

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENT MANAGEMENT PLAN

FOR OBTAINING

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

“B1” CATEGORY (Cluster) – MINOR MINERAL – CLUSTER –

PATTA LAND - FRESH QUARRY

THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY

Cluster Extent – 8.24.23 Ha, Lease Period: 10 Years

Project Proponent




Thiru. D. Sakthivel

S/o. Durairaj,

No.15, Melaratha Veethi,

Thirupparankundram,

Madurai District - 625 005.

PROJECT LOCATION	PROPOSED PRODUCTION
S.F. Nos. 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu Extent: 4.75.01 ha	Reserves: 6,53,795m ³ of Rough stone & 69,908m ³ of Gravel Peak Production = 1,18,575m ³ of Rough Stone 30,436 m ³ of Gravel Proposed Depth = 47m BGL Mining Plan Period: 10 years
ToR obtained vide File No: 10611 ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024	
Environmental Consultant GEO EXPLORATION AND MINING SOLUTIONS  Old No. 260-B, New No. 17, Advaitha Ashram Road, Alagapuram, Salem – 636 004, Tamil Nadu, India Accredited for sector 1 Cat ‘A’, sector 31 & 38 Cat ‘B’ Certificate No : NABET/EIA/2225/RA 0276  Phone: 0427-2431989, Email: infogeoexploration@gmail.com  Web: www.gemssalem.com	Laboratory EHS 360 LABS PRIVATE LIMITED, 10/2 Ground floor, 50 th street, 7 th Avenue, Ashok Nagar, Chennai – 600 083.
<u>Baseline Monitoring Period</u> March 2024 to May 2024	
JUNE 2024	

UNDERTAKING

I Thiru. D. Sakthivel given undertaking that this Draft EIA & EMP report prepared for our Rough stone and Gravel quarry situated in S.F. No 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, over an extent of 4.75.01Ha in Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State based on the Transfer in ToR obtained vide issued by the State Level Environmental Impact Assessment Authority (SEIAA), Tamil Nadu vide ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024.

I hereby assured that the Data's submitted and information given by me is true and correct to the best of my knowledge.

Signature of the Project Proponent



Thiru. D.Sakthivel

Place : Madurai

Dated :

DECLARATION

I Dr. M. Ifthikhar Ahmed – EIA Co Ordinator declare that the Draft EIA & EMP report for the Rough stone and Gravel quarry in S.F.No 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, over an extent of 4.75.01Ha in Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared by Geo Exploration and Mining Solutions, Salem, Tamil Nadu.

The Data's provided in the EIA report are true and correct to the best of my knowledge.

Signature of the EIA Co Ordinator



Dr. M. Ifthikhar Ahmed

Managing Partner

M/s. Geo Exploration and Mining Solutions

Place : Salem

Dated :

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA/EMP Report.

PROPOSED QUARRY				
CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	Thiru. D. Sakthivel, S/o. Durairaj, No.15, Melaratha Veethi, Thirupparankundram, Madurai District - 625 005.	217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B	4.75.01 ha	ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024.
TOTAL			4.75.01 ha	
EXISTING QUARRY				
CODE	Name of the Owner	S.F. No & Village	Extent	Status
E1	Thiru. D. Sakthivel, S/o. Durairaj, No.15, Melaratha Veethi, Thirupparankundram, Madurai District - 625 005.	14/2F,14/2G,14/4E,14/3B etc.. & Kurayur (Bit-1)	3.49.22 ha	Lease Period – 09.10.2020 – 08.10.2025
TOTAL			3.49.22 ha	
TOTAL CLUSTER EXTENT			8.24.23ha	

Note:-

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

TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. D.Sakthivel

ToR Identification No.: TO23B0108TN5116021N Dated: 12.04.2024.

Annexure-1												
1	<p>In the case of existing/operating mines. a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</p> <p>(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 zonelbenches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.</p>	Not Applicable, It is a Fresh Quarry										
2	<p>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.</p>	Detailed in chapter-3 and VAO certificate is incorporated in the Draft EIA/EMP report.										
3	<p>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 1km of the proposed quarry.</p>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;">Odai</td> <td style="text-align: center;">50m Safety - SE</td> </tr> <tr> <td style="text-align: center;">Tank</td> <td style="text-align: center;">370m_S</td> </tr> <tr> <td style="text-align: center;">Tank</td> <td style="text-align: center;">900m_NW</td> </tr> <tr> <td style="text-align: center;">Gundar River</td> <td style="text-align: center;">3.8Km_SW</td> </tr> <tr> <td style="text-align: center;">Lake</td> <td style="text-align: center;">6.4Km_NE</td> </tr> </tbody> </table> <p>Detailed EIA study has been carried out considering the impact to the water bodies and eco system of the area. Details are covered in the Chapter No.3 and 4. Attached detailed hydrological report in Annexure.</p>	Odai	50m Safety - SE	Tank	370m_S	Tank	900m_NW	Gundar River	3.8Km_SW	Lake	6.4Km_NE
Odai	50m Safety - SE											
Tank	370m_S											
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Gundar River	3.8Km_SW											
Lake	6.4Km_NE											
4	<p>The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.</p>	Detailed in chapter-3 ecology environment in the draft EIA report.										
5	<p>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.</p>	Kodimangalam B Block R.F – 25.17 Km – North Sirivilliputhur (Giant squirrel) Wildlife – 29.0km – North West DFO letter will be obtained and attached in the Final EIA/EMP report annexure										
6	<p>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</p>	Fresh lease application. The altitude of the area is 127m (max) above Mean Sea level										

