory and safety requirements and the applicant should ensure the periodical medical checkup to the quarry workers to safeguard them from quarry related diseases.

xvi. The waste materials generated during the course of quarrying should be dumped only within the lease hold area that will be earmarked for the purpose in the mining plan as per rule 31 of GCDR, 1999.

xvii. The applicant shall submit Scheme of Mining, mine closure plan and other statutory requirements within the time stipulated for submission of the above as per GCDR, 1999 rules.

xviii. The applicant should fence the lease granted area with barbed wire before the execution of lease deed as follows.

- The pillar post shall be firmly grounded with concrete foundation of height not less than 2 m with a distance between two pillars shall not be more than 3mts.
- The applicant shall incorporate the DGPS readings for the entire boundary pillars of the area and the same should be clearly shown in the mining plan.

- A soft copy of the digitized map with DGPS readings should be submitted in CD to the Deputy Director (G&M), Krishnagiri.

xix. The boundary stone should be fixed for the subject quarry should be fixed and the district administration / Geology and Mining Department should ensure that the quarrying operation should be restricted only within the area granted for lease.

xx. Environment Clearance should be obtained from the competent authority in respect of the subject area as per rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.

xxi. As per rule 12 (v) of Mineral (other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016, the applicant shall at his own expense, erect, maintain and keep in repair all boundary pillars.

xxii. The conditions mentioned in G.O No. 79 Industries Department dated 06.04.2015 should be complied with.

xxiii. The applicant may use mild explosives during quarrying, and storing of explosives if required, by obtaining valid license under explosive Acts and Rules.

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

xxv. Child labour should not be engaged in the quarry works and the quarry workers should be registered in the Tamil Nadu Construction Labour Welfare Board.

xxvi. The applicant should remit the Stamp Duty as per the approved modified mining plan during the currency of the lease period.

xxvii. The earlier instances of irregular / illegal quarrying, if any, shall not be regularized through the approval of this document.

xxviii. The applicant shall remit the penalty / cost of mineral / other dues if any as arrived by the District Collector / Deputy Director (G&M), Krishnagiri district.

xxix. Non adherence to any condition set-out above, the approval shall be deemed to have been withdrawn with immediate effect.

xxx. The applicant should comply with the additional conditions stipulated in the Government of India, Ministry of Mines, Order No.11/02/2020, dated.14.01.2020 issued as per the Order of the Hon'ble Supreme Court of India, dated.08.01.2020 states that, "The Mining lease holders shall after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc".

xxxi. The applicant should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019 dated.01.02.2018 and subsequent corrigendum dated 13.08.2019, using the agencies empaneled by the CGM on 01.03.2023, 08.03.2023, 17.03.2023 and 18.03.2023.

Encl: 5 Copies of Approved
Mining Plan.

Sd/- Pooja Kulkarni
Commissioner of Geology and Mining

Forwarded / by Order

13/12/23

Additional Director

13/12/2023

Copy to:

1. The Additional Chief Secretary
to Government,(FAC)
Natural Resources Department,
4th Floor, Secretariat, Chennai-9.

2. The Director of Mines Safety,
3rd Floor, Left Wing,
New Additional Building,
CGO Complex, Shastri Bhawan,
Nungambakkam, Chennai – 06

3. The District Collector,
Krishnagiri District.

MINING PLAN

FOR IRUDHUKOTTAI VILLAGE BLACK GRANITE QUARRY MINING LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta- Ryotwari land/Opencast, Semi-Mechanized mining/Non - Coast/ Non-captive use 'B2' Category

Lease period 20 Years ***from the date of lease execution***

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

(Prepared under rule 12 & 13 of Granite Conservation and Development Rules, 1999)

LOCATION OF THE LEASE AREA

STATE	:	TAMILNADU
DISTRICT	:	KRISHNAGIRI
TALUK	:	DENKANIKOTTAI
VILLAGE	:	IRUDHUKOTTAI
S.F. NO'S	:	720/3B, 725/1(Part), 725/2A, 726/B1 (Part) & 726/B2A
EXTENT	:	1.36.45 HECTARES

ADDRESS OF THE APPLICANTS

Thiru.D.Karunanidhi,
S/o.Dharuman,
No.15, Valasagoundanur,
Puliyampatti Post, Pochampalli Taluk,
Krishnagiri - 635206.

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. Tamil Nadu.
Mob. : +91 9443937841, +917010076633,
E-mail: info.gtmsdpi@gmail.com ,
Website: www.gtmsind.com

CONTENTS

ANNEXURES

Sl. No.	Description	Annexure No.
1.	Copy of The Additional Chief Secretary to Government of Tamil Nadu communication letter	I
2.	Copy of **FMB** (Field Measurement book)	II
3.	Copy of village map	III
4.	Copy of A-Register	IV
5.	Copy of Chitta	V
6.	Photocopy of the lease area	VI
7.	Copy of ID Proof of the authorized signature	VII
8.	Copy of RQP Certificate	VIII

LIST OF PLATES

Sl. No.	Description	Plate No.	Scale
1	Route Map	I	Not to scale
2	Location Plan	I-A	Not to scale
3	Topo Map	I-B	1:1,00,000
4.	Satellite image for 1km radius	I-C	1: 10,000
5	Environmental and land use plan for 1km radius	I-D	1: 10,000
6	Lease plan	II	1:1000
7	Surface plan	III	1:1000
8	Geological plan and Sections	IV	1:1000 **Section** HOR 1:1000 VER 1:500
9	Year wise Development, Production plan and Sections	V	1:1000 **Section** HOR 1:1000 VER 1:500
10	Quarry layout & Afforestation Plan	VI	1:1000
11	Progressive mine closure plan & Sections	VII	1:1000 **Section** HOR 1:1000 VER 1:500
12	Conceptual plan and Sections	VIII	1:1000 **Section** HOR 1:1000 VER 1:500

Thiru.D.Karunanidhi,
S/o.Dharuman,
No.15, Valasagoundanur,
Puliyampatti Post, Pochampalli Taluk,
Krishnagiri - 635206.

CONSENT LETTER FROM THE LESSEE

The Mining Plan in respect of Black granite quarry lease in S.F.No : 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45hectares of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State has been prepared by

Dr. S. KARUPPANNAN. M.Sc., Ph.D. Regn. No. RQP/MAS/263/2014/A
(Under rule 13 (1) of Granite Conservation and Development Rules, 1999)

I request **"The Commissioner, Department of Geology and Mining, Guindy, Chennai-600032"** 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, 7010076633,
E-mail: info.gtmsdpi@gmail.com,
Website: www.gtmsind.com

I hereby undertake that all modifications so made in the mining plan by the 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: Krishnagiri, TN

Date:

Signature of the applicant
(D.Karunanidhi)

Thiru.D.Karunanidhi,
S/o.Dharuman,
No.15, Valasagoundanur,
Puliyampatti Post, Pochampalli Taluk,
Krishnagiri - 635206.

DECLARATION

The Mining Plan in respect of Black granite quarry lease in S.F.No : 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45hectares of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State have been prepared with my consultation and I have understood and agree the contents to implement in accordance with the Granite Conservation & Development Rules, 1999.

Place: Krishnagiri, TN

Date:

Signature of the applicant
(D.Karunanidhi)

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(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 of under rule ***12 & 13 of Granite Conservation and Development Rules, 1999*** have been observed in the Mining plan for Black granite quarry lease in S.F.No: 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45 hectares of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State prepared to **Thiru.D.Karunanidhi,** Krishnagiri.

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: 9/11/23

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,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705, Tamil Nadu, India.

Dr.S.KARUPPANNAN,M.Sc.,Ph.D.
RQP/MAS/263/2014/A
GEO TECHNICAL MINING SOLUTIONS
(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

COMMISSIONER OF GEOLOGY AND MINING

CERTIFICATE

I certify that, in preparation of Mining plan in respect of Black granite quarry lease in S.F.No : 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45hectares of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State prepared to **Thiru.D.Karunanidhi,** Krishnagiri, Covers all the provisions of Mines Act, Rules, and Regulations etc made therein and if any specific permissions required the applicant should approach **"The Director General of Mines and Safety", Chennai**. The standards prescribed by DGMS with respect to mines health will be strictly implemented.

Place: Dharmapuri, TN
Date: 9/11/23

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,
Collectorate Post Office, Oddapatti,
Dharmapuri-636705,Tamil Nadu, India.

MINING PLAN

FOR IRUDHUKOTTAI VILLAGE BLACK GRANITE MINING LEASE WITH PROGRESSIVE QUARRY CLOSURE PLAN

Patta- Ryotwari land /Opencast-Semi Mechanized Mining/Non-Forest/Non-Captive Use
"B2" Category

Lease Period 20 Years *from the date of lease execution*

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

(Prepared under rule 12 & 13 of Granite Conservation and Development Rules, 1999)

INTRODUCTORY NOTES:

a) **Introduction:** The Mining plan with progressive quarry closure plan is prepared for **Thiru.D.Karunanidhi** S/o.Dharuman residing at No.15, Valasagoundanur, Puliyampatti Post, Pochampalli Taluk, Krishnagiri – 635206 and filed with application for new proposal has requested to grant the quarrying lease for Black granite in S.F.No's. 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45hectares of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State to the District Collector, Krishnagiri dated 30.01.2023 and forwarded to the Director, Department of Geology and Mining, Guindy, Chennai vide letter no.1336/MM4/2023, Dated 27.03.2023.

b) **Letter of Principal Secretary of Tamil Nadu:** The Additional Chief Secretary to Government of TamilNadu has directed to the applicant Thiru.D.Karunanidhi, through his precise area communication letter **Rc.No. 4811/MME.2/2023-1, Dated 06.11.2023,** to furnish approved mining plan through the Commissioner of Geology and Mining within a period of 3 months as per sub-rule (13) of rule 19-A of the **T**amilNadu **M**inor **M**ineral **C**oncession Rules, 1959 and to produce Environmental Clearance obtained from competent authority for the quarrying lease black granite at Tamil Nadu State, Krishnagiri District, Denkanikottai Taluk, Irudhukottai Village in S.F.No's. 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) over an extent of 1.36.45hectares has grant of quarrying lease for 20 (Twenty) years under rule 19-A of Tamil Nadu Minor Mineral Concession Rules, 1959, subject to the following conditions: -

1) A safety distance of 7.5m shall be maintained for the adjacent patta lands.

2) A safety distance of 50m shall be maintained for the electrical line passing East-west situated 46m away from the north-east corner and 34m away from the North-west corner of the applied area in S.F.No.726/B2A and 14km away from the East side of the applied area in S.F.No.725/2A.
3) A safety distance of 10m shall be maintained for the Government land (pathai) in S.F.No.847 and 860 situated on the East side of the applied area in S.F.No.726/B2A and 725/2A(P).
4) A safety distance of 10.0 mts shall be maintained for the Government land in S.F.No.721/3 (Podugal) situated on the southwest side of the applied area in S.F.No.720/3B.
5) The quarrying operation should be restricted only in the area granted on lease.
6) Barbed wire fencing or compound wall should be erected all along the boundary of the lease granted area and the boundary pillars should be erected as per DGPS norms.
7) The waste materials generated during the course of quarrying should be dumped only within the lease hold area.
8) Environment Clearance should be obtained from the competent authority in respect of the subject area as per Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.
9) The applicant shall at his own expenses erect, maintain and keep in repair all the boundary pillars with DGPS readings.
10) No encroachment shall be made in the adjacent Government lands.
11) As per the Hon'ble Supreme court of India order dated 08.01.2020 in W.P.(C) No.144/2014 after ceasing quarrying operation re-grassing the quarry area and any other area which may have been disturbed due to the quarrying activity and restore the land to a condition which is fit for growth of fooder, flora, fauna etc.,
12) Quarrying activity should be carried out from 6.00 A.M to 6.00 P.M only.
13) A green belt should be constructed all along the boundary of the area to prevent sound and air pollution due to the proposed quarrying activity over an extent of 1.36.45 hectares in S.F.No.720/3B (0.06.0), 725/1(P) (0.03.42), 725/2A (0.10.53), 726/B1(P) (0.42.0) and 726/B2A (0.74.50) of Irudhukottai village, Denkanikottai Taluk, Krishnagiri District by planting at least 500 seedlings of Neem and Pungan all around the area.
14) In order to prevent illicit quarrying, when quarried material is transported necessary permits had been produced before the forest check post officials and necessary entries should be made in the register.

15) The district administration and Geology and Mining department should ensure the conditions imposed in G.O.(Ms)No.79, Industries (MMC.1) department dated 06.04.2015.

16) Since the proposed area is situated 610m away from the Noganoor Reserve Forest, no forest violation should be carried out while quarrying.

17) The quarrying should be carried out without violation to the forest protection and wild life protection rules.

18) The applicant should fence the lease granted area with barbed wire before the execution of lease deed as follows:-

- The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
- The applicant shall incorporate the DGPS readings for the entire boundary pillars of the area and the same should be clearly shown in the mining plan.
- A soft copy of the digitized map with DGPS readings should be submitted in CD to the Deputy Director, Krishnagiri.

19) No damages should be cost to the forest area and wild life while black granite quarrying is carried out over extent of 1.36.45 hectares.

20) No pollution should be caused to the water bodies situated near the applied area.

21) The applicant should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019, dated 01.02.2018 and subsequent corrigendum dated 13.08.2019 before execution of quarry lease through the empanelled agencies.

22) If any elephant to the wild life movement is observed, the blasting and quarrying work shall be stopped and the same shall be re-started only after return of the wild animals from the area.

23) The District Collector, Krishnagiri shall obtain a Sworn-in-affidavit from the applicant/firm containing the above conditions before execution of lease deed and also ensure that the instructions issued in Government letter No.12789/MMB.2/2002-7, Industries Department, dated 09.01.2003 are complied with. Further, the District Administration /Geology and mining Department should ensure that the conditions imposed in G.O.(Ms) No.79, Industries (MMC.1) Department, dated 06.04.2015 and G.O.(Ms) No.295, Industries (MMC-1) Department, dated: 03.11.2021 are complied.

c) **Preparation and submission of mining plan:** The Mining Plan with progressive quarry closure plan is prepared under rule 12 & 13 of Granite Conservation and

Development Rules, 1999 and the conditions mentioned in the The Additional Chief Secretary of Tamil Nadu letter No. **4811/MME.2/2023-1, Dated 06.11.2023.**

d) **Geological resources and Mineable reserves:** Geological resource of total reserve is estimated to be **196240m³** including the resources of safety zone. Of which, Black granite is about **29431m³** at the recovery of 15% and granite rejects are **166809m³** at the recovery of 85% (Refer Plate No's. IV). The mineable reserve is estimated to be **107430m³** by deducting the reserve safety zone, block in benches from the total Geological resources. Of which, Black granite is about **16114m³** at the recovery of 15% and granite rejects are **91317m³** upto a depth of 28m below the ground level. (Refer Plate No's. VIII).

e) **Proposed production schedule:** Total proposed production of Black granite is about **27000m³.** Of which, Black granite is about **4049m³** at the recovery of 15% and granite rejects are **22951m³** at the recovery of 85% up to a depth of 13m below the ground level for first five years mining plan period. Average production is **810m³** of Black granite per year (Refer Plate No. V).

f) **Environmental sensitivity of the lease area: -**

1. **Interstate Boundary:** No interstate boundary around 10Km radius periphery of proposed lease area.
2. **Wildlife Protection Act, 1972:** There is Cauvery North wild life sanctuary is situated about 5.3Km away from the southern side.
3. **Indian Reserve Forest Act, 1980:** There is no reserved forest within the 60m radius from the lease area. The nearest reserved forest is Noganoor R.F is situated 610m away from the proposed area.
4. **CRZ Notification, 2011:** There is no Sea coastal zone found around 10km radius and this project site doesn't attract CRZ Notification, 2011.

1.0 GENERAL:

a.	Name of the Applicant		**Thiru.D.Karunanidhi**
	Applicant address	:	S/o.Dharuman, No.15, Valasagoundanur, Puliyampatti Post, Pochampalli Taluk,
	District	:	Krishnagiri
	State	:	Tamil Nadu
	Pin code	:	635206
	Phone	:	--
	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	:	Black granite quarry lease
d.	Period for which the mining lease granted /renewed/ proposed to be applied	:	Mining lease granted for the period of 20 (Twenty) years under rule 19-A of Tamil Nadu Minor Mineral Concession Rules, 1959
e.	Name of the RQP preparing the Mining Plan	:	Dr. S.KARUPPANNAN, M.Sc.,Ph.D.
	Address	:	**GEO TECHNICAL MINING SOLUTIONS** 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	:	Nil
	Registration Number	:	RQP/MAS/263/2014/A
	Date of grant/renewal	:	16.12.2014
	Valid upto	:	15.12.2024
f.	Name of the prospecting agency	:	The Commissioner, Department of Geology and Mining
	Address	:	Thiru.Ve.Ka.Industrial Estate,Guindy, Chennai-600032
	Phone	:	----
g.	Reference No. and date of consent letter from the State government	:	The Additional Chief Secretary to Government, Government of Tamilnadu, Letter.No. **4811/ MME.2/2023-1, Dated 06.11.2023**

2.0 LOCATION AND ACCESSIBILITY:

a.	Details of the Area:	:	Refer plate no: IA & IB
	District & State	:	Krishnagiri, Tamil Nadu

Taluk	:	Denkanikottai
Village	:	Irudhukottai

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

Survey No.	Sub division	Total Extent in Hect	Patta No	Name of the Land Owner	Mine lease Applied S.F. No.	Mine lease Applied Area out of total area in hect.
720	3B	0.06.0	8465	Mr.D.Karunanidhi S/o. Dharuman	720/3B	0.06.0
725	1	0.07.0	2103		725/1 (Part)	0.03.42
725	2A	0.10.53	2120		725/2A	0.10.53
726	B1	0.77.0			726/B1 (Part)	0.42.0
726	B2A	0.74.5			726/B2A	0.74.5
Total Extent		**1.75.03**		**Total lease area extent**		**1.36.45**

Lease area (hectares)	:	1.36.45 hectares
Whether the area is recorded to be in forest (please specify whether protected, reserved, etc)	:	The proposed lease area is recorded as patta land. (Ref. Anne. No: V)
Ownership / Occupancy	:	This is a patta land S.F.No. 720/3B, 725/1 (Part), 725/2A, 726/B1 (Part) and 726/B2A is registered on the name of Mr.D.Karunanidhi S/o. Dharuman as (Ref. Annex. No:V).
Existence of Public Road / Railway line if any nearby and approximate distance	:	✓ Exploited Black granite materials will be transported to through the approach road is situated on the Southeast side. ✓ MDR-588 road situated about 1.59km radius away from the western side which is connecting Karandapalli – Noganoor. ✓ There is no SH road situated within the radius of 5km. ✓ There is no NH road situated within the radius of 5km. ✓ No Railway line situated within the

		radius of 5km.
Toposheet No. with latitude and longitude	:	Toposheet No. **57 H/15** Latitude : From 12°27'36.97907"N To 12°27'40.50501"N longitude: From 77°47'0.03493"E to 77°47'9.65484"E

Geo-Coordinates of the lease boundary:

DGPS SURVEY WAS CONDUTED IN STATIC METHOD (BASE POINT 2 HOUR DGPS POINT)					
ID	**Latitude (Global)**	**Longitude (Global)**	**Easting (Meter)**	**Northing (Meter)**	**Feature Code**
BS	12° 27' 39.79141" N	77° 47' 8.76822" E	802840.095	1379126.343	**(Base Station)**
ROVER POINTS 2 HOURS FOR BOUNDARY PILLAR AND 20 MINUTES FOR INTERMEDIATE PILLAR IN STATIC METHOD					
1	12° 27' 39.79141" N	77° 47' 8.76822" E	802840.095	1379126.343	Boundary Pillar
2	12° 27' 39.33694" N	77° 47' 8.79496" E	802841.048	1379112.376	Boundary Pillar
3	12° 27' 37.75913" N	77° 47' 8.39588" E	802829.496	1379063.732	Intermediate Pillar
4	12° 27' 37.37407" N	77° 47' 8.29833" E	802826.676	1379051.859	Boundary Pillar
5	12° 27' 37.34942" N	77° 47' 9.65484" E	802867.674	1379051.532	Boundary Pillar
6	12° 27' 36.97907" N	77° 47' 9.64369" E	802867.457	1379040.138	Boundary Pillar
7	12° 27' 37.09266" N	77° 47' 7.99325" E	802817.545	1379043.108	Intermediate Pillar
8	12° 27' 37.21285" N	77° 47' 6.24586" E	802764.702	1379046.249	Boundary Pillar
9	12° 27' 37.31136" N	77° 47' 5.27150" E	802735.227	1379048.969	Boundary Pillar
10	12° 27' 37.67923" N	77° 47' 5.31677"E	802736.476	1379060.297	Boundary Pillar
11	12° 27' 38.55157" N	77° 47' 3.92053" E	802694.002	1379086.677	Intermediate Pillar
12	12° 27' 39.42388" N	77° 47' 2.52423" E	802651.527	1379113.058	Intermediate Pillar
13	12° 27' 39.78677" N	77° 47' 1.94325" E	802633.851	1379124.033	Boundary Pillar
14	12° 27' 39.46937" N	77° 47' 0.32083" E	802584.927	1379113.760	Intermediate Pillar
15	12° 27' 39.41345" N	77° 47' 0.03493" E	802576.306	1379111.950	Boundary Pillar
16	12° 27' 40.18509" N	77° 47' 0.22337" E	802581.749	1379135.735	Boundary Pillar
17	12° 27' 40.4203" N	77° 47' 2.0691" E	802637.453	1379143.556	Boundary Pillar
18	12° 27' 40.1589" N	77° 47' 3.7021" E	802686.884	1379136.038	Intermediate Pillar
19	12° 27' 39.8788" N	77° 47' 5.45136" E	802739.833	1379127.978	Boundary Pillar
20	12° 27' 40.50501" N	77° 47' 5.63023" E	802745.037	1379147.289	Boundary Pillar
21	12° 27' 39.90277" N	77° 47' 6.82624" E	802781.375	1379129.150	Boundary Pillar
22	12° 27' 39.89826" N	77° 47' 7.04404" E	802787.957	1379129.081	Boundary Pillar
23	12° 27' 39.66295" N	77° 47' 7.03903" E	802787.881	1379121.844	Boundary Pillar

	24	12° 27' 39.62113" N	77° 47' 7.76570" E	802809.856	1379120.788	Boundary Pillar
	25	12° 27' 39.84881" N	77° 47' 7.77069" E	802809.93	1379127.791	Boundary Pillar

	Land use pattern (Forest, Agricultural, Grazing, Barren etc.)	:	It is a fresh quarry lease area.
b).	***Attach a general location and vicinity map showing area boundaries and existing and proposed access routs. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However 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

COMMISSIONER OF GEOLOGY AND MINING * GUINDY, CHENNAI-600 032 *

i) INFRASTRUCTURE AND COMMUNICATION:

S.No	Description	Place	Distance	Direction
a.	Nearest post office	Bikkanapally	2.5Km	South
b.	Nearest police station	Denkanikottai	6.7Km	North
c.	Nearest fire station	Denkanikottai	6.5Km	North
d.	Nearest medical facility	Denkanikottai	6.4Km	North
e.	Nearest school	Andevanapalli	2.75Km	Southwest
f.	Nearest railway station	Periya Nagathunai	17.5km	Northeast
g.	Nearest port facility	Chennai	279.0km	Northeast
h.	Nearest airport	Hosur	23.0km	North
i.	Nearest DSP office	Denkanikottai	8.0km	North
j.	Nearest villages	Noganoor	3.1km	North
		Giriyanhalli	1.1km	Northeast
		Maniyambadi	1.15km	South
		Andevanpalli	1.9km	West

PART – A

3.0 GEOLOGY AND MINERAL RESERVES:

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

(i)	Topography	:	The lease area exhibits a elevated terrain and average altitude of about 853m AMSL. The proposed site shows the relief of 4m. The highest elevation observed on the western side of the area is 855m AMSL, whereas the lowest elevation in eastern side of 851m AMSL. The slope is towards eastern side and falls in Toposheet no. 57 H/15.

(ii) General Geology:

a) **Geology:**

The geological formations of the district belong mainly to Archaean age along with rock of Proterozoic age. The transition zone from amphibolite facies metamorphism in the north to granulite facies in the south in the vicinity of Krishnagiri, Dharmapuri District is marked by a uniquely designed, pink granite-gneiss which has become the world famous "PARADISO". The granite-gneiss of Peninsular Gneissic Complex with its diverse composition, colour, texture and degree of assimilation of basic enclaves has contributed immensely in the exploitation of several varieties. The area forms part of the peninsular gneiss, the widest spread group of rocks in many parts of the southern India. They consist of a very heterogeneous mixture of different types of granites intrusive into the schistose rock after the latter were folded, crumpled and metamorphosed. They include granite granodiorites, gneissic granites and banded or composite gneisses. The banded gneiss consists of white bands of quartz-Feldapar alternating with dark bands containing hornblend, biotite and minor accessories. The peninsular gneissic varity rose in colour with less Black colour with interclatiopns of quartz-feldspathic material along gneissosity. Migmatisation of varing kinds of rocks such as basic granulates; Charnockite and sillimanite gneiss has given rise to Black biotite gneiss. Subsequent inversion of rose pegmatite into biotite gneiss has rendered the Black gneiss to few vestiges

within migmatite complex. The rose feldspar pegmatite permeation is mostly parallel to the gneissose along with the garnet, thereby giving a design to the rock. The rose feldspar dominates over Black feldspar giving yellowish white appearance to the rock type.

Amphibolites with banded ferruginous quartzite and associated quartzo-feldspathic rocks (Chapion Gneiss) represent the Kolar Group and are found west and southwest of Veppanapalli. Following this there are basic intrusions occurring as dykes. The Alkaline Complex is represented by epidote-hornblende gneiss, ultramafics, syenite and carbonatite and these are distributed in the eastern part of the district. Innumerable basic dykes and felsite, quartz, barites and pegmatite veins form part of the Alkali Complex.

Order of superposition as under,

Age	Group	Rock Formation
Recent to Sub recent	----	Topsoil
Proterozoic	Alkali/Ultramafic complex	Felsite's porphyre biotite dyke Carbonatite, Pegmatite, Quartz veins
Archaean to lower Proterozoic	--	Dolerite dyke granite
	Kolar Group	Meta basalt, Metagabbro
Archaean	Migmatite complex	Hornblende -biotite gneiss
	Charnockite Group	Magnetite quartzite, Pyroxene Granulite, Charnockite
	Khondalite Group	Quartzite Garnet-sillimanite gneiss

(iii) Local / Mine Geology of The Mineral Deposit:

a) Topography of the proposed lease area:

The lease area exhibits an elevated topography and average altitude of about 853m AMSL. The proposed site shows the relief of 4m; The highest elevation observed on the western side of the area is 855m AMSL, whereas the lowest elevation in eastern side of 851m AMSL.

The black granite mostly concealed under reddish gravelly soil with thickness of 1m and 2m weathered rock below from the top soil, totally overburden having thickness of 3m followed by black Granites. The granite gneiss forms the country rock the area with trending of North-South with a dip of 80^0 East and" **BLACK GRANITE**" (Dolerite) between the batholithic formation of pre-existing country rock of Granite gneiss discordantly with trending of

$N40^0W - S40^0E$ with Vertical dipping with an average width of 50 meters (The width of the dyke is identified by Geophysical prospecting) which stretches about the entire area. The black granite is clearly exposed at surface and few small detached boulders are observed with linear strike dir[illegible] the dyke with spheroidal weathering and cuboidal joints.

The black granite (Dolerite dyke) rock is brownish black in color, inequigranular, fine to medium grained texture. It shows sub-ophitic texture. The color of the rock changes depending on the texture of the rock. The dykes is fine grained at the contact of country rock. The dolerite is compos[illegible] laths of plagioclase embedded in the plates of Augite (Ophitlc texture), Apatite, Magnetite and Pyrite forms the secondary mineral.

Strike and dip joints are observed at the surface level which is likely to decrease in deep seated condition. The recovery of black granite may vary from 15%. Hence, taking in to consideration of the above geological factors, an average recovery of 15% upto 28m depth (1m Topsoil +2m weathered rock + 25m Black granite) has been computed as economically viable at present market scenario. This mining plan is discussed based on 15% recovery factor. The physical attitude of the black granite deposit in this area is given below.

Strike direction = $N40^0W - S40^0E$
Dip direction and amount = Vertical dip.

The Surface plan showing elevation, contour, existing pit dimension, accessibility road and Geological map was prepared the lease area.

b) Mode of origin:

Dolerite is typically found as a hypabyssal igneous rock, typically within dykes. Formation of dolerite cools under basaltic volcanoes, dyke and has strike direction of NW-SE with steep dip and traversed by dolerite dyke trending NW-SE deviates upto $N40^0W - S40^0E$ direction. It cools moderately quickly when magma moves up into fractures and weak zones below a volcano. There, it forms dikes (tabular igneous rock bodies that cut across pre-existing rock layers or bodies) or sills (tabular igneous rock bodies that form parallel to pre-existing rock layers). The moderate cooling rate allows small visible crystals to form in the rock.

c) Physiography of the rocks:

A medium grained mafic intrusive rock whose main components are calcic plagioclase and clinopyroxene and which is characterized by ophitic to sub

ophitic texture; usually found in sills and dykes.

d) Chemical composition of rocks:

The black granite is mainly composed of Augite, plagioclase feldspar, pyroxene.

Order of superposition of rocks in the proposed site:

Age	Group	Rock Formation
Recent to Sub recent	----	Topsoil and weathered rock (3m thick)
Archaean to lower Proterozoic	--	Black granite (Dolerite)

(iv)	Drainage Pattern	:	There are no major water bodies like rivers, etc., located within a radius of 50m and the drainage is sub-dendritic in general.
(b)	***The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 : 2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:***		
	a. Present status:		RQP along with hydrogeologists and DGPS team of Geotechnical Mining Solutions, Dharmapuri analyzed the lease area for mining plan preparation. The proposed lease area is a fresh lease grant and the area exhibits outcrops well exposed on the proposed area and has strike of the granite body is trending in $N40^0W$-$S40^0E$ direction with steep dip.
	b. Surface Plan	:	Surface plan showing elevation, contours, and accessibility road was prepared at the scale of 1: 1000, as shown in Plate No.III.
	c. Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:	:	Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:500, as shown in Plate No. IV.

c) ***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 boreholes	Total meterage	No.of Pits and Dimensions	No.of Trenches and Dimensions
I	N.A	---	---	N.A
II	N.A	---	---	N.A
III	N.A	---	---	N.A
IV	N.A	---	---	N.A
V	N.A	---	---	N.A

Since, its proved by State Geological Department, The Commissioner of Geology and Mining, Thiru.Ve.Ka. Industrial Estate,Guindy, Chennai-600032. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.

(d) 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 cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into two sections (longitudinal and transverse) to calculate the volume of material up to the depth of 28m (which is 1m topsoil + 2m Weathered Rock + 25m Black granite) below the ground level. The longitudinal and transverse cross sections were assigned XY-AB & X1Y1-CD using the cross-sectional method, total reserve is estimated to be **196240m^3** including the resources of safety zone. Of which, Black granite is about **29431m^3** at the rate of 15% and granite rejects are **166809m^3** at the recovery of 85%. (Refer Plate No. IVA).

GEOLOGICAL RESOURCES												
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Geological Resources in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
XY-AB	I	149	87	1	12963	....	....	....	....	....	12963
	II	149	87	2	25926	....	....	....	....	25926	....
	III	149	37	5	27565	....	....	....	27565	....	....
	III	149	50	5	37250	37250	5587	31663	....	....	....
	IV	149	37	5	27565	....	....	....	27565	....	....
	IV	149	50	5	37250	37250	5587	31663	....	....	....
	V	149	37	5	27565	....	....	....	27565	....	....
	V	149	50	5	37250	37250	5587	31663	....	....	....
	VI	149	37	5	27565	....	....	....	27565	....	
	VI	149	50	5	37250	37250	5587	31663	....	....	
	VII	149	37	5	27565	....	....	....	27565	....	
	VII	149	50	5	37250	37250	5587	31663	....	....	
TOTAL						**186250**	**27935**	**158315**	**137825**	**25926**	**12963**
X1Y1-CD	I	37	18	1	666	....	....	....	....	....	666
	I	37	18	2	1332	....	....	....	....	1332	....
	I	37	8	2	592	....	....	....	592	....	....
	I	37	10	2	740	740	111	629	....	....	....
	II	37	8	5	1480	....	....	....	1480	....	....
	II	37	10	5	1850	1850	277	1573	....	....	....
	III	37	8	5	1480	....	....	....	1480	....	....
	III	37	10	5	1850	1850	277	1573	....	....	....
	IV	37	8	5	1480	....	....	....	1480	....	
	IV	37	10	5	1850	1850	277	1573	....	....	
	V	37	8	5	1480	....	....	....	1480	....	
	V	37	10	5	1850	1850	277	1573	....	....	
	VI	37	8	5	1480	....	....	....	1480	....	
	VI	37	10	5	1850	1850	277	1573	....	....	
TOTAL						**9990**	**1496**	**8494**	**7992**	**1332**	**666**
GRAND TOTAL						**196240**	**29431**	**166809**	**145817**	**27258**	**13629**

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

The mineable reserves are estimated to be **107430m³** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth 28m from the below the ground level. Of which, Black granite is about **16113m³** at the recovery of 15% and granite rejects are **91317m³** at the recovery of 85%. The commercially viable Black granite has been prepared on 1: 1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no. VIII).

MINEABLE RESERVES											
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m³)	Mineable reserves in m³	Black Granite 15% Recovery in m³	Granite Waste 85% in m³	Side Burden in m³	Weathered rock in m³	Top Soil in m³
XY-AB	I	131	71	1	9301	....	....	....	....	....	9301
	II	128	68	2	17408	....	....	....	....	17408	....
	III	123	14	5	8610	....	....	....	8610	....	....
	III	123	50	5	30750	30750	4612	26138	....	....	....
	IV	113	4	5	2260	....	....	....	2260	....	....
	IV	113	50	5	28250	28250	4237	24013	....	....	....
	V	103	44	5	22660	22660	3399	19261	....	....	....
	VI	93	34	5	15810	15810	2371	13439	....	....	....
	VII	83	24	5	9960	9960	1494	8466	....	....	....
TOTAL						**107430**	**16113**	**91317**	**10870**	**17408**	**9301**

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)	:	It is a fresh quarry lease and its works for open cast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 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. Doesn't any change of mining method in future.

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

Total proposed production of Black granite is about **27000m³.** Of which, Black granite is about **4049m³** at the recovery of 15% and granite rejects are **22951m³** at the recovery of 85% up to a depth of 13m below the ground level for five years mining plan periods. Average production is **810m³** of Black granite per year.

Year	Pit No.(s)	Topsoil (m^3)	ROM (m^3)	Saleable Black granite @ 15% (m^3)	Black granite Rejects @ 85% (m^3)	Weathered rock in (m^3)	Side Burden (m^3)	Overburden / Black granite ratio
I	I	2059	5500	825	4675	3536	4130	1 : 17.4
II	I	1562	5500	825	4675	2992	---	1 : 11.8
III	I	1065	5000	749	4251	2040	---	1 : 9.8
IV	I	---	5500	825	4675	---	980	1 : 6.8
V	I	---	5500	825	4675	---	---	1 : 5.7
Total	**---**	**4686**	**27000**	**4049**	**22951**	**8568**	**5110**	1 : 10.2

c.	***Composite plans and Year wise sections (In case of 'A' class mines):***	:	Not applicable. It is a "B2" category of quarry lease

Composite plans and Year wise sections (In case of 'B2' category of quarry lease):

YEARWISE PRODUCTION

Year	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Production Reserves in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
I - YEAR	XY-AB	I	29	71	1	2059	....	....	....	....	....	2059
		II	26	68	2	3536	....	....	....	....	3536	....
		III	59	14	5	4130	....	....	....	4130	....	
		III	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					**5500**	**825**	**4675**	**4130**	**3536**	**2059**
II - YEAR		I	22	71	1	1562	....	....	....	....	....	1562
		II	22	68	2	2992	....	....	....	....	2992	....
		III	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					**5500**	**825**	**4675**	**0**	**2992**	**1562**
III - YEAR		I	15	71	1	1065	....	....	....	....	....	1065
		II	15	68	2	2040	....	....	....	....	2040	....
		III	15	50	5	3750	3750	562	3188	....	....	....
		IV	5	50	5	1250	1250	187	1063	....	....	....
		TOTAL					**5000**	**749**	**4251**	**0**	**2040**	**1065**
		IV	49	4	5	980	....	....	....	980	....	....
IV- YEAR		IV	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					**5500**	**825**	**4675**	**980**	....	**0**
V- YEAR		IV	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					**5500**	**825**	**4675**	**0**	**0**	**0**
GRAND TOTAL							**27000**	**4049**	**22951**	**5110**	**8568**	**4686**

d.	Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.	:	Composite plan not prepared in this proposed lease area. It is "B_2" category of quarry lease.

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: -

Black granite:

Mineable reserves of Black granite @ 15%	=	**16113m³**
Five years production @ 15%	=	**4049m³**
Monthly production of Black granite	=	**810m³**
Remaining mineable reserves are	=	**12064m³**

The regular working of the quarry and its production depends upon the demand from the market. Accordingly, there is a possibility to increase or decrease the production. The year wise production, anticipated the life of quarry etc., are only a tentative figure.

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

(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:	:	Consider the indefinite depth the black granite deposit is proved beyond the workable limits about a depth 28m (which is 1m topsoil + 2m weathered rock + 25m black granite) below the ground level.

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

The ultimate pit limit has been determined and demarcated at conceptual plan periods as given below

ULTIMATE PIT – SECTION (XY-AB)

Bench	Bench R.L	Overburden/ Mineral	L (m)	W (m)	–	D (m)
I	R.L.853-852m	Topsoil	131	71	1	1
	R.L.852-850m	Weathered rock	128	68	2	2
II	R.L.850-845m	Side burden	123	14	5	5
		Black granite	123	50	5	
III	R.L.845-840m	Side burden	113	4	5	5
		Black granite	113	50	5	
IV	R.L.840-835m	**Black granite**	103	44	5	**5**
V	R.L.835-830m	**Black granite**	93	34	5	**5**
VI	R.L.830-825m	**Black granite**	83	24	5	**5**
					Total depth	**28m**

(iii)	Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity:-	:	The black granite rejects are **22951m³** (up to 85%), Side Burden are **5110m³** and Weathered rock is **8568m³** (Totally 36629m³) will be removed and dumped in the east side of the lease area average dimensions of (L65m X W30m X H 15m) for the period of five years. The topsoil is **4686m³** will be removed and stacked for earth bund in the lease hold area to prevent inherent entry of cattle's and human as per rules 106, Metalliferous Mines Regulations, 1961. If black granite may be unsold will be keep within the lease boundary.
(iv)	Whether back filling of pits after recovery of mineral upto techno-economically feasible depth envisaged. If so, describe the broad features of the proposal:-	:	As the depth of persistence of the deposit may likely to continue for further depth, it is proposed not to backfilled the quarry pit.
(v)	Whether post mining land use envisaged:-	:	At the end of mining activities over the quarry pit may be utilized fish culture or storage of rain water reservoir used for irrigation purposes.
g.	***Open cast Mines:***		
(i)	Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)	:	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 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.

(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 Black Granite is proposed to quarry at 5m bench height & width conventional open cast method. i) Drill hole diameter 32mm ii) Depth and inclination of drill hole: generally drilled vertically in alignment, however in primary cutting in the absence of sheet joints to bottom level, horizontal holes also are drilled. iii) Spacing and burden: The spacing shall be about 0.1m to 0.3m from hole to hole and burden goes up to 1.6m for the splitting of the rock. The intrusive body will be tackled with latest technology by deploying diamond wire saw cutting for obtaining the good recovery factor of sizeable blocks.
	a. Details of Topsoil/ Overburden	:	The topsoil is **4686m^3** will be removed and stacked for earth bund in the lease hold area to prevent inherent entry of cattle's and human as per rules 106, Metalliferous Mines Regulations, 1961. If black granite may be unsold will be keep within the lease boundary.
	b. Mineral waste and side burden waste: -	:	The black granite rejects are **22951m^3** (up to 85%), Side Burden are **5110m^3** and Weathered rock is **8568m^3** (Totally 36629m^3) will be removed and dumped in the west side of the lease area average dimensions of (L65m X W30m X H 18.5m) for the period of five years.
h.	***Underground Mines:***	:	It is an open cast quarry operation only
i.	***Extent of mechanization:*** Being a fresh quarry lease, opencast semi- mechanized methods of mining adopted. Deployment of drills, compressors, excavators, tipper, Diamond wire saw, and line drilling machineries are deployed depending upon the size of the		

quarry, rate of production, etc. There will not continue or regular work to the above machinery. Hence, most of the quarry operations engage this equipment on hire basis.