	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.	
7	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.	<p>Ultimate Pit Dimension</p> <p>Pit-I 108m(L) x 107m (W) x47m(D)</p> <p>Pit-II 100m(L) x 146m (W) x47m(D)</p> <p>Pit-III 106m(L) x 83m (W) x32m(D)</p> <p>Proposed Depth = 47m Bgl (45m Rough Stone + 2m Gravel)</p>
8	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/1st Class mines manager appointed by the proponent.	Proponent given Affidavit stating that the blasting operation will be carried out by the competent person as per the MMR 1961.
9	The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30m from the blast site.	The Blasting will be carried out by controlled blasting adopting muffle blasting and line drilling. The cost for the controlled blasting is allotted in the EMP
10	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	The Adjacent existing quarry is in the name of PP. Lease period from 09.10.2020 to 08.10.2025
11	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	It is a Fresh Lease application.
12	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 Lease application.
13	Quantity of minerals mined out <ul style="list-style-type: none"> a) Highest production achieved in any one year b) Detail of approved depth of mining c) Actual depth of the mining achieved earlier d) Name of the person already mined in that leases area e) If EC and CTO already obtained' the copy of the same shall be submitted 	Not Applicable, It is a Fresh lease application

	f) whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	
14	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).	Coordinates for all the boundaries are given in the Chapter No.2 Satellite imagery of the project site marked with Lease boundary, Safety area
15	The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,	Drone video survey covering the Cluster, Greenbelt and fencing will be submitted during appraisal.
16	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	The area has been fenced and the photographs are given in the Chapter No.2, No trees within the proposed excavation area, No transplanted is required. Water bodies near to the project site is given in the Chapter No.2
17	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	As per ToR obtained For First Five Year Production: 5,21,325m ³ of Rough stone, 69,908m ³ of Gravel For Second Five Year Production: 1,32,470 m ³ of Rough stone, Peak Production = 1,18,575 m ³ of Rough Stone Proposed Depth = 47m Bgl The proposed plantation is 2400 Nos.along the safety barrier, village road and panchayat road Details of Geological Resources and Proposed reserves are discussed under Chapter No. 2.
18	The Project Proponent shall provide the organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	Discussed about Organization chart in Chapter 6,
19	The project proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1km (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.	The hydro-geological study was conducted to evaluate the possible impact on the ground water table. No significant impacts are anticipated on the water bodies around the project area. Details are discussed under Chapter No. 3.

	Necessary data and documentation are this regard may be provided.	
20	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & Flora/fauna including traffic/vehicular movement study.	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 to assess the cumulative impact of the proposed project on the environment is prepared. The details of Baseline study is given in the Chapter No. 3.
21	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil, health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	The Cumulative impact study due to mining operations is explained in chapter – 7
22	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	The rain water will be collected in the mine pit at the lower point later it will be utilized for the haul road maintenance, Greenbelt development etc.,
23	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass pre operational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use Land cover study within the radius of 10km is detailed in the Chapter No. 3
24	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Not applicable, There is no wastages anticipated, the entire quarried out Rough stone material will be utilized..
25	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	The area is not declared as Critically polluted area, No court case pending against the project. Proponent obtained Precise area communication letter, Approval for the Mining plan. The Details are enclosed as Annexure .
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The rain water collected in the pits after spell of rain will be used for greenbelt development and dust suppression.
27	Impact on local transport infrastructure due to the Project should be indicated.	There is no group of Houses, Schools in the proposed transportation route. Proposed Transportation route with mitigation measures are given in the Chapter No.2

28	A tree survey study shall be carried out (nos., name of the species, age, diameter etc..) both within the mining lease applied area & 300m buffer zone and its management during mining activity.	The Flora study in the core zone has been carried out and the details are given in the Chapter No.3
29	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	The mine closure plan is detailed in the Chapter No.4 The budget for the mine closure is included in the Environmental Management plan in Chapter No.10 ,
30	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 Flora and Fauna study around the vicinity of the site is carried out by the Functional area experts along with Local School Students.
31	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 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.	The plantation in the project site will be carried out using native and mixed plantation. The recommended species for the plantation is given in the Chapter No.4 Table
32	Taller/one year old Saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted in proper replacement 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.	Noted and Agreed. The plantation in the project site will be carried out using native and mixed plantation. The recommended species for the plantation is given in the Chapter No.4
33	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster management Plan details in Chapter-7
34	A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.	A Risk Assessment and management Plan Chapter- 7
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational Health impacts of the project with mitigation measures are detailed in the Chapter No.7, Details of Periodical Medical Examination given in the Chapter No.10
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be	The details of the population in the impact zone (within 500m radius) is detailed in the Chapter No.3,

	detailed along with budgetary allocations.	
37	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.	Socio Economic study covering 10 km radius is detailed in the Chapter No.3
38	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 court case and litigation pending against the project.
39	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.	It is explained in Chapter -3- socio economic study
40	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.	Not applicable, the project is fresh proposal
41	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.	The EMP has been prepared for the entire life of the mine. Proponent given affidavit stating the EMP will be submitted during the appraisal after completion of Public hearing.
42	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Reference besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted and agreed

SEIAA STANDARD CONDITIONS

Cluster Management committee		
1.	Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.	Cluster management committee has been formed with mutual agreement with the proponents including Existing and Proposed quarry at present 2 Nos are members in this CMC
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..	As per the committee agreement proponents will coordinates for the Greenbelt development, Water sprinkling and tree plantation activities combinedly
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 formation of committee with list of members has been submitted to the AD mines office, Madurai and the same will be update in every year
4	Detailed operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the	As per the committee agreement the blasting frequency will be discussed and carryout by the

	cluster, the usage of haul roads by the individual quarry in the form of route map and network.	Mines Manager appointed by the proponents and the same will be updated in the committee minutes
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	Details discussed in chapter 7 of Final EIA report
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.	Details discussed in chapter 6 of Final EIA report
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.	Noted & agreed
8	The committee shall furnish the Emergency Management within the cluster.	Details discussed in chapter 7.
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Details discussed in chapter 10.
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	Noted & agreed
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	Detailed discussed in chapter 7.
<i>Impact study of mining</i>		
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following a) Soil health & bio-diversity b) Climate change leading to Droughts, Floods etc. 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. 1) 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 steams.	Details of Soil health is given in Chapter No 3 and biodiversity is given in Chapter No 3. The project will not cause any significant changes in the climate Climatic changes and GHG are described in Chapter No 4. Details of water contamination and impact on aquatic ecosystem is given in Chapter No 4. Hydrothermal/ Geothermal effects due to destruction in the environment, Bio geochemical process and sediment geo chemistry given in the Chapter No 7.
<i>Agriculture & Agro-Biodiversity</i>		
13	Impact on surrounding agricultural fields around the proposed mining Area.	Detailed discussed in chapter 4.
14	Impact on soil flora & vegetation around the project site.	Detailed discussed in chapter 4.

15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	Details discussed in chapter 10
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 EIA study on biodiversity, natural ecosystem, the soil micro flora, fauna was carried out and discussed in earlier slides. The species overcome periods of un favorable weather conditions by building up large seed stock in the soil, which is known as “soil seed banks”. This strategy protects plant species diversity against local extinction of the species during the disturbance and provides information on the past population dynamics and structure and future regeneration potential of degraded land. The proposed project site is a dry land without any major vegetation and its proposed to remove the top layer of gravelly formation and sold in open market and the 7.5m of safety barrier shall be remained un touched all around the lease applied area.
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	During Mine Closure the excavated pit will be allowed to collect rain water and shall act as an artificial reservoir and shall prove beneficial for the ecosystem. The proposed greenbelt activity shall also prove beneficial for the ecosystem during mine closure
18	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands. Horticulture, Agriculture and livestock .	The project area is bounded by Existing quarries on the South side. Proponent proposed to erect green mesh along with fencing on the boundary of the proposed quarry besides, Budgetary allocation given in the Chapter No. 10.
Forest		
19	The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.	Kodimangalam B Block R.F – 25.17 Km – North Sirivilliputhur (Giant squirrel) Wildlife – 29.0km – North West
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	Ecology and Biodiversity environment deals in Chapter-3
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	Ecology and Biodiversity environment deals in Chapter-3
22	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.	Anticipated Environment Impact and Mitigation measures are detailed in Chapter No.4
Water Environment		
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 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	There are 7 open wells and 8 bore wells within the radius of 1km from the project area, Hydrogeological study has been conducted by the resistivity method

	documentation in this regard may be provided, covering the entire mine lease period.	
24	Erosion Control measures.	Noted & agreed
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.	Details in Chapter 2
26	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Details in Chapter 2 and 4 impact of bio diversity
27	The project proponent shall study and furnish the details on potential fragmentation impact on natural Environment by the activities.	Noted & agreed
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.	Noted & agreed. Detailed under Chapter 3.
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil, physical, chemical components and microbial components.	Details in Chapter 3 Soil environment.
30	The Environmental impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Details in Chapter 3 Water environment.
Energy		
31	The measures taken to control Noise. Air, Water. Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	Details in Chapter 3 environmental monitoring details.
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.	Details of carbon emission and mitigation activities are given in the Chapter No.4
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	Details in Chapter-3 for meteorological and climate/weather data representation of graphs.
Mine Closure Plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Details in Chapter 2 mine closure plan
EMP		
35	Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	Detailed under Chapter 10
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.	Details in Green belt development in chapter 4
Risk Assessment		
37	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Detailed under Chapter 7

Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	Details in Study 7.3 Disaster Management Plan in Chapter -7
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.,	Noted & agreed. Detailed under Chapter 4
40	As per the MoEF& CC office memorandum tr.No.22-65/2017-1A.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.	Noted and agreed
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.	Details of carbon emission and mitigation activities are given int the Chapter No.4

S. No	Terms of Reference	Reply
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	Peak Production = 1,18,575m ³ of Rough Stone Proposed Depth = 47m bgl Project area of 4.75.01Ha.
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	Peak capacity of 1,18,575m ³ operation to cover the impacts and environment management plan in chapter- IV and Chapter-10 covered in project specific activities. Baseline Data were collected for Summer Season March– May 2024 as per CPCB Notification and MoEF & CC Guidelines. Details in Chapter No. III
1.3	Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided.	Noted, Google earth image showing lease area with Coordinates of pillars in chapter-II.

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	Land use and land cover of the 10km Radius of study area is discussed in Chapter No. III. Geology map of the project area covering 10km radius Figure No. 2.5, Page No. 20. Geomorphology of the area is given in Chapter No 2 Figure No 2.6, Page No. 20 There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km Radius from the periphery of the project area.
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	Land use and land cover of the study area is discussed in Chapter No. III with Physical features such as waterbodies, odai, canal etc.,
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	DEM data using Drainage pattern around 10km radius showing streams and lakes etc., discussed in Chapter No. 3.
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and	Drainage pattern around 10km radius showing streams and lakes etc., is discussed in Chapter No. 3.
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	Details in chapter-2 showing the land features. And also enclosed Approved mining plan in annexure