The following machinery already deployed in this quarry by project proponent: -

(1) (a) Drilling Machines:

Type	No	Dia of hole (mm)	Size / Capacity	Make	Motive power	H.P.
Jack Hammer	4	32 mm	Hand held	---	Compressor Air	--
Compressor	2	---	Air	---	Diesel/ Electrical	--

(1) (b) **Cutting equipment's:**

i. Diamond wire saw machine = 2 no's

ii. Line drilling machinery = 1 no's

(2) Loading Equipment:

Type	No	H.P	Size/Capacity	Make	Motive power
Excavator	1	2.9-4.5m^3	--	Diesel	--

(3) Haulage and Transport Equipment

(a) Haulage within the mining leasehold:

Type	Nos	Size / Capacity	Make	Motive power	H.P.
Tipper	2	--	---	Diesel	--

Whether the dumpers are fitted with exhaust conditioner should be indicated: The dump is not used in this quarry area, hence it's a small B2 category mine.

(b) Transport from mine head to the destination	:	Tipper will be used for transport.
(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 tippers and hydraulic excavator for production purposes.
(e) Main destination to which ore is transported (giving to and from distance)	:	The excavated Black granite transported to needy buyers

(b) Details of hauling / transport equipment:

Type	No	Size / Capacity	Make	Motive power	H.P.
---	---	---	---	---	---

(4).Miscellaneous:

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

(A) Operations	:	The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.
(B) Machineries deployed	:	Deployment of drills, compressors, excavators, tipper, Diamond wire saw, and line drilling machineries are deployed depending upon the size of the quarry, rate of production, etc. There will not continue or regular work to the above the machinery.

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: It is an Eco-friendly quarry operation, no blasting is proposed, Diamond wire saw cutting method is adopted by the lessee. Now a day, the splitting within the sheet rock is affected by diamond wire-sawing, which largely reduces the use of explosives in granite mining. Besides, chemical powder called as "Rock breaking Powder" [Ca (OH)2] are also used for splitting. Many adverse effects of blasting are avoided and hence diamond wire cutting will substantially increase the recovery. Since primary cutting comprising splitting from the sheet rock is affected by diamond wire-sawing there will not be any drilling or blasting involved. Hence, there will not any adverse effects and vibration due to this type of mining operation.

Chemical Blasting Method: The Black Granite operations should not be conducted with any blasting. This will totally damage the possible output by inducing cracks in the rock. For this reason, Chemical explosives are not used for this process. Inserted the rock is split with help of chemical powder which is an expander of the rock. The process is as under long jack hammer holes of around 3

	to 6 meters are drilled in close spacing. The spacing is generally 5 to 10mm after the entire line is drilled, it is plugged to prevent any foreign materials entering the hole, later two vertical and one bottom cut are made with slotters and wire saw machines. After these operations are complete, the holes are loaded with chemical generates a crack which is through the holes drilled. The crack is expanded any hydraulic bags are used to pull the rock.		
	b) Miscellaneous: Apart from the above, the following tools and tackles already provided by lessee in quarry leased area for quarry operations. a) For operation: 1. Drill rods 0.4m, 0.5, 0.6m, 0.75m, 1.65m, 2.25m, 3m and 3.6m. 2. Steel alloy chains of sufficient length of 12mm, 16mm, 18mm sizes. 3. "D' Shackles to link the chain length, 4. Rubber hose of required length, 5. Hose clamps to link the compressor delivery hoses, 6. Feather and wedges of 6" and 12" sizes, utilized for splitting the block from the mother rock. This is an important tool in the operation of the quarry. 7. Crow bars, 8. Spades, 9. Sludge hammer, 10. Iron pans, 11. Pitcher hammer, 12. Chisels, 13. Consumables, such diesel, Hydraulic oil, etc		
	c) Powder factor in ore and overburden / waste / development heading / stope	:	Not applicable
	d) Whether secondary blasting is needed, if so describe it briefly	:	Not applicable
	e) Storage of explosives (like capacity and type of explosive magazine)	:	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. First Aid Box will be keeping ready at all the time. 3. Necessary precautionary announcement will be carried out before the blasting operation.
6.	***MINE DRAINAGE***		
	a) Likely depth of water table based on observations from nearby wells and water bodies	:	The ground water table is reported as of 55m in summer and 50m in rainy season from the general ground level in the adjacent bore wells of the area.
	b) Workings expected to be _____ m. above / reach below water table by the year _____.	:	Ultimate mining depth is 28m below ground level. So, the present mine lease will be proposed above the water table and hence, quarrying may not affect the ground water.
	c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged	:	The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 Lpm and it shall be pumped about periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor.
7.	***STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:***		
(a)	Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years:		

Year	Topsoil/ Overburden (m^3)	Weathered rock & Side burden (m^3)	Mineral rejects/Waste
I	2059	7666	4675
II	1562	2992	4675
III	1065	**2040**	4251
IV	---	980	4675
V	---	---	4675
Total	**4686**	**13678**	**22951**

(b)	Land chosen for disposal of waste with proposed justification	:	The side burden and granite rejects are dumped on west side.

(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 year wise.	:	The black granite rejects are **22951m^3** (up to 85%), Side Burden are **5110m^3** and Weathered rock is **8568m^3** (Totally 36629m^3) will be removed and dumped in the west side of the lease area average dimensions of (L65m X W30m X H 18.5m) for the period of five years. The topsoil is **4686m^3** will be removed and stacked for earth bund in the lease hold area to prevent inherent entry of cattle's and human as per rules 106, Metalliferous Mines Regulations, 1961. If black granite may be unsold will be keep within the lease boundary.
8.	***USES OF MINERAL:***		
(a)	Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)	:	The quarried Black granite blocks are used to make floors, monuments etc.
(b)	Indicate physical and chemical specifications stipulated by buyers	:	The materials produced at this quarry are Black granite which is used in floors, furniture, counter tops and monuments. The properties of granite which are normally valued for exploitation are compressive strength, tensile strength, density, p-wave velocity, etc. For marketability, other requirements like colour, texture, granularity, size, water absorption, porosity, hardness, moisture content, etc. are also essential. Raw blocks should be free from normal defects like fractures, joints, shears, hairline cracks, segregation, veins, etc.

(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.	:	No blending process is involved in quarry. Blocks approved for export are shipped from harbor to exporter's designations.
9.	***OTHERS***		
(a)	**Describe briefly the following** Site services	:	Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as per the Metalliferous Mines Regulations, 1961 as a welfare amenity for mine laborers. No manual mine or stack of spares, lubricant and fuels are required to be maintained at the mine site. Approach road is available from the mine road to the site.

(b) Employment potential:

As per Mines safety under the provisions of Metalliferous Mines Regulations, 1961 under the Mines Act, 1952, whenever the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the production workers directly under his control and supervision.

The following man power is proposed for quarrying Black granite during the five years period the same manpower will be utilize for this Mining Plan period to achieve the proposed production and to comply the provisions of the MMR, 1961 norms.

1.	Highly Skilled	Quarry Manager	1No.
		Mines Forman	1No
		Mechanical Engineer	1No
		Accountant cum & admin	1No.
2.	Skilled	Earth moving Operator	1No
		Line drilling Operator	1 Nos.
		Wire saw Operator	2 No.
		Driver	1No
3.	Semi – skilled	Helpers, Greaser's	1 No
4.	Unskilled	Cutter	4Nos
		Musdoor / Labours	8 Nos
		Total =	**22Nos**

10	**MINERAL PROCESSING/BENEFICIATIONS:**		
(a)	If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.	:	Excavated Black Granite raw blocks shall be directly sale to the needy buyers.
(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 (KLD per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.	:	Drinking is 0.500KLD, utilized water is 0.5KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 3.0KLD per day has to be maintained as per the Mines Rules, 1952. Drinking water will be bought to authorized vendor of the nearby the village. The dust suppression and green belt development will be bought to water tanker. The sewage water to a tune of 0.7KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit.

PART – B

11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) **Attach a note on the statuts 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 land use pattern is given as below.

S. No.	Land Use	Present area (Hect.)
1.	Area under Mining	Nil
2	Waste dump	Nil
3	Office (Infrastructure)	Nil
4	Road	Nil
5	Green Belt	Nil
6	Unutilized area	1.36.45
	Total =	**1.36.45**

11.2	Water Regime	:	Water table in this area is noticed at a depth of 55m in summer and 50m in rainy season from the general ground level and presently the quarrying of black granite is ultimate depth of 28m bgl. Hence, it will not affect the ground water depletion of this area.
11.3	Flora and Fauna	:	There is no major flora observed in this area and except acacia bushes, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.
11.4	Quality of air, ambient noise level and water	:	Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc.., will be suppressed by periodical wetting of land by water spraying. In this quarry, the machinery operations like jack hammer drilling compressor and

			excavators will generate sound pollution. The sound level should be within the limits of 58dBA. To minimize this sound pollution within the permissible limits, the machinery will be operated at different places and time. The sound pollution will be reduced periodical maintenance of the mining equipment. However periodical noise level monitoring will be carried out every six months around the quarry site.

11.5 Climatic conditions:

The climate of Krishnagiri district is comparatively more pleasant than that of the surrounding districts due to general dryness of atmosphere and appreciable drop in temperature in the monsoon season. The year may be divided into four season namely dry season from January to March, summer season April and May, southwest monsoon season from June to Sept. and northeast monsoon season from October to December.

During summer season (April to May) the maximum temperature is about 37°C, and the mean daily minimum temperature of about 25°C in the plains.

The day temperature increases gradually from January onwards. The lowest temperature is reached in January when the mean daily minimum is about 19°C. However, in higher areas i.e., Hosur, Thally and Krishnagiri taluks day and night temperature are lower by about 2 to 3°C.

11.6 Human Settlement:

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

S.No	Village	Direction	Distance in Kms	Population
1	Noganoor	North	3.1km	2984
2	Giriyanhalli	Northeast	1.1km	716
3	Maniyambadi	South	1.15km	930
4	Andevanpalli	West	1.9km	4908

11.7	Public buildings, places of worship and monuments	:	No infrastructure like residential building, places of special interest like archeological

			monuments, Sanctuaries, etc., are found around 10km radius.
11.8	Attach plans showing the locations of sampling stations	:	We have tested for every season (6 months once) around 1km radius Ambient air quality, Water quality Ambient noise level and vibration are periodically as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.
11.9	Does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974	:	The lease area doesn't fall under notified area under Water (Prevention & Control of Pollution), Act, 1974 within the radius of 1km.

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:***

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

S. No.	Land Use	Area in use during the quarrying period (Hect.)
1.	Under quarrying area	0.41.82
2	Infrastructure	0.02.0
3	Roads	0.05.0
4	Waste dump	0.39.0
5	Green belt	0.19.25
6	Drainage & Settling Tank	0.05.52
7	Unutilized	0.23.86
	Total	**1.36.45**

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 Black granite 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)		It is an Eco-friendly quarry operation, no blasting is proposed, Diamond wire saw cutting method is adopted by the lessee. Now days, the splitting within the sheet rock is affected by diamond wire-sawing, which largely reduces the use of explosives in granite mining. Besides, chemical powder called as "Rock breaking Powder" [Ca(OH)2] are also used for splitting. Many adverse effects of blasting are avoided and hence diamond wire cutting will substantially increase the recovery. Since primary cutting comprising splitting from the sheet rock is affected by diamond wire-sawing there will not be any drilling or blasting involved. Hence, there will not any adverse effects and vibration due to this type of mining operation. 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		Drinking water will be bought to authorized vendor of the nearby the village. The dust suppression and green belt development will be bought to water tanker.
vii).	Socio-economics		1. To provide Employment opportunities of the nearby villagers.

			2. For the cultural development of the nearby villagers.
viii).	Historical monuments etc.		There are no historical monuments, etc found around 10km radius.

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

i).	Temporary storage and utilization of topsoil	:	The topsoil is **4686m^3** will be removed and stacked for earth bund in the lease hold area to prevent inherent entry of cattle's and human as per rules 106, Metalliferous Mines Regulations, 1961. If black granite may be unsold will be keep within the lease boundary.
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 be given.	:	The present mining is proposed to a depth of 13m below ground level 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 Black granite 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.***

Safety barrier, nearby school area and Nearest Panchayat approach Roads has been identified to be utilized for Greenbelt appropriate native species of Neem, Pungan and other regional trees will be planted in a phased manner as described below

Year	Place	Area in Sq.m	No.of Plants	Rate of survival	Rate	Amount in Rs
First	Lease Boundary	2386	260	80%	@100 Rs Per sapling	26,000/-
Second	Approach road and Nearby Village Road	--	400	80%		40,000/-
Third	Schools	--	200	80%		20,000/-
					Total	**86,000/-**

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).	:	The black granite rejects are **22951m^3** (up to 85%), Side Burden are **5110m^3** and Weathered rock is **8568m^3** (Totally 36629m^3) will be removed and dumped in the west side of the lease area average dimensions of (L65m X W30m X H 18.5m) for the period of five years.
v).	Measures to control erosion / sedimentation of water courses.	:	No soil erosion takes place in this quarrying activity.
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 will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.

viii).	Protective measures for ground vibrations / air blast caused by blasting,	:	It is a small B2 category opencast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry.
ix).	Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.	:	No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.
x).	Socioeconomic benefits arising out of mining.	:	The nearest villages are will get employment benefits.

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

Not applicable. It is B2 category quarry

12.0 PROGRESSIVE MINE CLOSURE PLAN:

12.1	Steps proposed for phased restoration, reclamation of already mined out area.	:	The present mining is proposed to depth of 13m below ground level. 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 260 trees are proposed lease boundary for mining plan period. No immediate proposals for closure of pit as the Black granite persist still at deeper level.
12.3	Mitigation measures to be	:	The quarry lease is a fresh mining lease

	undertaken for safety and restoration/ reclamation of the already mined out area		for 20 years lease period.
12.4	Mine closure activity	:	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 Black granite 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 per Metalliferous Mines Regulations, 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 mining method is adopted in this quarry. If the benches are made with proposed height and width no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at 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. 22 labors will be improved. During the next five-year compensations will be given as per rules.

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

A	**Fixed Asset Cost**:		
	1. Land Cost	:	Rs. 16,86,000, /-
	2. Labour Shed		Rs. 50,000, /-
	3. Sanitary Facility	:	Rs. 1,50,000/-
	4. Fencing	:	Rs. 3,00,000/-
	5. Other expenses (Security guard, bin, etc)	:	Rs. 5,00,000/-
	Total	:	**Rs. 26,86,000/-**
B	**B. Machinery cost**	:	**Rs. 20,00,000/-** (Hire Basis)
C	**Total Expenditure of EMP cost** (for five years)		
	1. Drinking Water Facility	:	Rs. 1,00,000/-
	2. Sanitary facility & Maintenance	:	Rs. 1,00,000/-
	3. Permanent water sprinkler	:	Rs. 1,00,000/-
	4. Afforestation and maintenance	:	Rs. 86,000/-

	5. Safety Kits	:	Rs. 1,00,000/-
	6. Provision of tyre washing facility	:	Rs. 1,00,000/-
	7. Surface runoff management structures like garland drain, settling pond & Bund (0.05.52Hect or 552Sq.m X 400	:	Rs. 2,20,800/-
	8. Blasting materials with blast mat cost	:	Rs. 10,00,000/-
	9. Environment monitoring	:	Rs. 5,00,000/-
	Total	:	**Rs. 23,06,800/-**
D	**Total Project Cost (A+B+C)**	:	**Rs. 69,92,800/-**

13.0 FINANCIAL ASSURANCE:

Not applicable, it is a small B2 Black granite 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 Black granite economically without any wastage and to improve the environment and ecology.

(iii) The Mining Plan with progressive quarry closure plan is prepared by incorporating the conditions stipulated in the precise area communication issued by The Additional Chief Secretary of Tamil Nadu, vide letter **Rc.No. 4811/MME.2/2023-1, Dated 06.11.2023**

(iv) Total proposed production of Black granite is about **27000m^3.** Of which, Black granite is about **4049m^3** at the recovery of 15% and granite rejects are **22951m^3** at the recovery of 85% up to a depth of 13m below the ground level for first five years mining plan period. Average production is **810m^3** of Black granite per year.

17.0 CSR Expenditure:

CSR (Corporate Social responsibility) shall provide by the applicant @ 2.0% of average net profit of the company for the last three financial years to the nearby village on the Ministry has notified the amendments in section 135 of the Act as well in the CSR Rules on 22nd January 2021 as circular no. CSR-05/01/2021-CSR-MCA dated 25th August 2021.

Place: Dharmapuri, TN

Date: 9/11/23

Signature of the Recognized Qualified Person

Dr.S.KARUPPASAMY, M.Sc.,Ph.D.,
RQP/MAS/2[illegible]/14/A
GEO TECHNICAL MINING SOLUTIONS
1/213-B, Ground Floor, Near [illegible]
Collectorate Post Office, Oddapatti,
Dharmapuri-636 705, Tamil Nadu, India.

COMMISSIONER
GEOLOGY AND MINING,
GUINDY, CHENNAI-600 032.

This Mining Plan is Approved
Subject to the Conditions/ Stipulation
Indicated in the Mining Plan Approval
Letter No./1336/mmq/2021 Dated 13-12-2023

ANNEXURE -1

-939-

Natural Resources (MME.2) Department,
Secretariat, Chennai-600 009.

Letter No.4811/MME.2/2023-1, dated 06.11.2023

From
Thiru. K. Phanindra Reddy, I.A.S.,
Additional Chief Secretary to Government (FAC)

To
Thiru D. Karunanidhi,
S/o.Dharuman,
No.15, Valasagoundanur,
Puliyampatti Post,
Pochampalli Taluk,
Krishnagiri-635 206.

Sir,

Sub: Natural Resources – Minor Mineral – Black Granite - Quarry lease application preferred by Thiru D.Karunanidhi for quarrying of Black Granite over an extent of 1.36.45 hectares of patta lands in S.F.Nos.720/3B (0.06.00 hectare), 725/1 (Part) (0.03.42 hectare), 725/2A (0.10.53 hectare), 726/B1 (Part) (0.42.00 hectare) and 726/B2A (0.74.50 hectare) of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District – Precise area communicated - Approved Mining Plan and Environmental Clearance – Called for.

Ref: 1. Your Quarry Lease Application, dated 06.03.2020.

2. From the District Collector, Krishnagiri, Note File No.226/2020/Mines, dated 30.01.2023.

3. From the Commissioner of Geology and Mining, Chennai, Note File No.1336/MM4/2023, dated 27.03.2023.

I am directed to invite attention to the references second and third cited, wherein the District Collector, Krishnagiri and the Commissioner of Geology and Mining, Chennai have recommended and forwarded your quarry lease application for grant of quarry lease for quarrying of Black Granite over an extent of 1.36.45 hectares of patta lands in S.F.Nos.720/3B (0.06.00 hectare), 725/1 (Part) (0.03.42 hectare), 725/2A (0.10.53 hectare), 726/B1 (Part) (0.42.00 hectare) and 726/B2A (0.74.50 hectare) of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District for a period of 20 years under rule 19-A of the Tamil Nadu Minor Mineral Concession Rules, 1959.

(p.t.o)

2. The Government carefully examined the reports / recommendations of the District Collector, Krishnagiri and the Commissioner of Geology and Mining, to communicate precise area for quarrying Black Granite over an extent of 1.36.45 hectares of patta lands in S.F.Nos.720/3B (0.06.00 hectare), 725/1 (Part) (0.03.42 hectare), 725/2A (0.10.53 hectare), 726/B1 (Part) (0.42.00 hectare) and 726/B2A (0.74.50 hectare of Irudhukottai Village, Denkanikottai Taluk, Krishnagiri District and accordingly, the Government hereby communicate Precise Area for the above said area under sub-rule (13) of Rule 19-A of the Tamil Nadu Minor Mineral Concession Rules, 1959 for grant of quarry lease.

3. I therefore request you to furnish the Approved Mining Plan for the above mentioned Precise Area through the Commissioner of Geology and Mining within a period of 3 months as per sub-rule (13) of Rule 19-A of the Tamil Nadu Minor Mineral Concession Rules, 1959 and to produce Environmental Clearance obtained from the competent authority for the above said area for grant of quarry lease subject to the following conditions to the Government: -

1. A safety distance of 7.5 m shall be maintained for the adjacent patta lands.
2. A safety distance of 50 m shall be maintained for the electrical line passing East-west situated 46 m away from the north-east corner and 34 m away from the North-West corner of the applied area in S.F.No.726/B2A and 14 km away from the East side of the applied area in S.F.No.725/2A.
3. A safety distance of 10 m shall be maintained for the Government land (pathai) in S.F.No.847 and 860 situated on the East side of the applied area in S.F.No.726/B2A and 725/2A(P).
4. A safety distance of 10.00 mts shall be maintained for the Government land in S.F.No.721/3 (Podugal) situated on the south west side of the applied area in S.F.No.720/3B.
5. The quarrying operation should be restricted only in the area granted on lease.
6. Barbed wire fencing or Compound wall should be erected all along the boundary of the lease granted area and the boundary pillars should be erected as per DGPS norms.
7. The waste materials generated during the course of quarrying should be dumped only within the lease hold area.
8. Environment Clearance should be obtained from the competent authority in respect of the subject area as per rule 42 of TNMMCR, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.
9. The applicant shall at his own expenses erect, maintain and keep in repair all the boundary pillars with DGPS readings.