1.9	<p>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.</p>	<p>It is an opencast quarrying operation proposed to operate in Mechanized method. The Rough Stone quarry formation is a hard, compact and homogeneous body.</p> <p>The height and width of the bench will be maintained as 5m with 90° bench angles.</p> <p>Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining</p>								
1.10	<p>Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.</p>	<p>Impact Studies and Mitigation Measures of Water Environment including Surface Water and Ground Water are discussed in Chapter 4.</p>								
1.11	<p>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</p>	<p>Not Applicable. The details of waste dump management are given in the Chapter No. 4</p>								
1.12	<p>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</p>			<p>Land use and land cover of the study area is discussed in Chapter No. 3.</p> <p>Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in Chapter No. 2, Table No 2.5.</p>						
	<table border="1"> <thead> <tr> <th>Description</th> <th>Present area (Ha)</th> <th>Area at the end of lease period (Ha)</th> </tr> </thead> <tbody> <tr> <td>Area under quarrying</td> <td>Nil</td> <td>3.65.08</td> </tr> </tbody> </table>			Description	Present area (Ha)	Area at the end of lease period (Ha)	Area under quarrying	Nil	3.65.08	
	Description	Present area (Ha)	Area at the end of lease period (Ha)							
	Area under quarrying	Nil	3.65.08							
	Sno	ML. project Land use	Area under Surface Rights (ha)	Area Under Mining Rights (ha)	Area under Both (ha)					
	1	Agriculture Land			Green Belt	Nil	0.01.00			
	2	Forest Land				Nil	0.02.00			
	3	Grazing Land			Unutilized Area	4.75.01	0.13.64			
	4	Settlements								
	5	Others (Specify)			Grand Total	4.75.01	4.75.01			
S.No	Details	Area (Ha)								
1	Buildings									
2	Infrastructure									
3	Roads									
4	Others (Specify)									
	Total									

1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive	Detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] was carried out and discussed under Chapter No. 3. There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SO _x , NO _x 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/	Baseline Data were collected for Summer season March–May 2024 as per CPCB Notification and MoEF & CC Guidelines.Details in Chapter No. 3.
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	Details in chapter-3 showing the various sampling stations As per CPCB guidelines.
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 10km buffer zone i.e.,	Air Quality Modelling and windrose pattern for prediction of incremental GLC's of pollutant was carried out using AERMOD view 12 Model. Details in Chapter No. 4.
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	Traffic density survey was carried out to analyses the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details in Chapter-II.

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	Detailed in chapter-3 socio-economic study with occupational status & economic status of the study area. The study should also include the status of infrastructural facilities and amenities present in the study area CSR are discussed under Chapter 8.
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	Detailed Ecology and biodiversity study in chapter-3
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	Detailed in chapter-4 population in the impact zone and measures for occupational health and safety and proposed occupational health in chapter-X
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be	Noted and agreed
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	The ground water table is at 57m below ground level. In these projects, ultimate depth is 47m Bgl It is inferred the quarrying activities in the Cumulative EIA project (Quarry) will not intersect the Ground water table.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.	Detailed in Chapter-IV Anticipated and mitigation measures of in the study area.
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 operating years should be provided	Total Water Requirement: 2.1 KLD Discussed under Chapter 2, Table No 2.15, The required water will be met from rainwater accumulated in mine pit (when available) and from the approved water vendors.
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	Methodology And Instrument Used For Air Quality Analysis in chapter-3and Air Pollution control equipment (APCEs) in chapter-10 sub 10.2 Environmental policy.
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.	Details in Machinery and equipment details in Chapter-2 Table No 2.10

1.27	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption	Noted and agreed
1.28	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan	A Risk Assessment and Disaster Preparedness and management Plan Chapter- 7
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.	Detailed in Machinery and technology used Chapter-3 Table 3.17 – Methodology and Instrument Used for Air Quality Analysis Detailed study in chapter-4 Impact of choice of mining method and impact on air quality and blasting and noise and vibrations.
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	Traffic density survey was carried out to analyse the impact of Transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no much significant impact due to the proposed transportation from the project area. Details in Chapter 2. Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in
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.	Infrastructure & other facilities will be provided to the Mine Workers after the grant of quarry lease and the same has been discussed in the Chapter No.2
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	Detailed in chapter-2 for mineral transportation route with approach roads etc., and impacting air quality detailed given chapter-4
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	Discussed under Chapter 2. Mine Closure Plan is a part of Approved Mining Plan enclosed as Annexure Volume – 1.
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	Greenbelt Development Plan is discussed under Chapter 4,
1.35	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.	The total cost and the details are given in the Chapter No. 10
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	Not Applicable. There are no approved habitations within a radius of 300 meters. Therefore, R&R Plan / Compensation details for the Project Affected People (PAP) is not anticipated and Not Applicable for this project.

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.	CSR are discussed under Chapter 8. And specific budgetary provisions (capital and recurring) for specific activities over the life of the project in chapter-10
1.38	Corporate Environment Responsibility:	CER are discussed under Chapter 8.
1.39	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.	Detailed in chapter-10 The Environment Policy
1.40	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the	
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	The Environment Monitoring Cell discussed under Chapter 6
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 of	The Environment Monitoring Cell discussed under Chapter 6
1.43	e) Environment Management Cell and its responsibilities to be clearly spell out in	The Environment Monitoring Cell discussed under Chapter 6
1.44	f) In built mechanism of self-monitoring of compliance of environmental regulations	The Environment Monitoring Cell discussed under Chapter 6
1.45	Status of any litigations/ court cases filed/pending on the project should be	No litigation is pending in any court against this project
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	<u>Sirivilliputhur (Giant squirrel) Wildlife – 29.0km – North West</u> It will submit final EIA/EMP report.
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	It will submit final EIA/EMP report
1.48	Details on the Forest Clearance should be given as per the format given: Total Mine lease area (ha): Total Forest Land (Ha) : Date of FC : Extent of Forest Land : Balance area for which FC is yet to be obtained: Status of application for diversion of forest	Kodimangalam B Block R.F – 25.17 Km – North Total Mine Lease area 4.75.01ha It will submit final EIA/EMP report
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	Enclosed Approved mining plan in Annexure volume-I
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.	The outcome of public hearing will be updated in the final EIA/AMP report.