10. No encroachment shall be made in the adjacent Government lands.

11. As per the Hon'ble Supreme Court of India order dated 08.01.2020 in W.P.(C) No.144/2014 after ceasing quarrying operation re-grassing the quarry area and any other area which may have been disturbed due to the quarrying activity and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.,

12. Quarrying activity should be carried out from 6.00 A.M to 6.00 P.M. only

13. A green belt should be constructed all along the boundary of the area to prevent sound and air pollution due to the proposed quarrying activity over an extent of 1.36.45 hectares in S.F.No.720/3B (0.06.00), 725/1(P) (0.03.42), 725/2A (0.10.53), 726/B1(P) (0.42.00) and 726/B2A (0.74.50) of Irudhukottai village, Denkanikottai Taluk, Krishnagiri District by planting at least 500 seedlings of Neem and Pungan all around the area.

14. In order to prevent illicit quarrying, when quarried material is transported necessary permits had been produced before the forest check post officials and necessary entries should be made in the register.

15. The district administration and Geology and Mining department should ensure the conditions imposed in G.O.(Ms.)No.79, Industries (MMC.1) department, dated 06.04.2015.

16. Since the proposed area is situated 610 m away from the Noganoor Reserve Forest, no forest violation should be carried out while quarrying.

17. The quarrying should be carried out without violation to the forest protection and wild life protection rules.

18. The applicant should fence the lease granted area with barbed wire before the execution of lease deed as follows:

- The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
- The applicant shall incorporate the DGPS readings for the entire boundary Pillars of the area and the same should be clearly shown in the mining plan.
- A soft copy of the digitized map with DGPS readings should be submitted in the CD to the Deputy Director, Krishnagiri.

19. No damages should be cost to the forest area and wild life while black granite quarrying is carried out over extent of 1.36.45 hectares.

20. No pollution should be caused to the water bodies situated near the applied area.

21. The applicant should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019, dated 1.02.2018 and subsequent corrigendum dated 13.08.2019 before execution of quarry lease through the empanelled agencies.

22. If any elephant to the wild life movement is observed, the blasting and quarrying work shall be stopped and the same shall be re-started only after return of the wild animals from the area.

23. The District Collector, Krishnagiri shall obtain a sworn-in-affidavit from the applicant / firm containing the above conditions before execution of lease deed and also ensure that the instructions issued in Government Letter No.12789/MMB.2/ 2002-7, Industries Department, dated 09.01.2003 are complied with. Further, the District Administration / Geology and Mining Department should ensure that the conditions imposed in G.O. (Ms) No.79, Industries (MMC.1) Department, dated 06.04.2015 and G.O.(Ms) No.295, Industries (MMC-1) Department, dated: 03.11.2021 are complied.

Yours faithfully,

06/11/2023

for Additional Chief Secretary to Government (FAC)

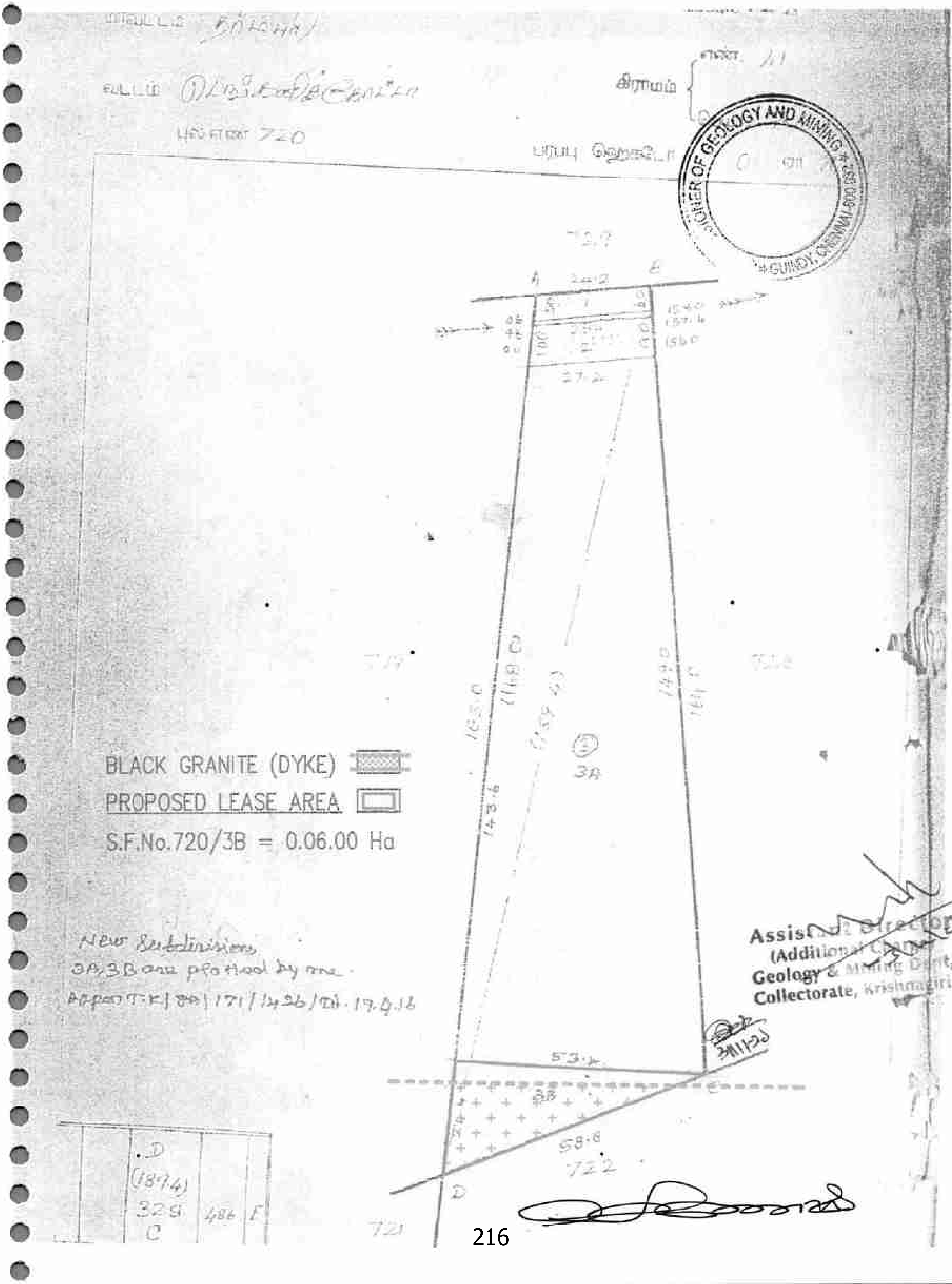
6/11/2023

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

The District Collector,
Krishnagiri District.

ANNEXURE - II

-927-



தேனகனிகோட்டை [10]
இருதுகோட்டா [41]

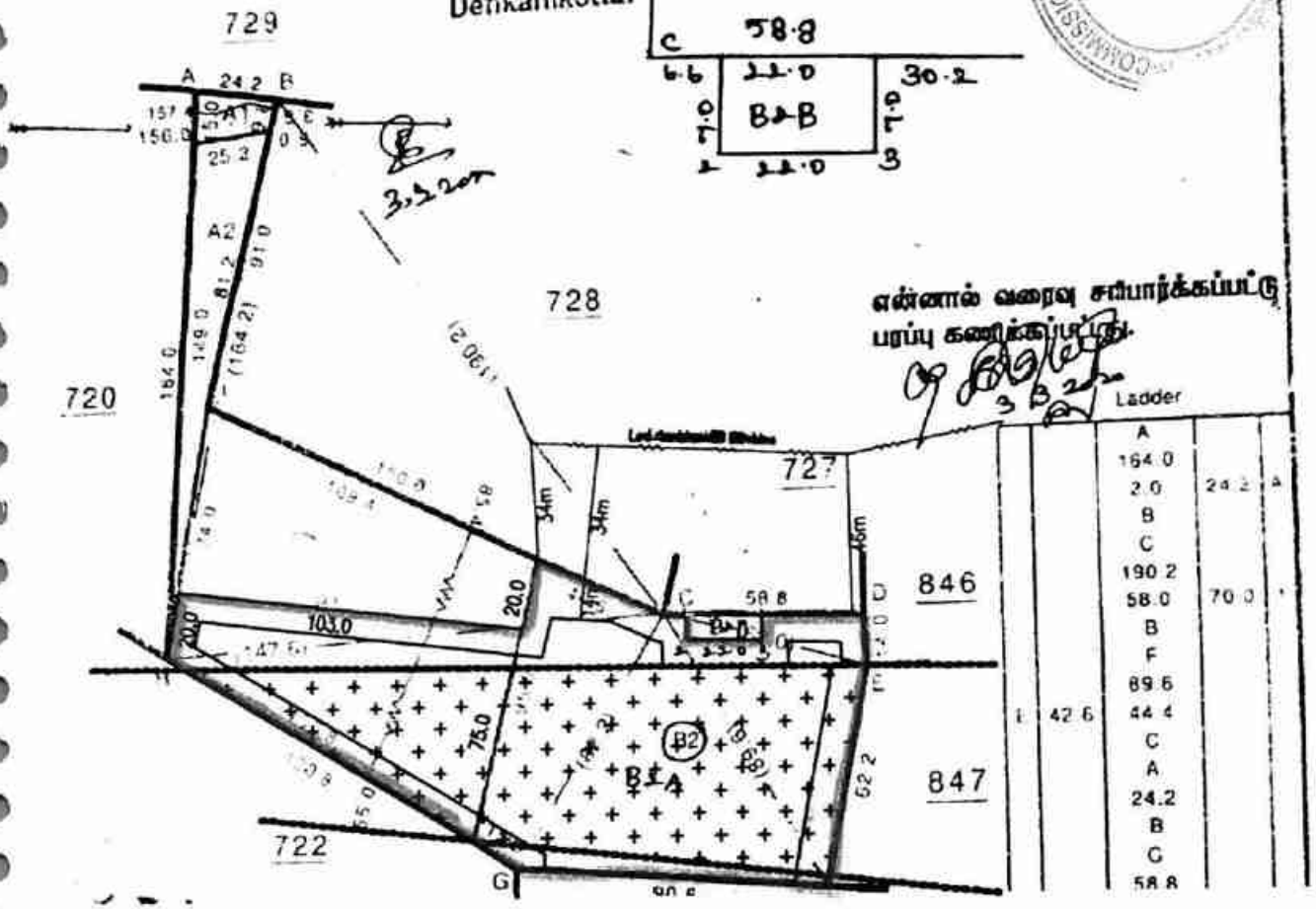
பரப்பளவு எக்டா 01 ஏர் 72 50
அளவு 1 : 2000

726 | B2A - 0.74.50
B2B - 0.01.50
0.76.00

@S.D.Feed Rs

Tahsildar
Denkanikottai

விரிவுபடியம்:-



என்னால் வரைவு சரிபார்க்கப்பட்டு பரப்பு கணிக்கப்பட்டது.

BLACK GRANITE (DYKE)
SAFETY ZONE
PROPOSED LEASE AREA

S.F.No.726/B1(P) = 0.42.00 Ha
S.F.No.726/B2A = 0.74.50 Ha

Assistant Director
(Additional Charge)
Geology & Mining Dept,
Collectorate, Krishnagiri

மா கிருஷ்ணகிரி

யு தேங்கனிக்கோட்டை [10]

ாமம இருதுகோட்டா [41]

புல எண் 725

பரப்பளவு எக்டா 01 ஏ 28 00

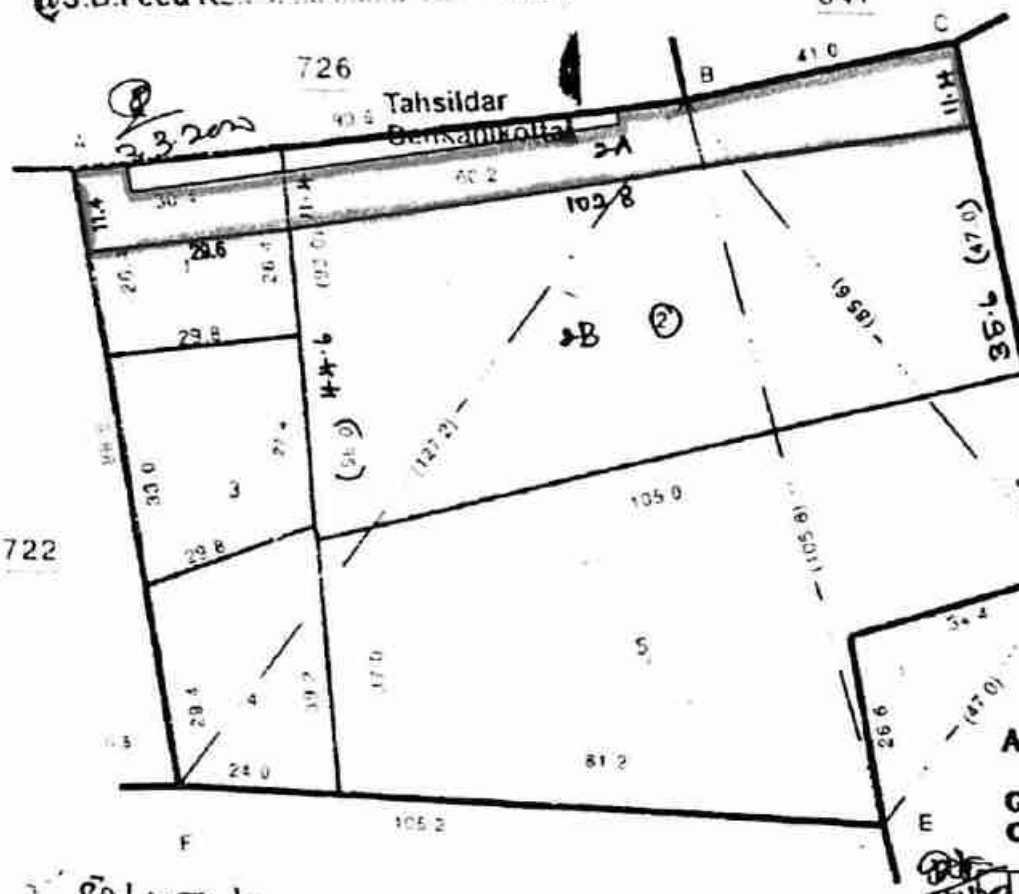
அளவு 1 : 1000

New Sub Division .....

sanctioned as per .....

.... ance

@S.D.Feed Rs. .....



725/2A 0.10.53

2B 0.44.47

0.55.00

Assistant Director
(Additional Charge)
Geology & Mining Dept,
Collectorate, Krishnagiri

Ladder

		E
		75.6
	4.0	10
		D
		E
		105.6
1	3.0	76.6
D	37.2	77.2
		B
		127.2
A	62.4	61.8
		F
		105.2
		E
		47.0
		D
		75.6
		C
		41.0
		B
		90.6
		A
		88.8
		F

கூ/454/2020
கூராய்வு செய்யப்பட்டது.

வட்டத் துணை ஆய்வாளர்
தேன்கனிக்கோட்டை

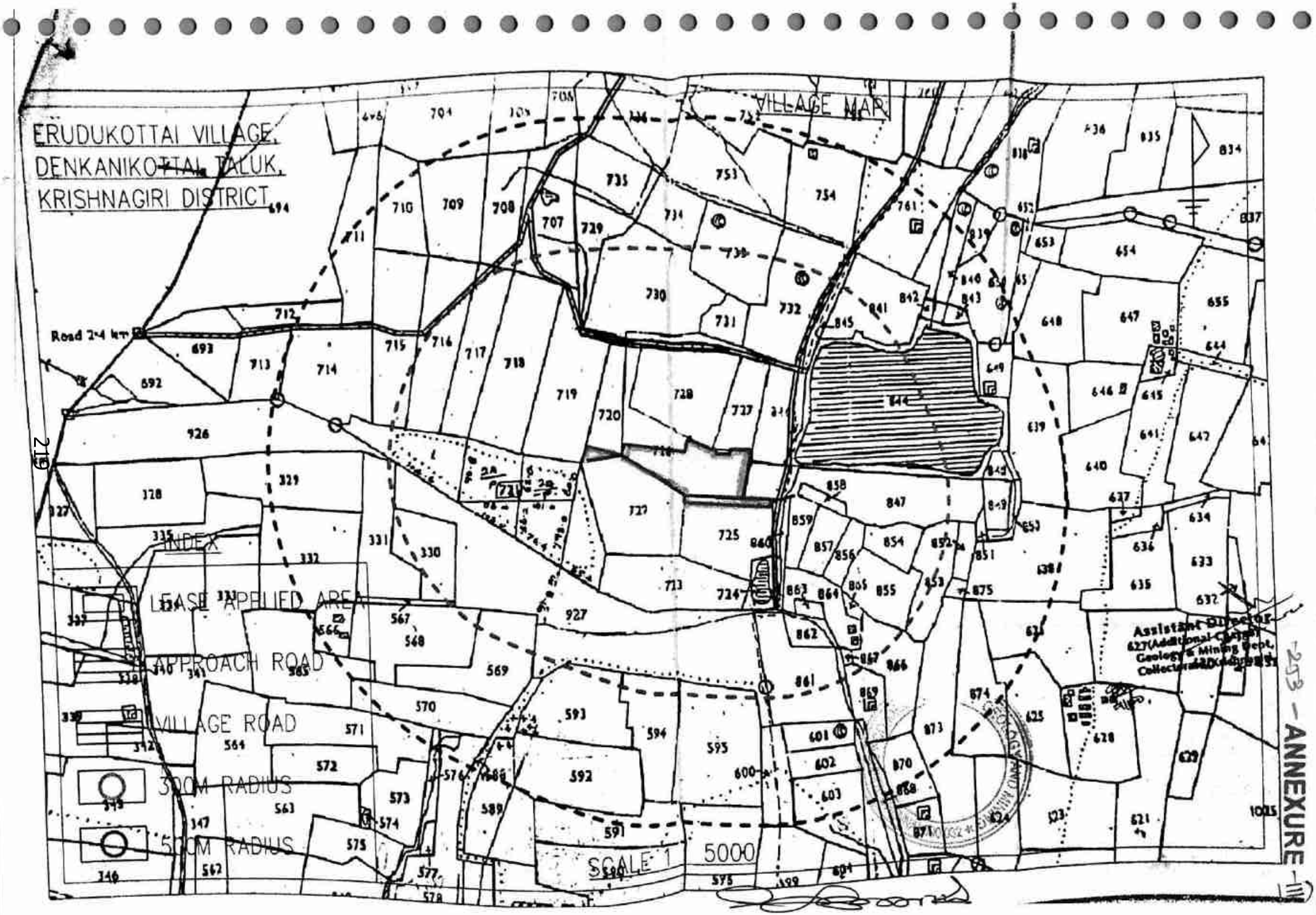
என்னால் வரைவு சரிபார்க்கப்பட்டு
பரப்பு கணிக்கப்பட்டது.