1.51	PP shall carry out survey through drone highlighting the ground reality for at least 10	Noted and agreed
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	Noted and agreed
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	As per detailed in front page of Draft EIA/EMP, NABET, NABL certification detailed given in the report.
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	As per Tor compliance each chapter wise page and table, figure no given in the EIA/EMP report.

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1. INTRODUCTION

1.0 PREAMBLE

The project proponent Thiru. D.Sakthivel S/o. Durairaj, Rough Stone and Gravel Quarry Extent 4.75.01Ha in S.F. No. 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District.

- Proponent applied for Rough stone and Gravel quarry lease on 28.08.2023.
- Precise area communication letter was issued by District Collector, Madurai R.C.No.996/Mines/2023 Dated:12.10.2023
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Madurai District, vide R.C.No. 996/Mines/2023 Dated:22.11.2023.
- The Mining plan has been approved for the quantity of 6,53,795m³ of Rough stone, and 69,908m³ of Gravel up to the depth of 47m bgl for the period of Ten years.

As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries - 1 proposal and 1 Existing quarries forming Cluster Category {Total Extent of the Cluster is 8.24.23 Ha}- Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

- Proponent applied for Transfer Terms of Reference vide Proposal No. SIA/TN/MIN/302896/2023 Dated 04.08.2023 and the Transfer ToR was Granted vide ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024
- Based on the ToR Baseline Monitoring study has been carried out for one season i.e., **March – May 2024** and this EIA/EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project.

1.1 PURPOSE OF THE REPORT

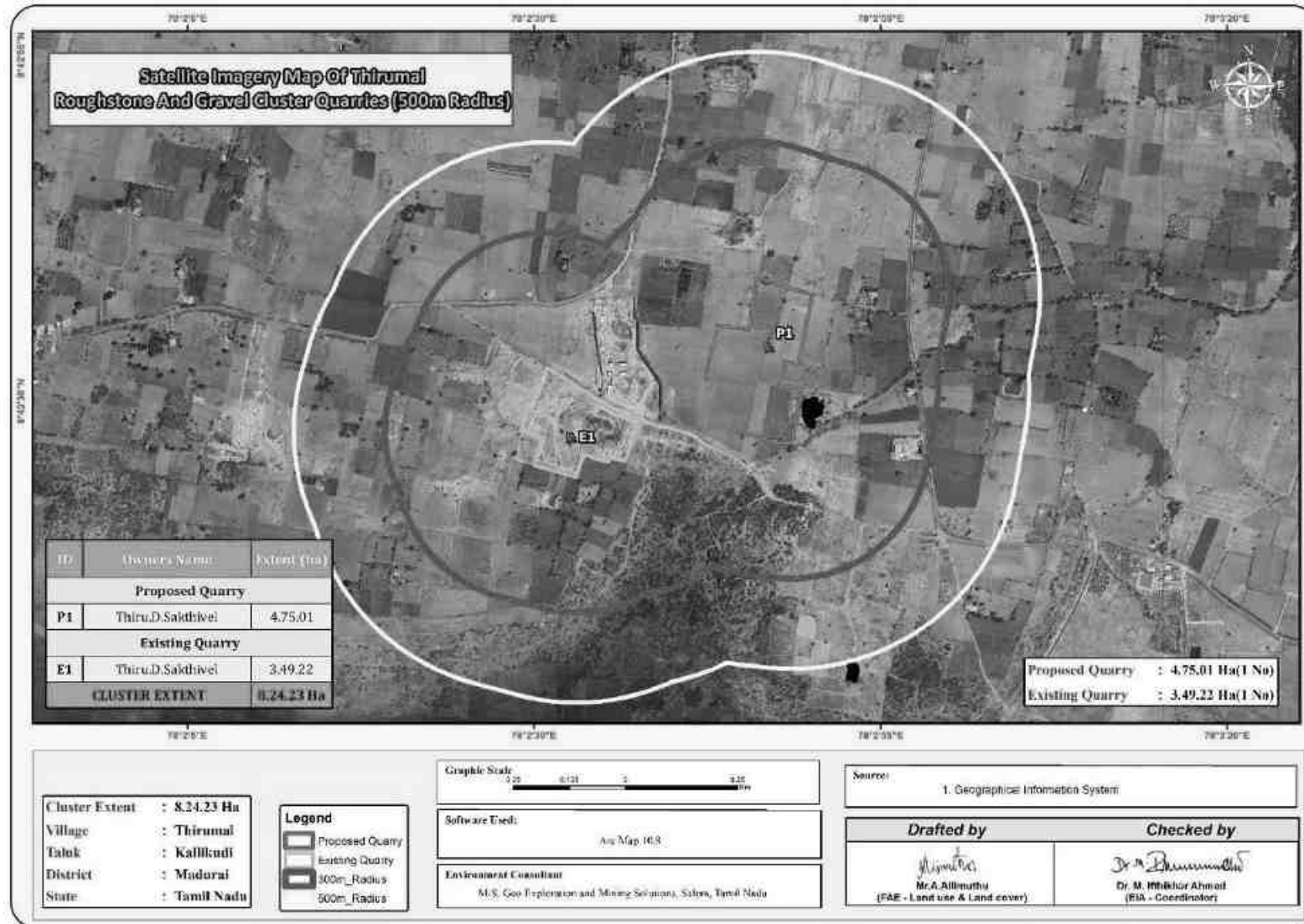
The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 1889 of 20th April 2022, Mining Projects are classified under two categories i.e. A (> 250 Ha) and B (≤ 250 Ha), and Schematic Presentation of Requirements on Environmental Clearance of Minor Minerals including cluster situation in Appendix–XI.

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No. 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”

FIGURE 1.1 SATELLITE IMAGERY CLUSTER QUARRIES 500m RADIUS



1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1 Identification of Project Proponent

TABLE 1.1: SALIENT FEATURES OF THE PROPOSED PROJECT

Name of the Project Proponent	Thiru. D. Sakthivel
Address	No.15, Melaratha Veethi, Thirupparankundram, Madurai District
Mobile No	98421 26789
Email	kuppusamns@gmail.com
Status	Individual

Source: Approved Mining Plan.

1.2.2 Identification of Project Proponent

TABLE 1.3: BRIEF DESCRIPTION OF THE PROJECT

Name of the Project	Thiru. D. Sakthivel Rough Stone & Gravel Quarry	
S.F. No.	217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B	
Extent	4.75.01 ha	
Village Taluk and District	Thirumal Village, Kallikudi Taluk, Madurai District.	
Land Type	patta land	
Land Ownership	It is a Patta lands. S.F.Nos 217/2A & 217/2B Registered in the name of Thiru.Duraigiopalasamy,s/o, Thalapathy vide Patta No.3418 & 3436 and other S.F.Nos are Registered in the name of Tmt.D.Dhanalakshmi,W/o, T.Duraigopalasamy vide Patta No.3051,3325 & 3063 . the applicant has obtained consent from the Pattadhar for the period of 10 years.	
Toposheet No	58-K/02	
Latitude between	09°42'26.88"N to 09°42'38.86"N	
Longitude between	78°02'42.36"E to 78°02'50.07"E	
Highest Elevation	127 m AMSL	
Lease Period	Ten years	
Mining Plan Period	Ten years	
Proposed Depth of Mining	47 m bgl (2m Gravel +45m Roughstone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	21,37,545	95,002
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	6,53,795	69,908
Proposed Quantity of Production for this Mining Plan Period First Five Years	5,21,325	69,908
Proposed Quantity of Production for this Mining Plan Period Second Five Years	1,32,470	-

Peak Production	1,18,575	30,436
Ultimate Pit Dimension	108 m (L) * 107 m (W) * 47 m (D) Below from the general ground level	
	100 m (L) * 146 m (W) * 47 m (D) Below from the general ground level	
	106 m (L) * 83 m (W) * 32 m (D) Below from the general ground level	
Water Level in the surrounds area	57m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards south-eastern side. The altitude of the area is 127 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the nearby existing quarrying pit.	
Machinery proposed	Jack Hammer	6Nos
	Compressor	2 Nos
	Excavator with Bucket and Rock Breaker	1 No
	Water Sprinkler	1 No
	Tippers	3 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	34 Nos	
Project Cost	Rs.3,08,19,000/-	
EMP cost	Rs. 7,60,000/-	
Total Project cost	Rs.3,15,79,000	
CER Cost	Rs 5,00,000	
Nearby Water Bodies	Odai	50m Safety SE
	Tank	370m S
	Tank	900m NW
	Gundar River	3.8Km SW
	Lake	6.4Km NE
Greenbelt Development Plan	Proposed to plant 2400 trees in the 7.5 m Safety Zone, panchayat road etc..	
Proposed Water Requirement	3.5 KLD	
Nearest Habitation	630m – North	
Nearest Reserve Forest	Kodimangalam B Block R.F – 25.17 Km – North	
Nearest Wild Life Sanctuary	Sirivilliputhur (Giant squirrel) Wildlife – 29.0km – North West	