PROPOSED LEASE AREA

SAFETY ZONE

S.F.No.725/1(P) = 0.03.42 Ha

S.F.No.725/2A = 0.10.53 Ha


VILLAGE MAP
ERUDUKOTTAI VILLAGE,
DENKANIKOTTAI TALUK,
KRISHNAGIRI DISTRICT.
INDEX
LEASE APPLIED AREA
APPROACH ROAD
VILLAGE ROAD
300M RADIUS
500M RADIUS
SCALE 1 5000
Road 2·4 km
Assistant Director
(Additional Charge)
Geology & Mining Dept.
Collectorate
219
253 - ANNEXURE - III

ANNEXURE - IV

3	4	5	6	7	8	9	10	11
				ஹெ	ஏர்	ஆ	ஹெ	ஏர்	ஆ	
			8-3	9	1	38	0	07	0	0	10	034 இ. முக்கன்
			8-3	9	1	38	0	55	0	0	76	1219 அ. வகு...
			8-3	9	1	38	0	08	5	0		... கான்...
			8-3	9	1	38	0	08	5		12	1115 ...
			8-3	9	1	38	0	49	0	0	68	551 அ. ... தலி ...
							1	28	0	1	78	
			8-3	9	1	38	0	03	0	0	05	1224 கொ. வகு மல்லா
			8-3	9	1	38	0	16	5	0	23	1224 கொ. வகு மல்லா
			8-3	9	1	38	0	77	0	1	06	1421 ஜெக்கம்மா.
			8-3	9	1	38	0	76	0	1	05	1219 அ. லகுமய்யா.
							1	72	5	2	40	
727	727	ஏ	ப	...	8-2	8	2	15	0	72	5	1	56	1362 இ. வெங்கட தாஸ்தாயுடு
728	728	ஏ	ப	...	8-2	8	2	15	1	89	5	4	07	623 கு. நாராயண தாயுடு
729	729	அ	புஅ	...	...	...	...	...	1	28	0	...	...	...
730	1	730-1	ஏ	ப	...	8-2	8	2	15	1	74	5	3	75	1657 மு. சின்ன கெஞ்சப்பா (1) மு. பெரியகெஞ் சப்பா (2).
	2	2	ஏ	ப		8 2	8	2	15	0	65	0	1	40	126 கோ. காத்த ராஜி நாயுடு.
										2	39	5	5	15	
731	731	அ	புஅ	...	...	...	...	...	0	38	5	...	...	...
732	1	732-ப	ஏ	ப	...	8-2	8	2	15	0	38	5	0	83	1061 செ. மூக்கன்.
	2	-ப	ஏ	ப	...	8-2	8	2	15	0	39	0	0	84	953 செ. முனியப் பன்.
	3	-ப	ஏ	ப	...	8-2	8	2	15	0	03	5	0	09	1658 செ. மூக்கன் (1), செ. முனி யப்பன் (2), செ. சென்ன ... பன் (3).

COMMISSIONER OF GEOLOGY AND ... GUINDY, CHENNAI-600 032

கிராம நிர்வாக அலுவலர்
41. திருத்தேரை திராமம்
கேனகனிகோட்டை மல்லம்

727, 728, 730/2, 732

2	3	4	5	6	7	8	9	10	11
						ரூ. பை.	இலை. ஏர்ஸ்	ரூ. பை.	
119-பம	ஏ	பு	..	8-3	9	1 38	0 24·0	0 33	1655 ப. வீரப்பன் (1), ப. இரத்தப்பா (2), ப. ஏகுமலையா (3)
-பம	ஏ	ச	...	8-3	9	1 38	0 08·5	0 12	1748 ப. வீரப்பன் (1), ப. இரத்தப்பா (2), ந. ஏகுமலப்பா (3) ந. வீரப்பா (4) ஒ. பாலப்பா (5)
-பம	ஏ	ச	..	8-3	9	1 38	0 30·0	0 41	676 ஒ. பாலப்பா.
-பம	ஏ	ச	...	8-3	9	1 38	1 03·0	1 43	1323 ந. வீரப்பா.
-பம	ஏ	ச	..	8-3	9	1 38	0 13·0	0 25	676 ஒ. பாலப்பா.
							1 83	2 54	
120-பம	ஏ	ச	..	8-3	9	1 38	0 01·0	0 06	1224 கொ. ஏகுமலப்பா.
-பம	ஏ	ச	..	8-3	9	1 38	0 02·5	0 06	1224 கொ. ஏகுமலப்பா
பம	ஏ	ச	..	8-3	9	1 38	0 67·0	0 93	1224 கொ. ஏகுமலப்பா
							0 70 5	1 05	
721-1	ஏ	ச	...	8-4	11	0 91	0 98·5	0 90	1812 வெள்ளப்பா
-2	ஏ	ச	..	8-4	11	0 91	2 02·5	1 85	1813 ஹரிகரன் (1), முனியமலை (2)
-3	ஏ	ச	..	8-4	11	0 91	0 58·0	0 53	
							3 59·0	3 28	
722-பம	ஏ	ச	...	8-3	...	0 62	0 91·0	0 56	1054 இ. முத்தன்
-பம	ஏ	ச	...	8-3	...	0 62	0 36·0	0 22	123 பெ. காளப்பா.
-பம	ஏ	ச	...	8-3	...	0 62	0 48·0	0 31	1115 பெ. சாமப்பா.
							1 75·0	1 09	
723-1	ஏ	ச	...	8-3	9	1 38	0 86·5	1 20	544 கா. இம்மப்பா.
-2	ஏ	ச	...	8-3	9	1 38	0 64·0	0 88	544 கா. இம்மப்பா.
							1 50·5	2 08	
724	ஏ	ச					0 35·0		

ANNEXURE- V

-259-

தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : கிருஷ்ணகிரி வட்டம் : [illegible]

வருவாய் கிராமம் : இருதுகோட்டா பட்டா எண் : 8465

உரிமையாளர்கள் பெயர்

1. தருமன் மகன் கருணாநிதி

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	
716	4B2	0 - 9.50	0.32	--	--	--	--	2020/0103/31/132024--2016/31/10/000001SD -- 29-02-2020
717	3B	0 - 8.50	0.12	--	--	--	--	2016/0105/31/001346--2016/31/10/000001SD -- 02-03-2016
718	4B	0 - 6.00	0.10	--	--	--	--	2016/0105/31/001346--2016/31/10/000001SD -- 02-03-2016
718	5B	0 - 10.00	0.14	--	--	--	--	2016/0105/31/001346--2016/31/10/000001SD -- 02-03-2016
719	5B	0 - 7.50	0.10	--	--	--	--	2016/0105/31/001346--2016/31/10/000001SD -- 02-03-2016
720	3B	0 - 6.00	0.10	--	--	--	--	2016/0105/31/001346--2016/31/10/000001SD -- 02-03-2016
		0 - 47.50	0.88					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **31/10/041/08465/90153** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 08-11-2023 அன்று 03:52:28 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : கிருஷ்ணகிரி

வட்டம் : டெங்கனி

வருவாய் கிராமம் : இருதுகோட்டா

பட்டா எண் : 103

உரிமையாளர்கள் பெயர்

1. தருமன் மகன் டி.கருணாநிதி

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	
330	1	0 - 19.00	0.53	--	--	--	--	588/12--- -- 03-11-2009
330	2	0 - 30.00	0.83	--	--	--	--	588/12--- -- 03-11-2009
330	3	0 - 31.00	0.86	--	--	--	--	588/12--- -- 05-07-2004
715	3	0 - 97.00	1.35	--	--	--	--	---- -- -
721	1	0 - 98.50	0.90	--	--	--	--	---- -- -
721	2A	1 - 1.00	0.92	--	--	--	--	---- -- -
721	2B	1 - 1.50	0.93	--	--	--	--	---- -- -
722	1	0 - 91.00	0.56	--	--	--	--	---- -- -
722	2	0 - 36.00	0.22	--	--	--	--	588/12--- -- 19-05-2007
722	3	0 - 48.00	0.31	--	--	--	--	588/12--- -- 19-05-2007
725	1	0 - 7.00	0.10	--	--	--	--	---- -- -
725	3	0 - 8.50	0.12	--	--	--	--	---- -- -
725	4	0 - 8.50	0.12	--	--	--	--	---- -- -
725	5	0 - 49.00	0.68	--	--	--	--	---- -- -
		7 - 26.00	8.43					

குறிப்பு2 :

-263-

தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : கிருஷ்ணகிரி வட்டம் : டெங்கனிகோட்டா

வருவாய் கிராமம் : இருதுகோட்டா பட்டா எண் : 2120

உரிமையாளர்கள் பெயர்

1. தருமன் மகன் டி.கருனாநிதி

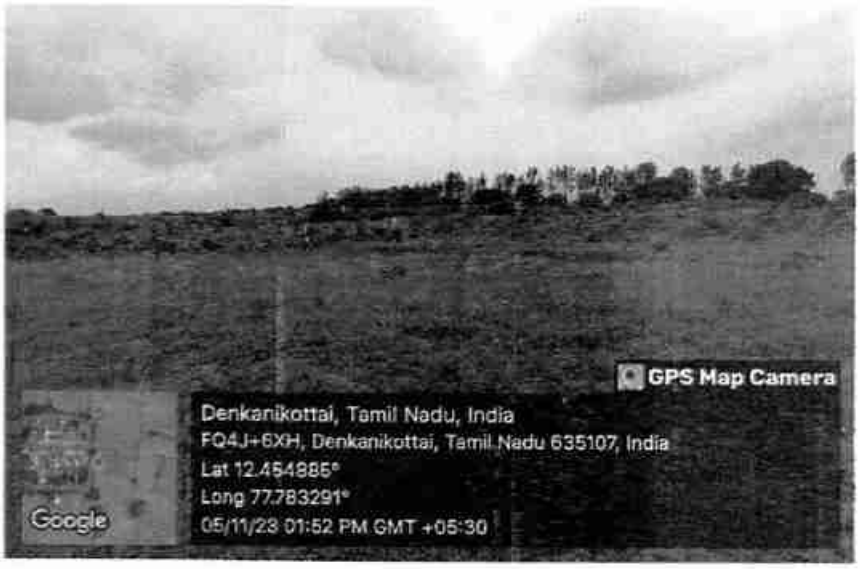
புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
331	1B	0 - 44.53	1.51	--	--	--	--	2020/0105/31/197428--2020/31/10/000220SD -- 03-03-2020
719	4B	0 - 15.75	0.22	--	--	--	--	2017/0105/31/045305--2017/31/10/000118SD -- 11-11-2017
725	2A	0 - 10.53	0.15	--	--	--	--	2020/0105/31/198083--2020/31/10/000217SD -- 03-03-2020
726	B1	0 - 77.00	1.06	--	--	--	--	2020/0103/31/132217-- -- 29-02-2020
726	B2A	0 - 74.50	0.95	--	--	--	--	2020/0105/31/198083--2020/31/10/000217SD -- 03-03-2020
728	4B	0 - 12.15	0.26	--	--	--	--	2020/0105/31/197418--2020/31/10/000221SD -- 03-03-2020
		2 - 34.46	4.15					

குறிப்பு2 :

1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் **https://eservices.tn.gov.in** என்ற இணைய தளத்தில் **31/10/041/02120/30105** என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 08-11-2023 அன்று 03:50:54 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின்2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

PHOTOCOPY OF THE APPLIED LEASE AREA

Field photos in respect of Black granite quarry lease in S.F.No: 720/3B (0.06.0Hect), 725/1 (Part) (0.03.42Hect), 725/2A (0.10.53Hect) 726/B1 (Part) (0.42.0Hect) and 726/B2A (0.74.5Hect) of Patta land, over an extent of 1.36.45hectares of Irudhukottai village, Denkanikottai Taluk, Krishnagiri District, Tamil Nadu State belongs to **Thiru.D.Karunanidhi,**



ANNEXURE - VII

இந்திய அரசாங்கம்
Government of India

கருணாநிதி த
KARUNANIDHI D
பிறந்த நாள்/DOB: 03/05/1979
ஆண்/ MALE

COMMISSIONER OF GEOLOGY AND MINING * GUINDY, CHENNAI-600 032 *

6838 7736 5789

VID : 9179 3214 8573 0915

எனது ஆதார், எனது அடையாளம்

இந்திய தனித்துவ அடையாள ஆணைய அமைப்பு
Unique Identification Authority of India

முகவரி:
S/O தருமன், எண் 15, வலசகவுண்டனூர்,
புளியம்பட்டி, போச்சம்பல்லி,
திம்மிநாய்க்கம்பட்டி, கிருஷ்ணகிரி,
தமிழ்நாடு - 635206

Address:
S/O Dharuman, NO 15, VALASAGOUNDANUR,
PULIYAMPATTI, POCHAMPALLI,
Thimminaikampatti, Krishnagiri,
Tamil Nadu - 635206

6838 7736 5789

VID : 9179 3214 8573 0915

1947 | help@uidai.gov.in | www.uidai.gov.in

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 वयॉ , 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 में मान्यता प्रदान की जाती है ।

Shri S. Karuppannan, Manganikadu, Muthampatty (Post), Bommidi (Via), Omalur Taluk, Salem District, Tamilnadu – 635 301, whose **Photograph and signature** is affixed herein above, having given satisfactory evidence of his qualifications & experience hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

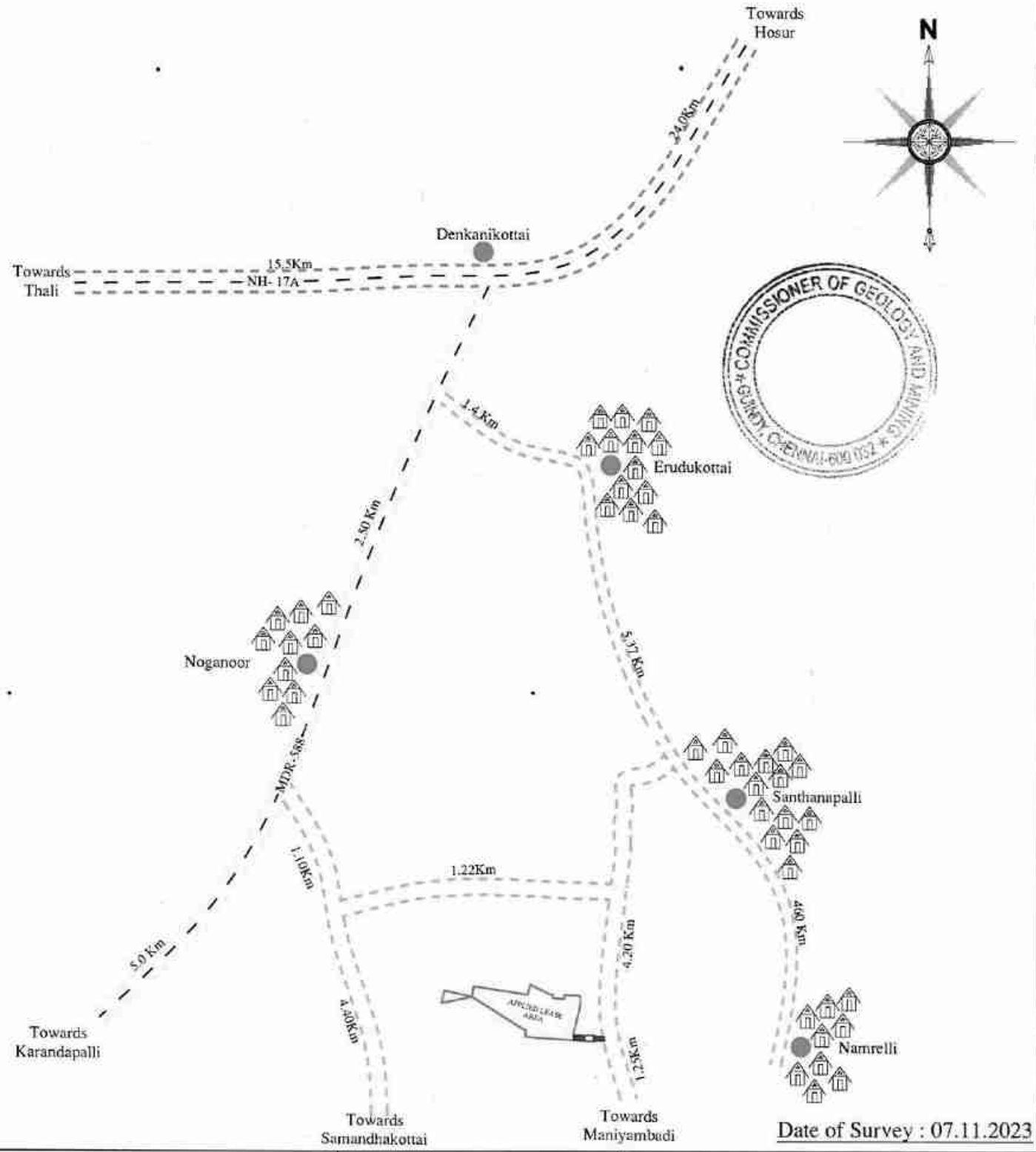
उनकीपंजीयन संख्या है
His registration number is — RQP /MAS/263/2014/A

यह मान्यता 10 वर्षों की अवधि के लिए मान्यता है जो दिनांक 15.12.2024 को समाप्त होगी।
This recognition is valid for a period of 10 years ending on 15.12.2024.

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिती में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।
This certificate will liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

स्थान/ Place : Chennai
दिनांक/ Date : 16.12.2014.

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



Date of Survey : 07.11.2023

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
VELLIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

PLATE NO-I

INDEX

QUARRY LEASE AREA
APPROACH ROAD
VILLAGE ROAD
MDR-588
NH-17A

ROUTE MAP

Not to Scale

PREPARED BY :

I DO HERE BY 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

12°27'40.50501"N

77°47'0.03493"E

N

COMMISSIONER OF GEOLOGY AND MINING * GUINDY *

Date of Survey : 07.11.2023

PLATE NO-IA

APPLICANT:
Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT	: 1.36.45Hect
S.F.NO	: 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE	: IRUDHUKOTTAI
TALUK	: DENKANIKOTTAI
DISTRICT	: KRISHNAGIRI
STATE	: TAMIL NADU

INDEX

MINE LEASE AREA:

TOPO SHEET NO : 57-H/15

LATITUDE: 12°27'36.96907"N - 12°27'40.50501"N

LONGITUDE: 77°47'0.03493"E - 77°47'9.65484"E

LOCATION PLAN

Not to Scale

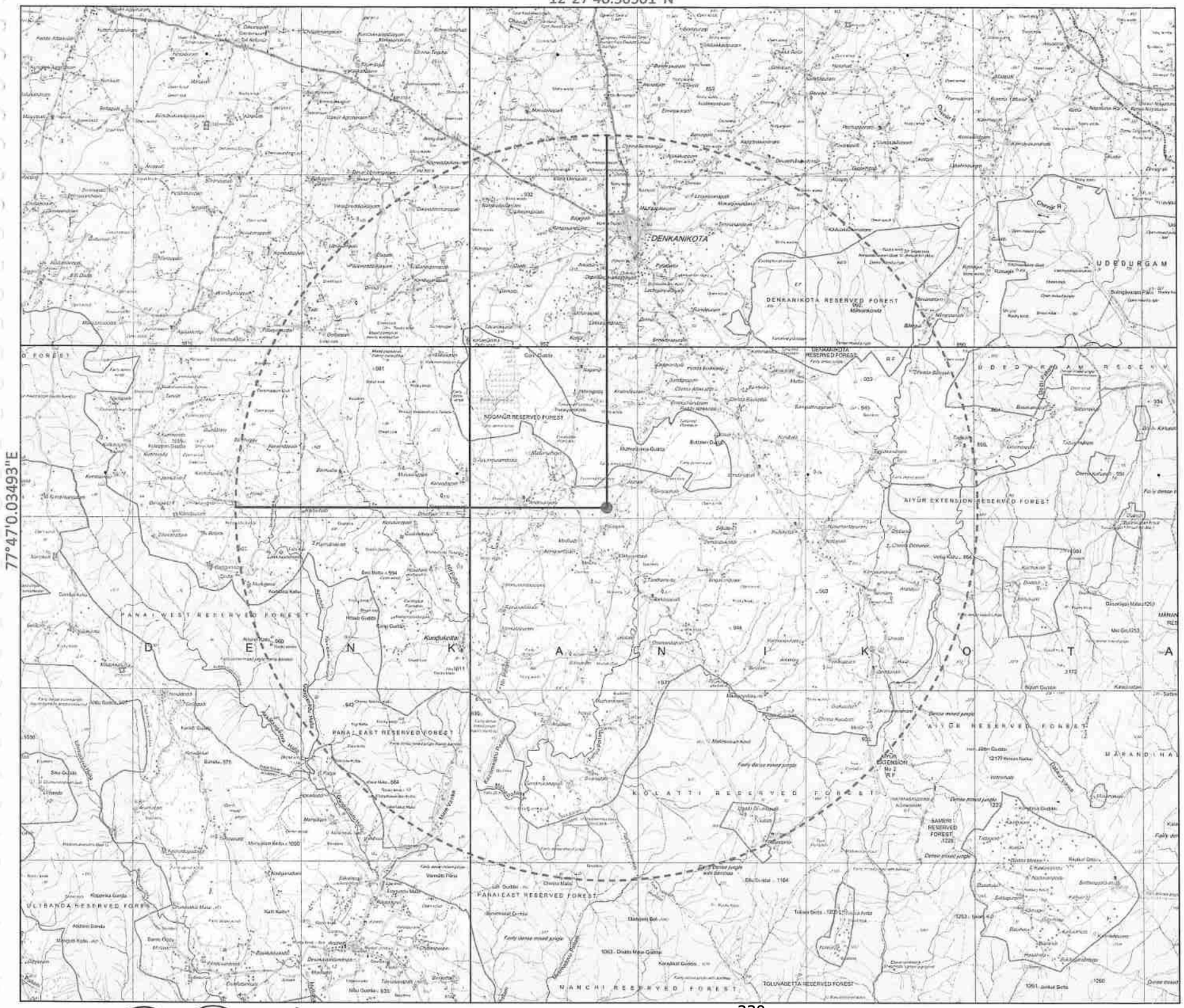
PREPARED BY :