Source: Approved Mining Plan

1.3 BRIEF DESCRIPTION OF THE PROJECT

1.3.1 Nature and Size of the Project

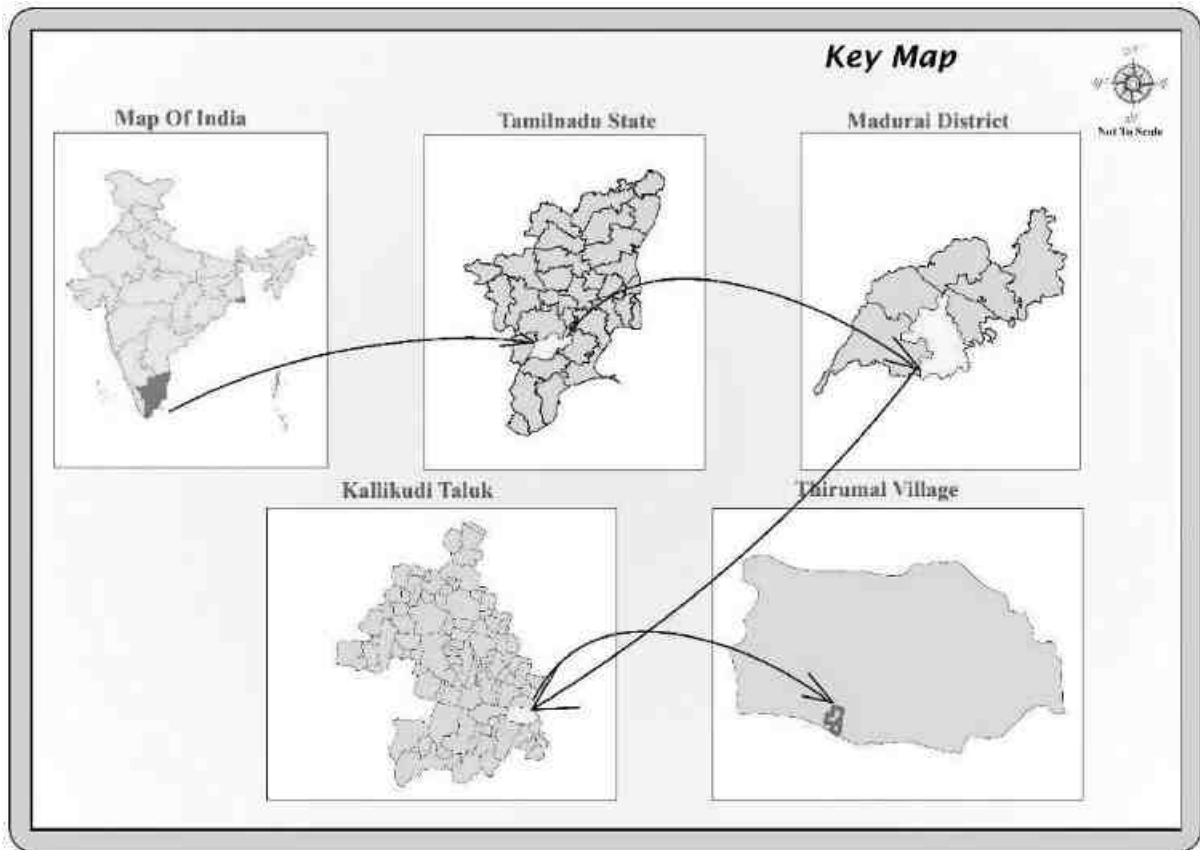
The quarrying operation is proposed to be carried out by Opencast Mechanized Mining method with 5.0m bench height and 5.0m bench width by deploying Jack Hammer Drilling & Slurry Explosive during blasting. Hydraulic Excavator and tippers are used for Loading and transportation. Rock Breakers are deployed to avoid secondary blasting.

The peak production of rough stone is 1,18,575m³ maximum in a year (396m³ per day/33Tippers per day). The depth of the mining is 47m Bgl.

1.3.2 Location of the Project

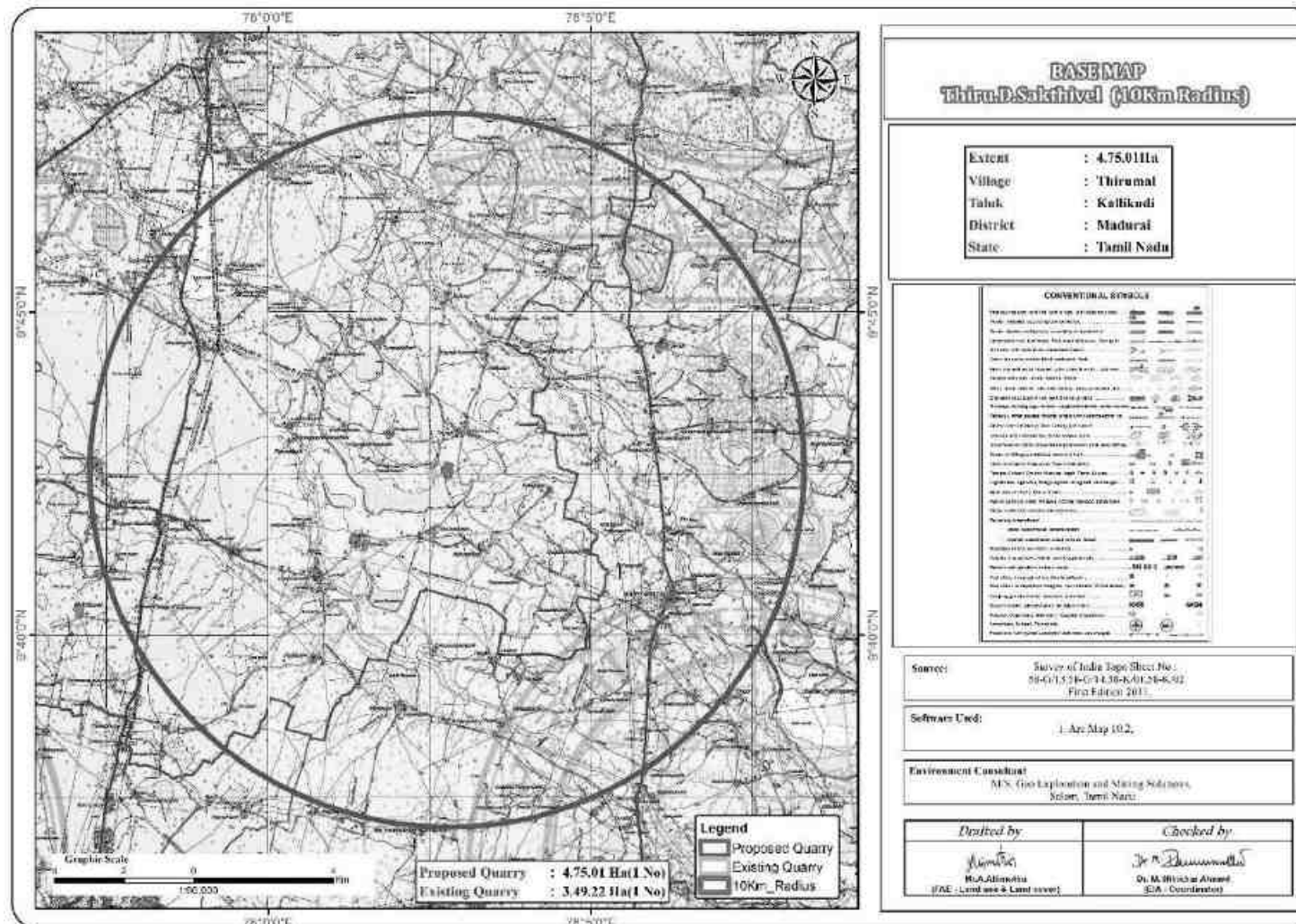
- ✚ The proposed quarry project falls in Thirumal Village, Kallikudi Taluk and Madurai District.
- ✚ Proposed quarry is located about 1.0 km South side of Thirumal Village
- ✚ The Thirumal Village is located about 8.0 km North East of Kallikudi Taluk.
- ✚ The area is marked in the Survey of India, Toposheet No. 58-K/02. The area lies between the Latitudes of 09° 42'26.88"N to 09°42'38.86"N and Longitudes of 78°02'42.36"E to 78°02'50.07"E