I DO HERE BY 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

12°27'40.50501"N

77°47'0.03493"E



-975-

Date of Survey : 07.11.2023

PLATE NO-IB

N

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 725/1(Part), 726/1(Part), 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

INDEX

TOPO SHEET NO : 57-H/15

LATITUDE: 12°27'36.96907"N - 12°27'40.50501"N

LONGITUDE: 77°47'0.03493"E - 77°47'9.65484"E

MINE LEASE AREA

10KM RADIUS

CONVENTIONAL SYMBOLS

TOPOSHEET MAP
SCALE– 1:1,00,000

PREPARED BY :

I DO HERE BY 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

N

PLATE NO-IC Date of Survey : 07.11.2023

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect.
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

INDEX

TOPO SHEET NO : 57-H/15

LATITUDE: 12°27'36.96907"N - 12°27'40.50501"N

LONGITUDE: 77°47'0.03493"E - 77°47'9.65484"E

INDEX

QUARRY LEASE AREA
100M RADIUS
200M RADIUS
300M RADIUS
400M RADIUS
500M RADIUS
1KM RADIUS
APPROACH ROAD
VILLAGE ROAD
EXISTING QUARRY PIT

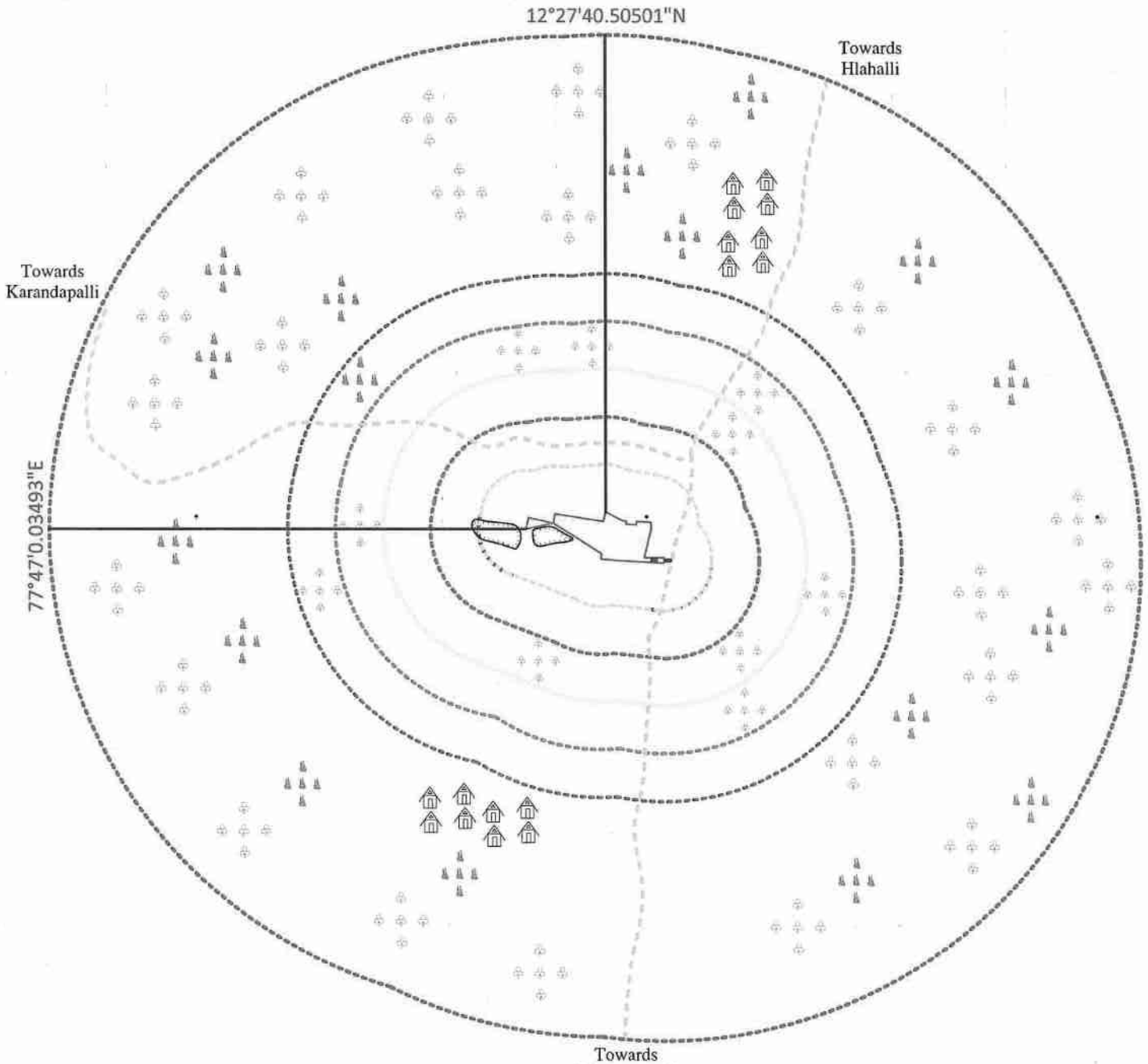
SATELLITE IMAGE FOR
1Km RADIUS
SCALE- 1:10000

PREPARED BY:

I DO HERE BY 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



JULY TO SEPTEMBER

N

279

PLATE NO-ID Date of Survey : 07.11.2023

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT	: 1.36.45Hect
S.F.NO	: 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE	: IRUDHUKOTTAI
TALUK	: DENKANIKOTTAI
DISTRICT	: KRISHNAGIRI
STATE	: TAMIL NADU

INDEX

TOPO SHEET NO : 57-H/15

LATITUDE: 12°27'36.96907"N - 12°27'40.50501"N

LONGITUDE: 77°47'0.03493"E - 77°47'9.65484"E

INDEX

- QUARRY LEASE AREA
- 100M RADIUS
- 200M RADIUS
- 300M RADIUS
- 400M RADIUS
- 500M RADIUS
- 1KM RADIUS
- APPROACH ROAD
- VILLAGE ROAD
- HABITATIONS
- SHRUBS & TREES
- EXISTING QUARRY PIT

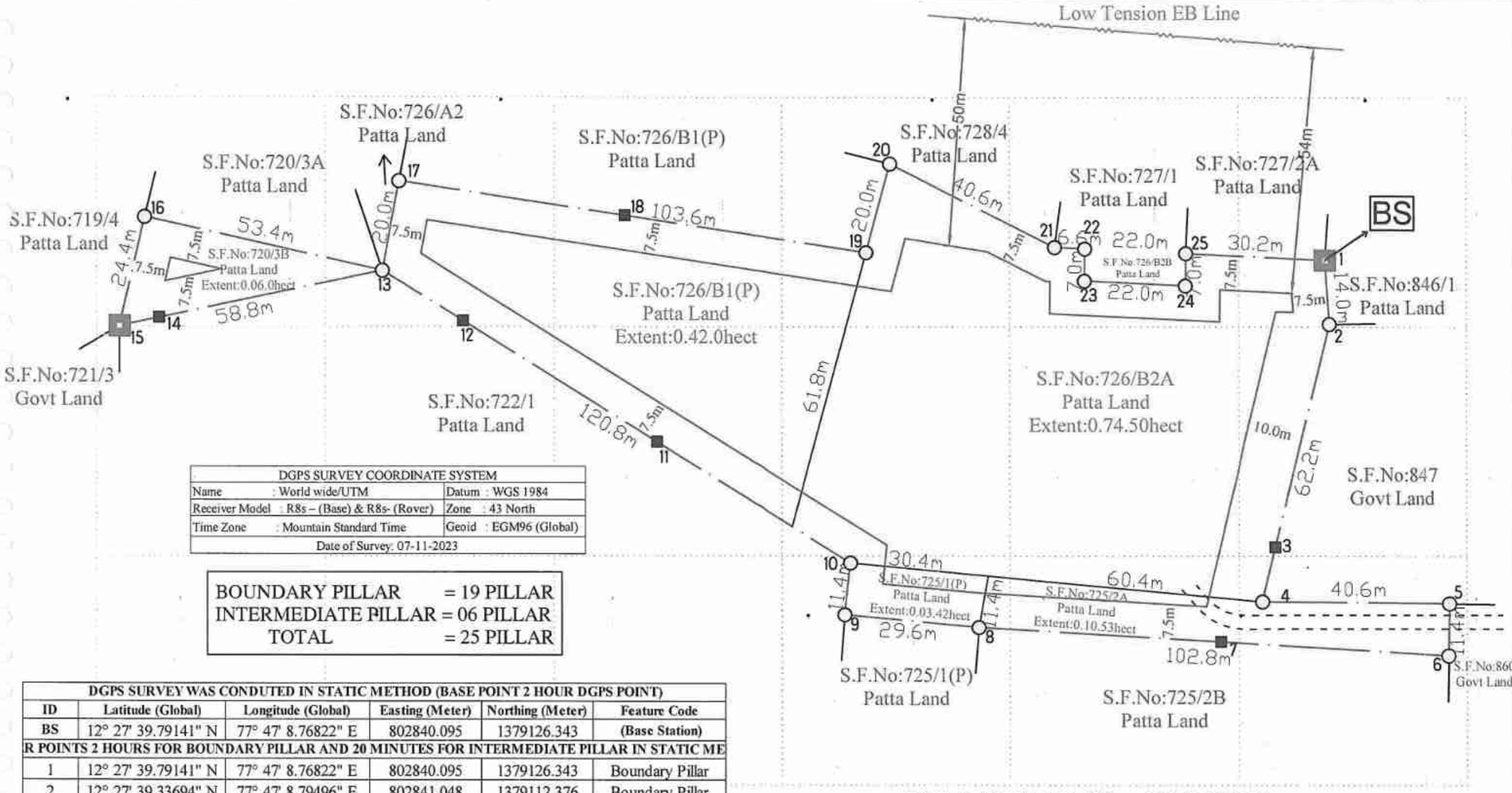
ENVIRONMENTAL PLAN

SCALE– 1:10000

PREPARED BY:

I DO HERE BY 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



DGPS SURVEY COORDINATE SYSTEM			
Name	: World wide/UTM	Datum	: WGS 1984
Receiver Model	: R8s – (Base) & R8s- (Rover)	Zone	: 43 North
Time Zone	: Mountain Standard Time	Geoid	: EGM96 (Global)
Date of Survey: 07-11-2023			

BOUNDARY PILLAR	= 19 PILLAR
INTERMEDIATE PILLAR	= 06 PILLAR
TOTAL	= 25 PILLAR

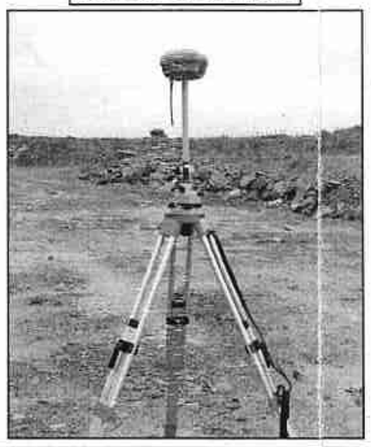
DGPS SURVEY WAS CONDUTED IN STATIC METHOD (BASE POINT 2 HOUR DGPS POINT)					
ID	Latitude (Global)	Longitude (Global)	Easting (Meter)	Northing (Meter)	Feature Code
BS	12° 27' 39.79141" N	77° 47' 8.76822" E	802840.095	1379126.343	(Base Station)
R POINTS 2 HOURS FOR BOUNDARY PILLAR AND 20 MINUTES FOR INTERMEDIATE PILLAR IN STATIC ME					
1	12° 27' 39.79141" N	77° 47' 8.76822" E	802840.095	1379126.343	Boundary Pillar
2	12° 27' 39.33694" N	77° 47' 8.79496" E	802841.048	1379112.376	Boundary Pillar
3	12° 27' 37.75913" N	77° 47' 8.39588" E	802829.496	1379063.732	Intermediate Pillar
4	12° 27' 37.37407" N	77° 47' 8.29833" E	802826.676	1379051.859	Boundary Pillar
5	12° 27' 37.34942" N	77° 47' 9.65484" E	802867.674	1379051.532	Boundary Pillar
6	12° 27' 36.97907" N	77° 47' 9.64369" E	802867.457	1379040.138	Boundary Pillar
7	12° 27' 37.09266" N	77° 47' 7.99325" E	802817.545	1379043.108	Intermediate Pillar
8	12° 27' 37.21285" N	77° 47' 6.24586" E	802764.702	1379046.249	Boundary Pillar
9	12° 27' 37.31136" N	77° 47' 5.27150" E	802735.227	1379048.969	Boundary Pillar
10	12° 27' 37.67923" N	77° 47' 5.31677"E	802736.476	1379060.297	Boundary Pillar
11	12° 27' 38.55157" N	77° 47' 3.92053" E	802694.002	1379086.677	Intermediate Pillar
12	12° 27' 39.42388" N	77° 47' 2.52423" E	802651.527	1379113.058	Intermediate Pillar
13	12° 27' 39.78677" N	77° 47' 1.94325" E	802633.851	1379124.033	Boundary Pillar
14	12° 27' 39.46937" N	77° 47' 0.32083" E	802584.927	1379113.760	Intermediate Pillar
15	12° 27' 39.41345" N	77° 47' 0.03493" E	802576.306	1379111.950	Boundary Pillar
16	12° 27' 40.18509" N	77° 47' 0.22337" E	802581.749	1379135.735	Boundary Pillar
17	12° 27' 40.4203" N	77° 47' 2.0691" E	802637.453	1379143.556	Boundary Pillar
18	12° 27' 40.1589" N	77° 47' 3.7021" E	802686.884	1379136.038	Intermediate Pillar
19	12° 27' 39.8788" N	77° 47' 5.45136" E	802739.833	1379127.978	Boundary Pillar
20	12° 27' 40.50501" N	77° 47' 5.63023" E	802745.037	1379147.289	Boundary Pillar
21	12° 27' 39.90277" N	77° 47' 6.82624" E	802781.375	1379129.150	Boundary Pillar
22	12° 27' 39.89826" N	77° 47' 7.04404" E	802787.957	1379129.081	Boundary Pillar
23	12° 27' 39.66295" N	77° 47' 7.03903" E	802787.881	1379121.844	Boundary Pillar
24	12° 27' 39.62113" N	77° 47' 7.76570" E	802809.856	1379120.788	Boundary Pillar
25	12° 27' 39.84881" N	77° 47' 7.77069" E	802809.93	1379127.791	Boundary Pillar

Extent As Per Revenue FMB – 1.36.45 Hectares
Extent As Per DGPS Survey – 1.36.40 Hectares

NOTE:
1. The True North Adopted both for surveyed plan and DGPS Coordinated.
2. The Given Measurements are in Meter.
3. The DGPS Survey for the area is taken up by synchronising nearest survey of India control point, (Near Krishnagiri Collectore Office).
4. Base is at 46.112 Kilometers from GCP Control Point.

LINE MEASUREMENT			
LINE	DGPS READINGS	LINE	DGPS READINGS
1 TO 2	14.0m	14 TO 15	8.8m
2 TO 3	50.0m	15 TO 16	24.4m
3 TO 4	12.2m	16 TO 13	53.4m
4 TO 5	40.6m	13 TO 17	20.0m
5 TO 6	11.4m	17 TO 18	50.0m
6 TO 7	50.0m	18 TO 19	53.6m
7 TO 8	52.8m	19 TO 20	20.0m
8 TO 9	29.6m	20 TO 21	40.6m
9 TO 10	11.4m	21 TO 22	6.6m
10 TO 11	50.0m	22 TO 23	7.0m
11 TO 12	50.0m	23 TO 24	22.0m
12 TO 13	20.8m	24 TO 25	7.0m
13 TO 14	50.0m	25 TO 1	30.2m

BASE STATION



N

PLATE NO-II

APPLICANT:
Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT	: 1.36.45Hect
S.F.NO	: 720/3B,725/1(P),725/2A,&726/B1(P) 726/B2A.
VILLAGE	: ERUDUKOTTAI
TALUK	: DENKANIKOTTAI
DISTRICT	: KRISHNAGIRI
STATE	: TAMIL NADU

INDEX

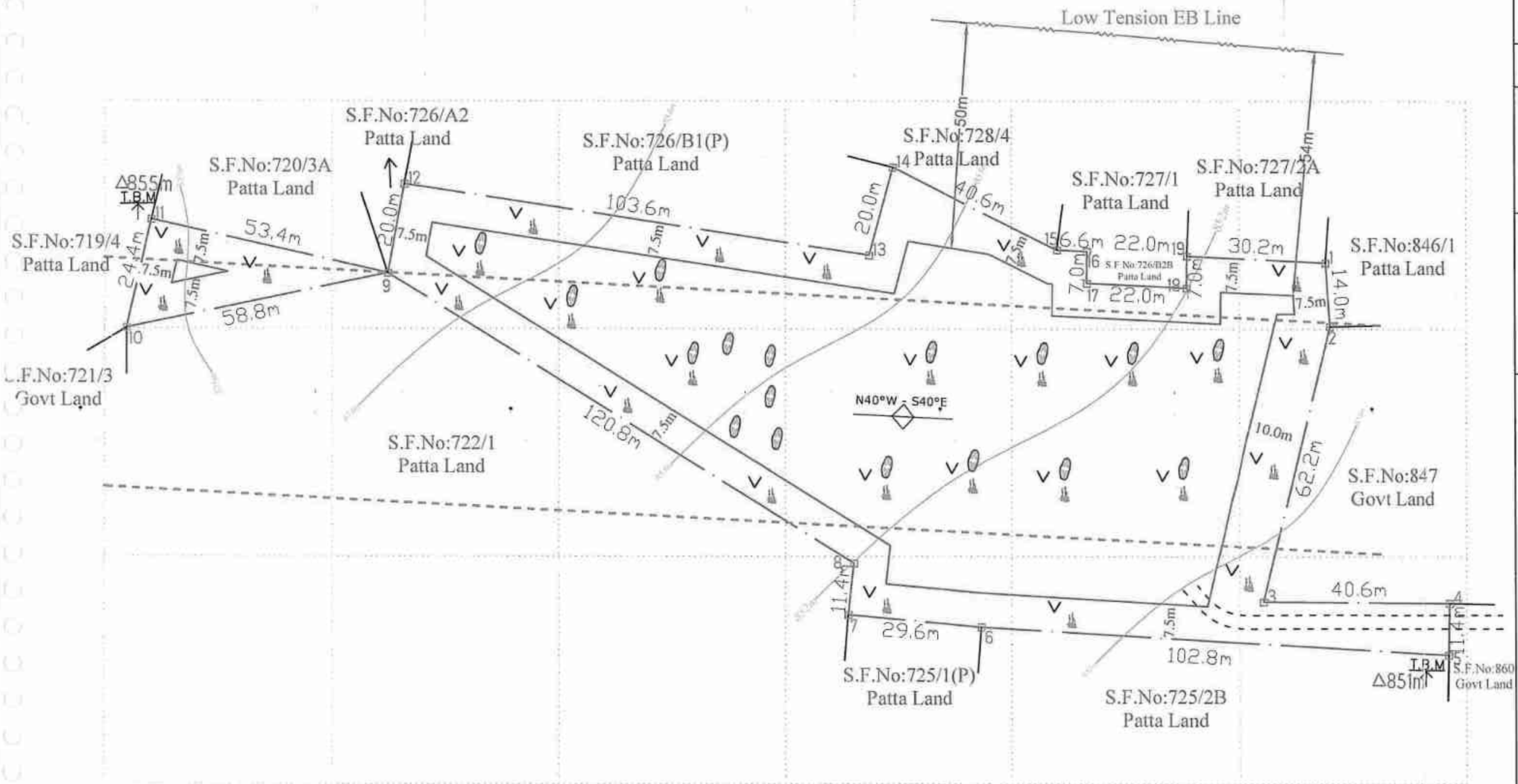
- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH ROAD
- REVENUE STONE
- BOUNDARY STONES
- INTERMEDIATE STONES
- EB LINE

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.,
GEO TECHNICAL MINING SOLUTIONS
(NABET Accreditation & ISO Certified Company)
No.1/213–B, Ground Floor, Natesan Complex,
Oddapatti, Collectorate Post office,
Dharmapuri – 636 705. Tamil Nadu, India.



Date of Survey : 07.11.2023

PLATE NO-III

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT	: 1.36.45Hect
S.F.NO	: 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE	: IRUDHUKOTTAI
TALUK	: DENKANIKOTTAI
DISTRICT	: KRISHNAGIRI
STATE	: TAMIL NADU

INDEX

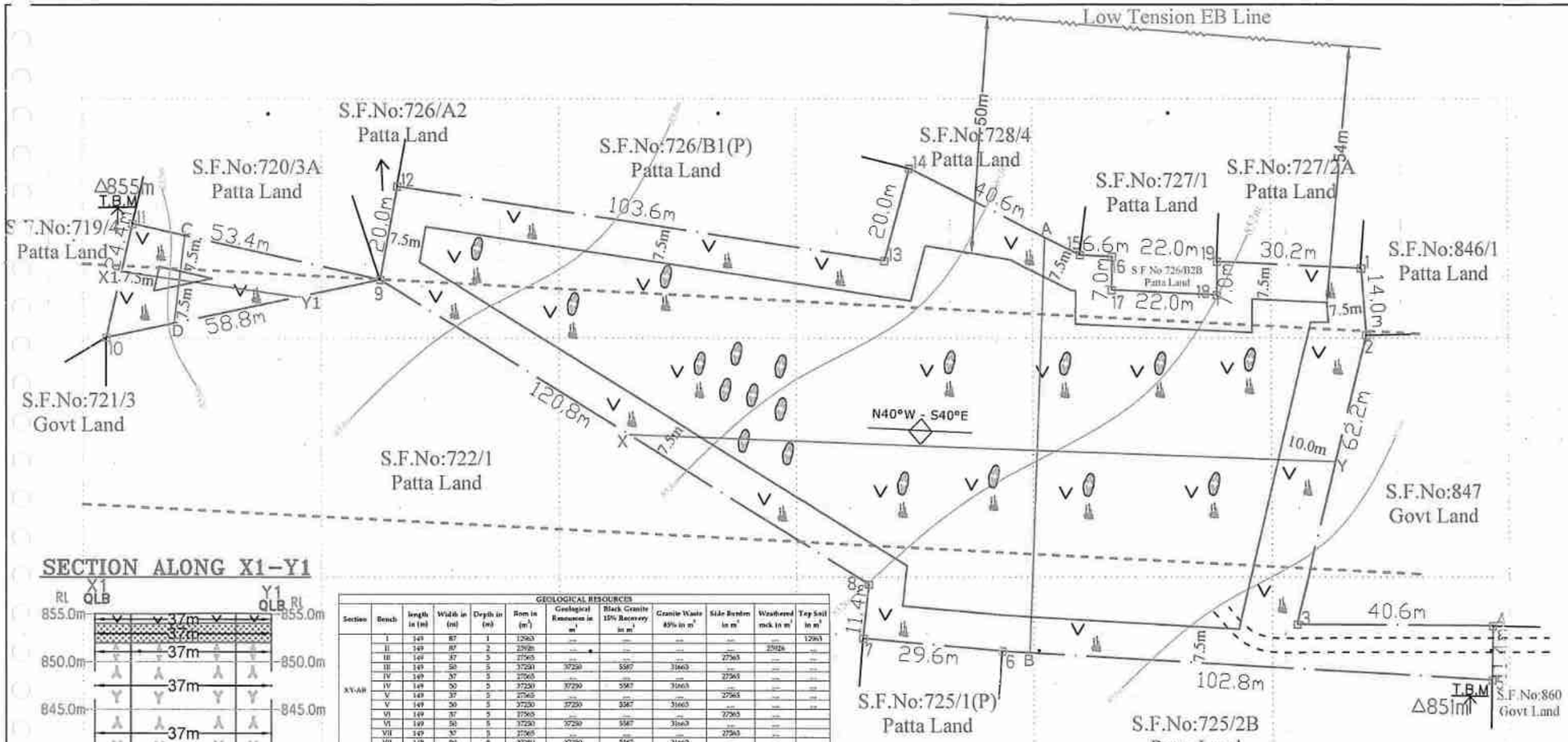
- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS (T.B.M △855.0m)
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE

SURFACE PLAN
SCALE 1 : 1000

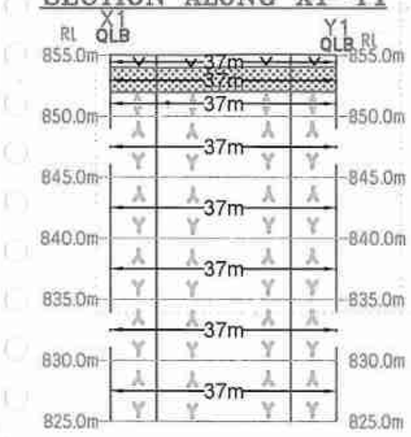
Prepared By:

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

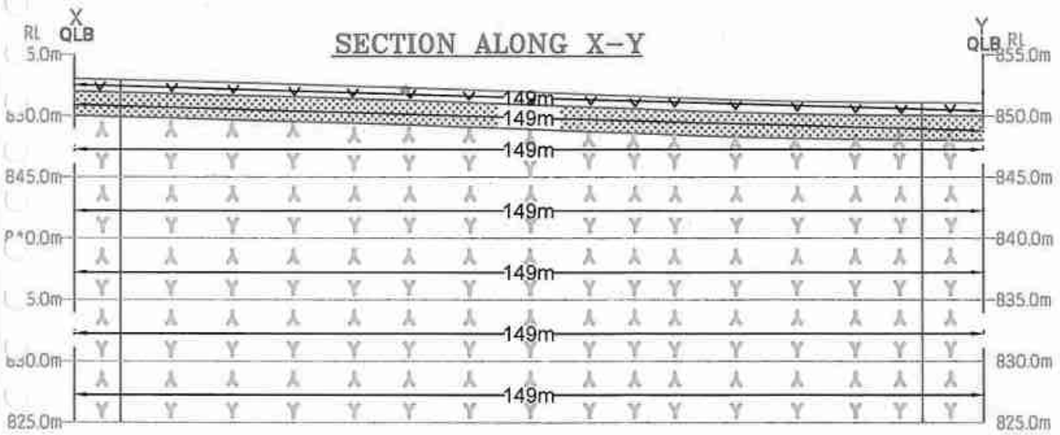


SECTION ALONG X1–Y1

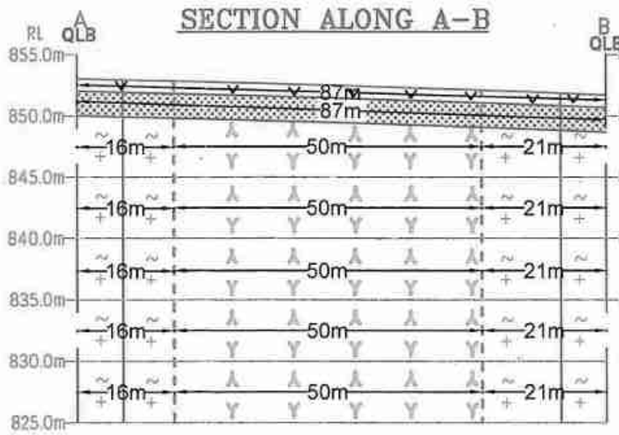


GEOLOGICAL RESOURCES												
Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Geological Resources in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
XY-AB	I	149	87	1	12963	---	---	---	---	---	12963
	II	149	87	2	25926	---	---	---	---	25926	---
	III	149	87	3	37565	---	---	---	27565	---	---
	IV	149	50	5	37250	37250	5587	31663	---	---	---
	V	149	87	3	37565	---	---	---	27565	---	---
	IV	149	50	5	37250	37250	5587	31663	---	---	---
	V	149	87	3	37565	---	---	---	27565	---	---
	VI	149	50	5	37250	37250	5587	31663	---	---	---
	VI	149	87	3	37565	---	---	---	27565	---	---
	VII	149	50	5	37250	37250	5587	31663	---	---	---
TOTAL						184150	27935	158312	137825	25926	12963
XIYI-CD	I	37	18	1	666	---	---	---	---	---	666
	I	37	18	2	1332	---	---	---	---	1332	---
	I	37	8	2	592	---	---	---	592	---	---
	I	37	10	2	740	740	111	629	---	---	---
	II	37	8	5	1480	---	---	---	1480	---	---
	II	37	10	5	1850	1850	277	1573	---	---	---
	III	37	8	5	1480	---	---	---	1480	---	---
	III	37	10	5	1850	1850	277	1573	---	---	---
	IV	37	8	5	1480	---	---	---	1480	---	---
	IV	37	10	5	1850	1850	277	1573	---	---	---
	V	37	8	5	1480	---	---	---	1480	---	---
	V	37	10	5	1850	1850	277	1573	---	---	---
	VI	37	8	5	1480	---	---	---	1480	---	---
	VI	37	10	5	1850	1850	277	1573	---	---	---
TOTAL						9990	1496	8494	7992	1332	666
GRAND TOTAL						196240	29431	166809	145817	27258	13629

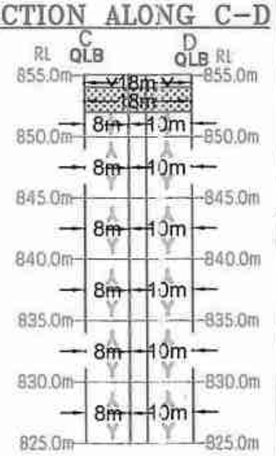
SECTION ALONG X–Y



SECTION ALONG A–B



SECTION ALONG C–D



N

Date of Survey : 07.11.2023

PLATE NO-IV

APPLICANT:
Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI DISTRICT.

LOCATION:
EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

INDEX

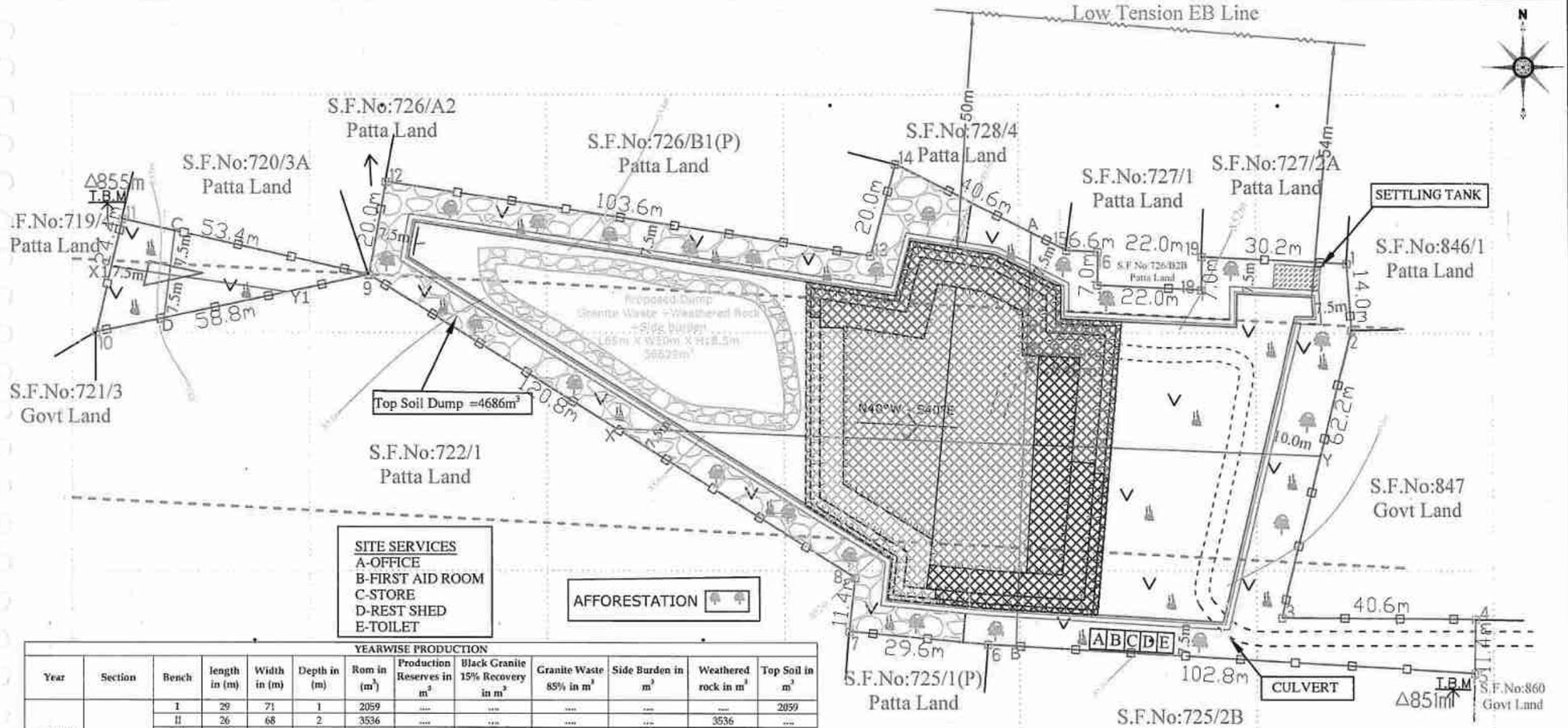
- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS (T.B.M 855.0m)
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE
- WEATHERED ROCK
- GRANITE GNIESS

GEOLOGICAL PLAN & SECTIONS
SCALE 1 : 1000
SCALE HOR 1:1000
VER 1:500

Prepared By:

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

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

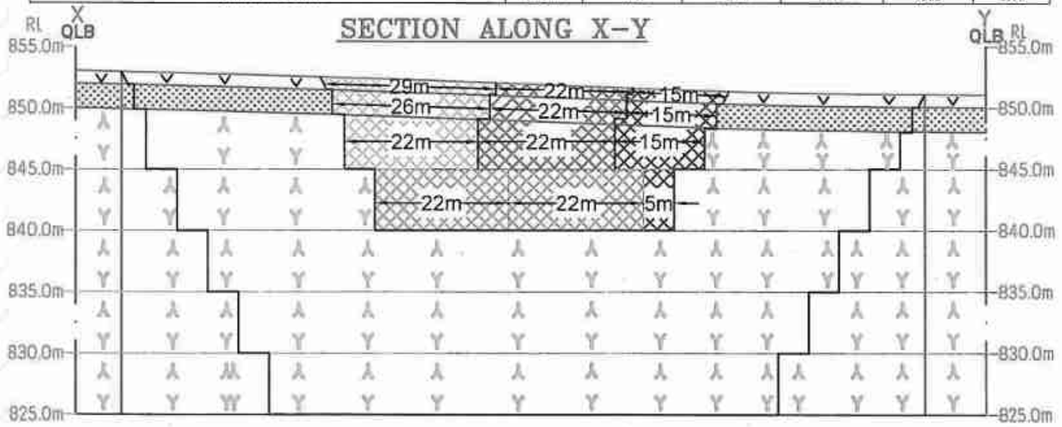


YEARWISE PRODUCTION

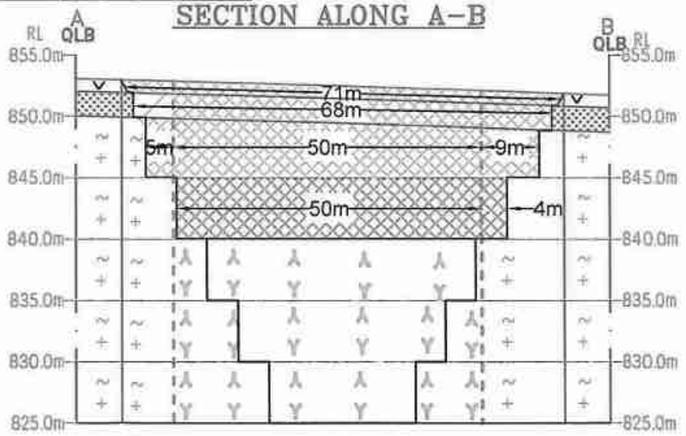
Year	Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Production Reserves in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
I - YEAR	XY-AB	I	29	71	1	2059	....	....	....	....	....	2059
		II	26	68	2	3536	....	....	....	....	3536	....
		III	59	14	5	4130	....	....	....	4130	....	
		III	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					5500	825	4675	4130	3536	2059
II - YEAR		I	22	71	1	1562	....	....	....	....	....	1562
		II	22	68	2	2992	....	....	....	....	2992	....
		III	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					5500	825	4675	0	2992	1562
III - YEAR		I	15	71	1	1065	....	....	....	....	....	1065
		II	15	68	2	2040	....	....	....	....	2040	....
		III	15	50	5	3750	3750	562	3188	....	....	....
		IV	5	50	5	1250	1250	187	1063	....	....	....
		TOTAL					5000	749	4251	0	2040	1065
IV-YEAR		IV	49	4	5	980	....	....	....	980	....	....
		IV	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					5500	825	4675	980	0	0
V-YEAR		IV	22	50	5	5500	5500	825	4675	....	....	....
		TOTAL					5500	825	4675	0	0	0
GRAND TOTAL							27000	4049	22951	5110	8568	4686

I-YEAR EXCAVATION
II-YEAR EXCAVATION
III-YEAR EXCAVATION
IV-YEAR EXCAVATION
V-YEAR EXCAVATION

SECTION ALONG X–Y



SECTION ALONG A–B



Date of Survey : 07.11.2023

PLATE NO-V

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 726/A1(Part), 725/2B, 726/B1 (Part) & 726/B2A.
VILLAGE : IRUTTUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMILNADU

INDEX

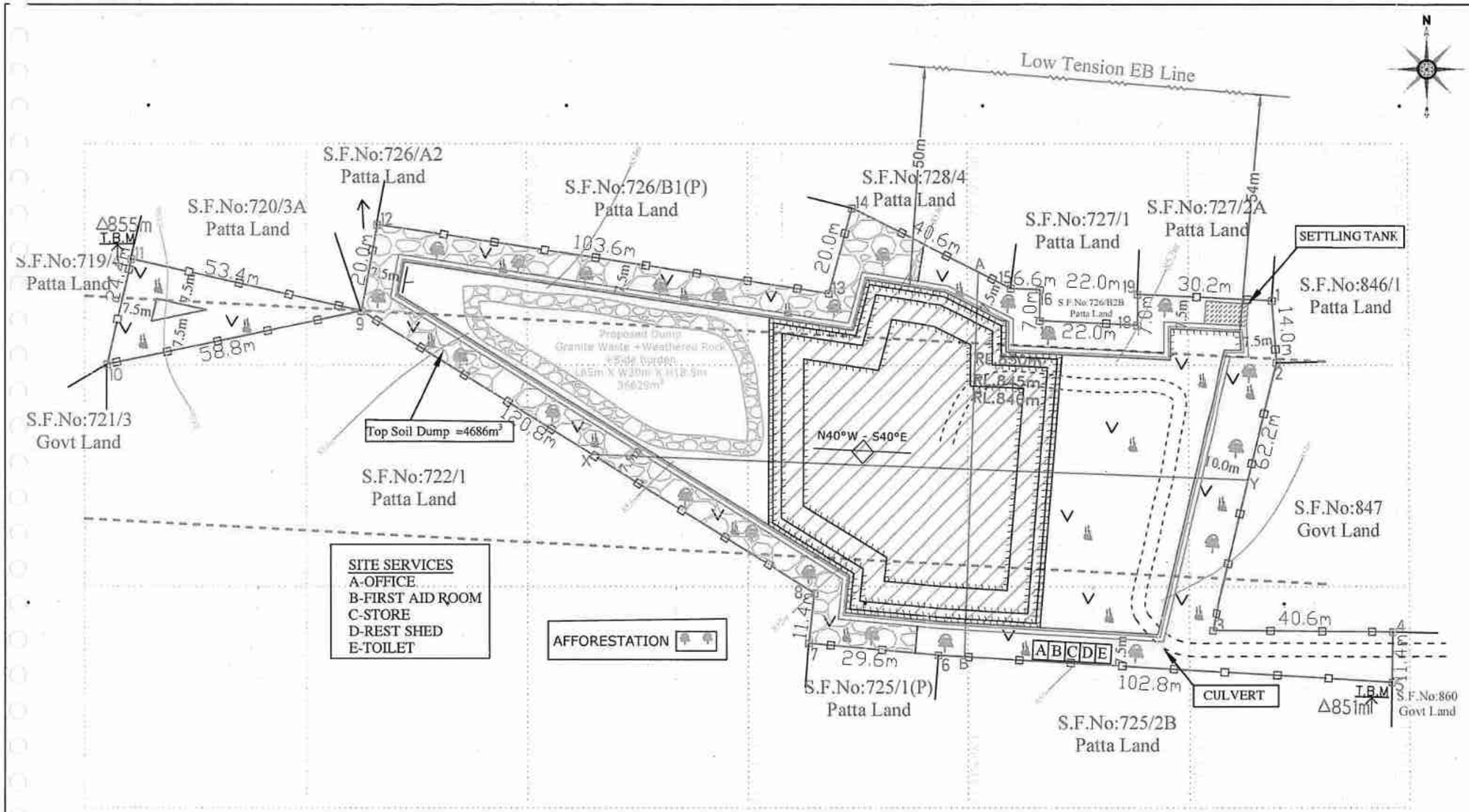
- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE
- DRAINAGE + SETTLING TANK
- BACK FILLING
- FENCING
- ULTIMATE BENCH
- PROPOSED BENCH
- WEATHERED ROCK
- GRANITE GNIESS

YEARWISE DEVELOPMENT, PRODUCTION PLAN & SECTIONS
SCALE 1 : 1000
SCALE HOR 1:1000
VER 1:500

Prepared By:

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

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



QUARRY LAYOUT LAND USE PATTERN

DESCRIPTION	PRESENT AREA IN (Hect)	AREA IN USE DURING THE MINING PERIOD (Hect)	COLOUR CODE
AREA UNDER MINING	NIL	0.41.82	
INFRASTRUCTURE	NIL	0.02.0	
ROAD	NIL	0.05.0	
GREEN BELT	NIL	0.19.25	
WASTE DUMP	NIL	0.39.00	
DRAINAGE + SETTLING TANK	NIL	0.05.52	
UN-UTILIZED AREA	1.36.45	0.23.86	...
GRAND TOTAL	1.36.45	1.36.45	...

Date of Survey : 07.11.2023

PLATE NO-VI

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect.
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

INDEX

- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS (T.B.M 1)(M55.0m)
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE
- DRAINAGE + SETTLING TANK
- BACK FILLING
- FENCING
- PROPOSED BENCH

QUARRY LAYOUT & AFFORESTATION 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

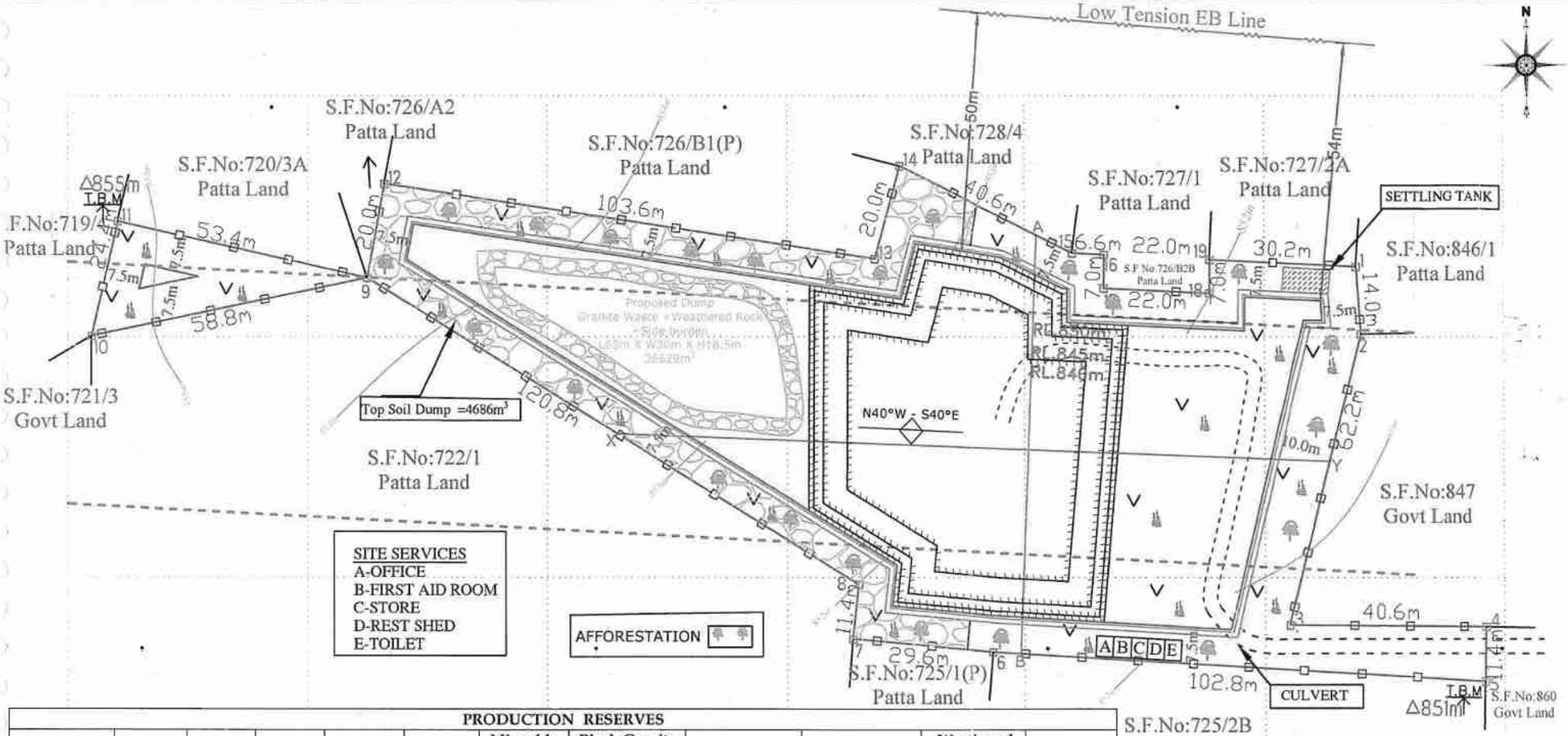
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A

Date of Survey : 07.11.2023

PLATE NO-VII

APPLICANT:
Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:
EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU



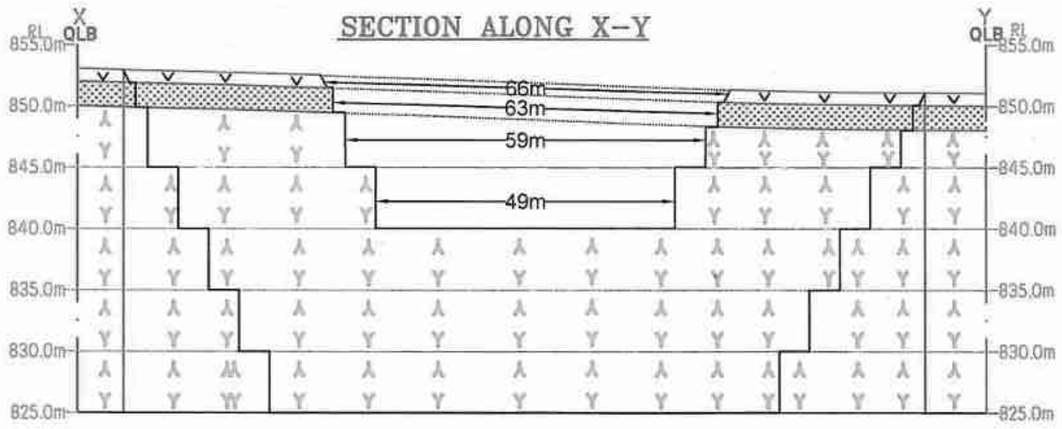
INDEX

- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE
- DRAINAGE + SETTLING TANK
- BACK FILLING
- FENCING
- ULTIMATE BENCH
- PROPOSED BENCH
- WEATHERED ROCK
- GRANITE GNIESS

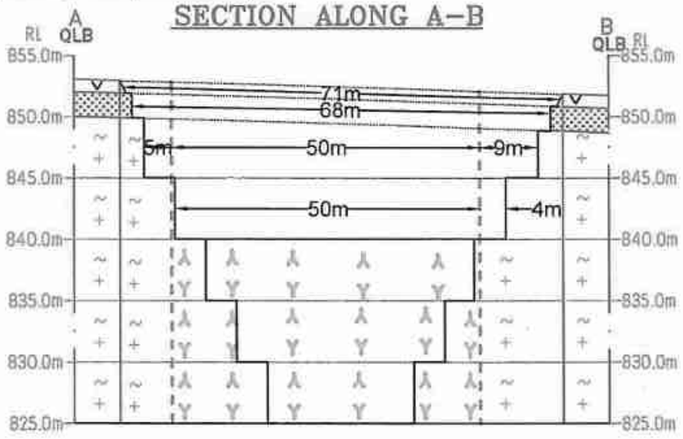
PRODUCTION RESERVES

Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Mineable reserves in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
XY-AB	I	66	71	1	4686	....	....	....	....	....	4686
	II	63	68	2	8568	....	....	....	....	8568	....
	III	59	14	5	4130	....	....	....	4130	....	....
	III	59	50	5	14750	14750	2212	12538	....	....	....
	IV	49	4	5	980	....	....	....	980	....	....
	IV	49	50	5	12250	12250	1837	10413	....	....	....
TOTAL						27000	4049	22951	5110	8568	4686

SECTION ALONG X–Y



SECTION ALONG A–B

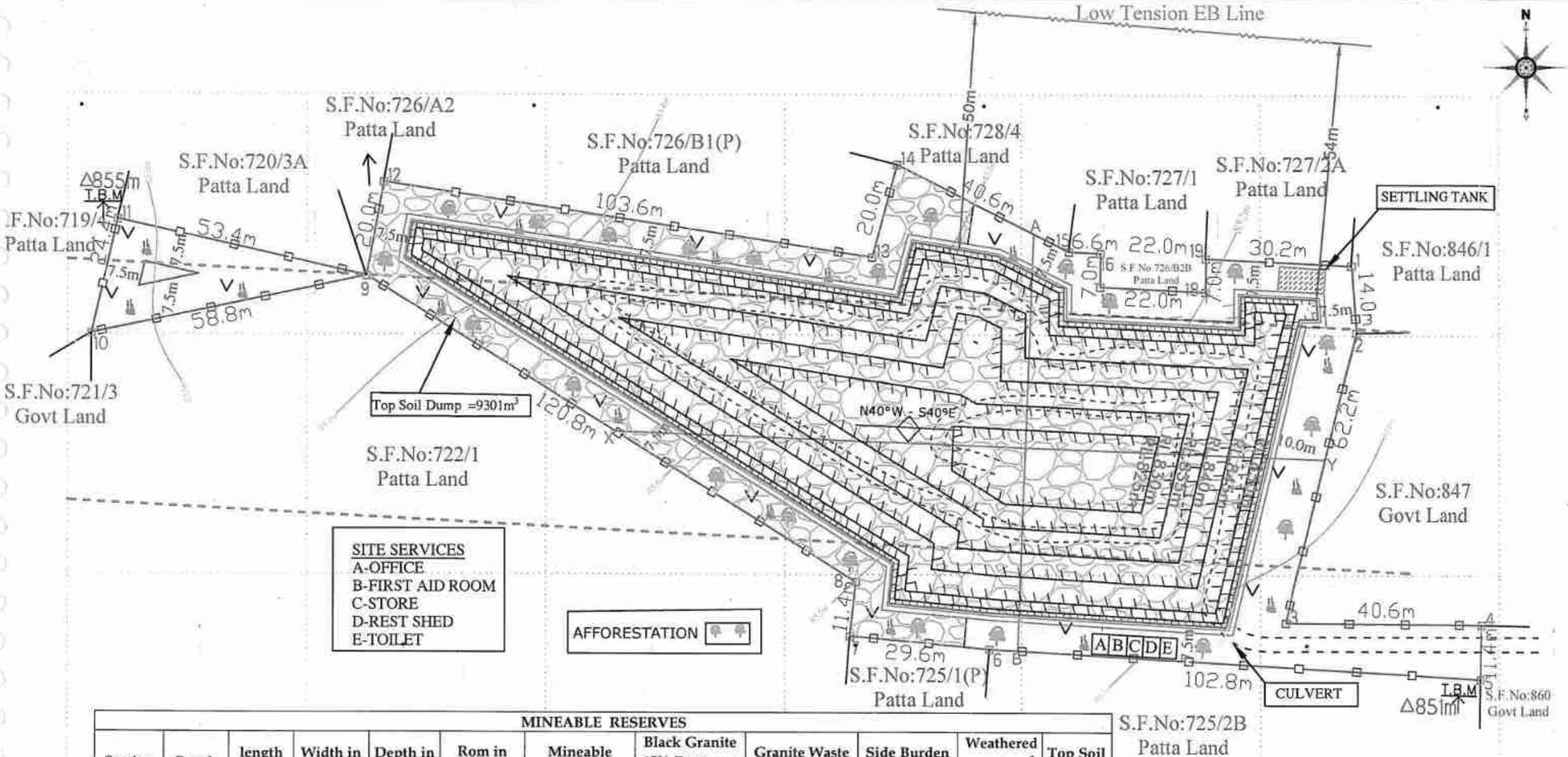


PROGRESSIVE MINE
CLOSURE PLAN& SECTIONS
SCALE 1 : 1000
SCALE HOR 1:1000
VER 1:500

Prepared By:

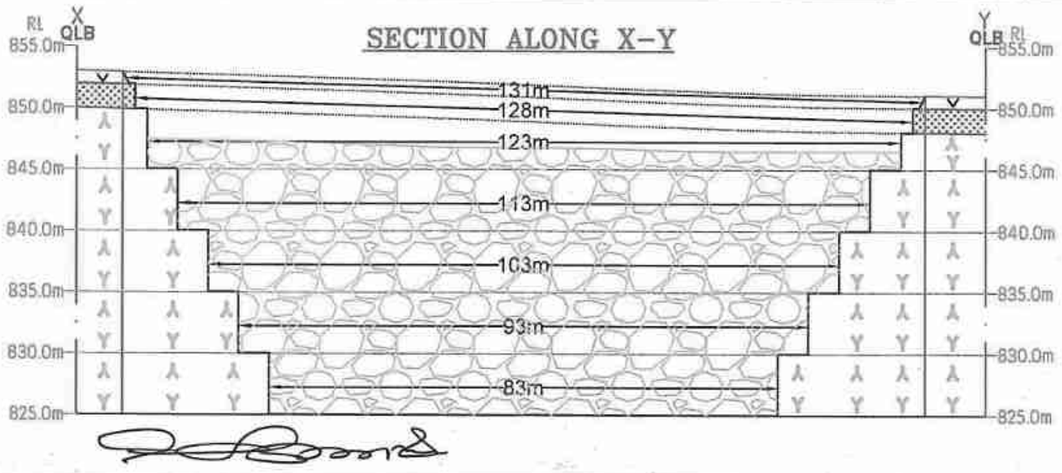
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

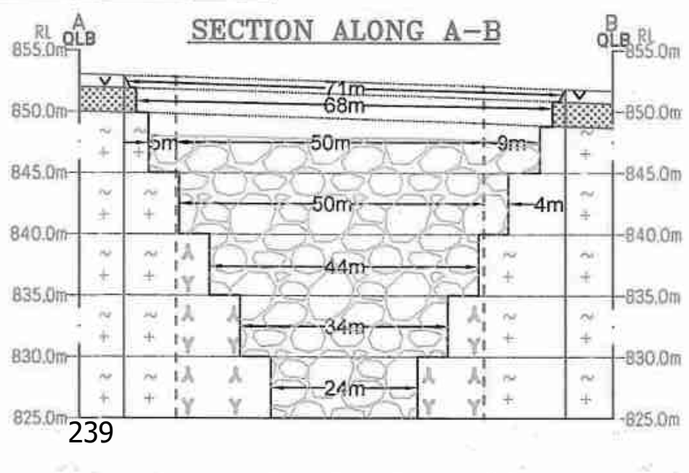
Dr.S.KARUPPANNAN,M.Sc.,Ph.D.,
RECOGNIZED QUALIFIED PERSON
RQP/MAS/263/2014/A



MINEABLE RESERVES

Section	Bench	length in (m)	Width in (m)	Depth in (m)	Rom in (m^3)	Mineable reserves in m^3	Black Granite 15% Recovery in m^3	Granite Waste 85% in m^3	Side Burden in m^3	Weathered rock in m^3	Top Soil in m^3
XY-AB	I	131	71	1	9301	....	....	....	....	....	9301
	II	128	68	2	17408	....	....	....	....	17408	....
	III	123	14	5	8610	....	....	....	8610	....	....
	III	123	50	5	30750	30750	4612	26138	....	....	....
	IV	113	4	5	2260	....	....	....	2260	....	....
	IV	113	50	5	28250	28250	4237	24013	....	....	....
	V	103	44	5	22660	22660	3399	19261	....	....	....
	VI	93	34	5	15810	15810	2371	13439	....	....	....
	VII	83	24	5	9960	9960	1494	8466	....	....	....
TOTAL						107430	16113	91317	10870	17408	9301





Date of Survey : 07.11.2023

PLATE NO-VIII

APPLICANT:

Thiru.D.KARUNANIDHI,
S/o.DHARUMAN,
No.15, VALASAGOUNDANUR,
PULIYAMPATTI POST,
POCHAMPALLI TALUK,
KRISHNAGIRI - 635206.

LOCATION:

EXTENT : 1.36.45Hect
S.F.NO : 720/3B, 725/1(Part), 725/2A, 726/B1(Part) & 726/B2A.
VILLAGE : IRUDHUKOTTAI
TALUK : DENKANIKOTTAI
DISTRICT : KRISHNAGIRI
STATE : TAMIL NADU

INDEX

- LEASE BOUNDARY
- SAFETY DISTANCE
- APPROACH & MINE HAUL ROAD
- BOUNDARY PILLAR STONES
- TEMPORARY BENCH MARKS
- SHRUBS
- CONTOUR LINES
- EB LINE
- TOPSOIL
- STRIKE & DIP (DOLERITE DYKE)
- BLACK GRANITE BOULDERS
- BLACK GRANITE CONTACT LINE
- DRAINAGE + SETTLING TANK
- BACK FILLING
- FENCING
- ULTIMATE BENCH
- WEATHERED ROCK
- GRANITE GNIESS

CONCEPTUAL PLAN& SECTIONS
SCALE 1 : 1000
SCALE HOR 1:1000
VER 1:500

Prepared By:

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

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

கிருஷ்ணகிரி மாவட்டம் தேன்கனிக் கோட்டை வட்டம் மற்றும் உள் வட்டம் 41. கொத்தக் கோட்டை கிராம நிர்வாக அலுவலர் அவர்கள் வாக்குமூலம்.

அய்யா,

தேன்கனிக் கோட்டை வட்டம் மற்றும் உள் வட்டம் 41. கொத்தக் கோட்டை கிராம புல எண்கள் 720/3B, 725/1, 725/2A, 726/B1, 726/B2A ஆகிய எண்களில் கல்குவாரி கிரானைட் கற்கள் 20 ஆண்டுகளுக்கு வெட்டி எடுக்க குத்தகை உரிமம் அனுமதி கோரி திரு. D. கணேசன் என்பவர் அளித்த மனுவின் மீது பரிந்துரை என்பதை தெரிவித்துக் கொள்கிறேன்.

தேன்கனிக் கோட்டை வட்டம் மற்றும் உள் வட்டம் 41. கொத்தக் கோட்டை கிராம புல எண்கள் 720/3B - பரப்பு - 0060 ஹெக்டேர் 0.10 தீர்வை; 725/1 - பரப்பு - 0070 ஹெக்டேர் 010 தீர்வை; 725/2A - பரப்பு - 0145 ஹெக்டேர் 015 தீர்வை; 726/B1 - பரப்பு - 0770 ஹெக்டேர் 146 தீர்வை; 726/B2A - பரப்பு - 0745 ஹெக்டேர் 095 தீர்வை கொண்ட நிலங்கள் பட்டா எண் 2120, 8465, 2103, ஆகியவைகளில் திரு. தம்மண்ணா மகன் திரு. D. கணேசன் என்பவன் பெயரில் தனிப்பட்டா நிலங்களாக உள்ளது.

மேற்படி புல எண்களை தவிர அனைத்து
நஞ்சை மற்றும் புன்செய் இனாம் நிலங்கள்
ஏதும் இல்லை. புறம்போக்கு நிலங்கள் ஏதும்
இல்லை. ஓடைகள், குளம், குட்டை ஏதுமில்லை.
அரசுக்கு சொந்தமான பிற நிலங்கள்
ஏதும் இல்லை என்பதை பணிவுடன்
தெரிவித்துக் கொள்கிறேன்.

இப்படிக்கு நம்பத்தகுந்த

Village Administrative Officer
41. IRUDUKOTTAI (Village)
DENKANIKOTTAI (Tk), Krishnagiri Dist.

भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL® OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Geo Technical Mining Solutions, Dharmapuri

5/1485-3, Salem Main Road, Elakkiyampatty, Dharmapuri, Tamil Nadu

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

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals - including opencast and underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated January 24, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3142 dated Feb 19, 2024. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.

Issue Date
Feb 19, 2024

Valid up to
Dec 31, 2026

Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0319

Prof (Dr) Varinder S Kanwar
(CEO NABET)

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