FIGURE: 1.2 KEY MAP SHOWING THE LOCATION OF THE CLUSTER SITE



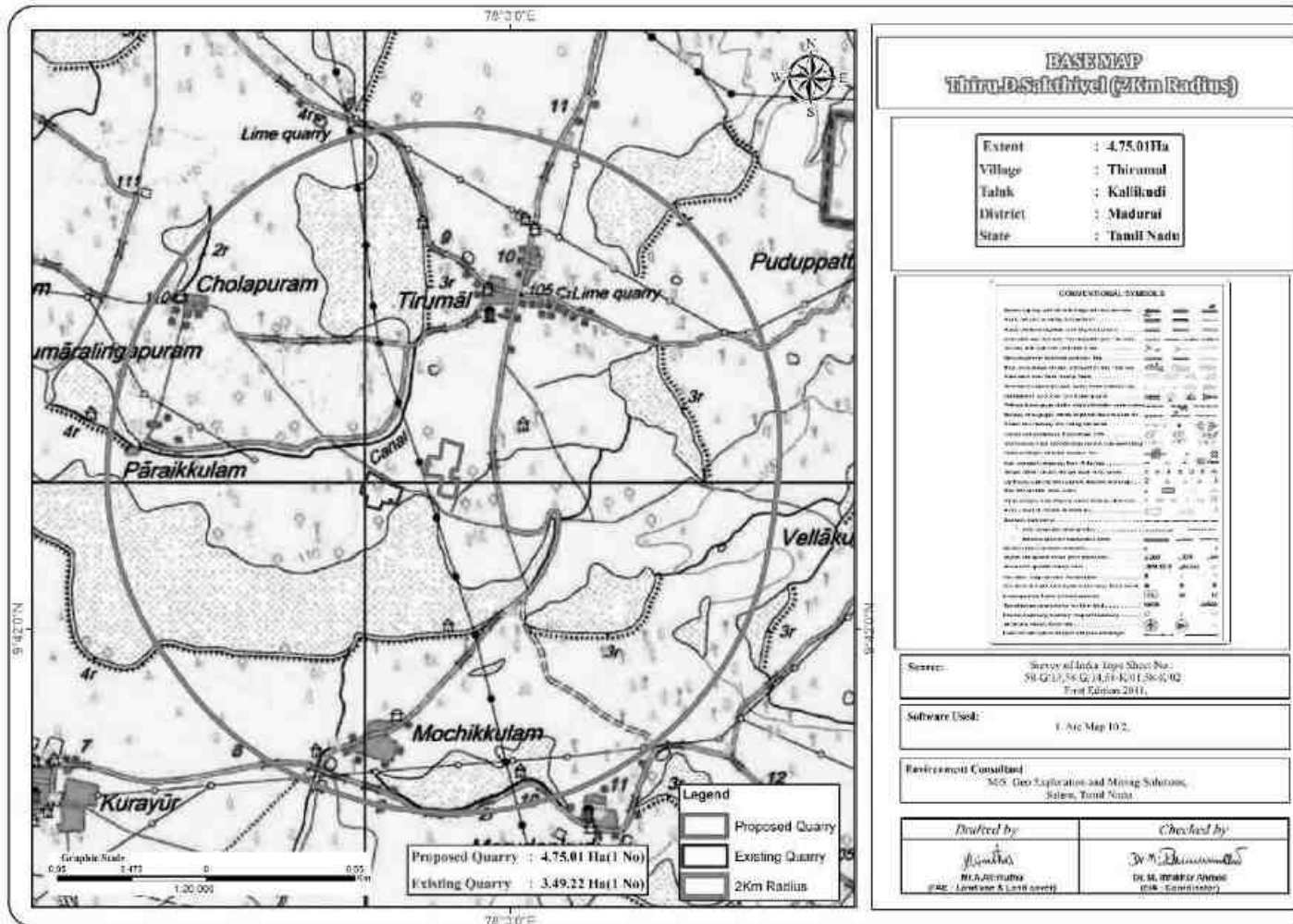
Source: Survey of India Toposheet 58-K/02

FIGURE 1.3: TOPOSHEET MAP OF THE STUDY AREA 10 KM RADIUS



Source: Survey of India Toposheet 58-K/02

FIGURE 1.4: TOPOSHEET MAP OF THE STUDY AREA 2 KM RADIUS



1.4 ENVIRONMENTAL CLEARANCE

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

1. Screening,
2. Scoping
3. Public consultation &
4. Appraisal

SCREENING –

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 28.08.2023
- Precise Area Communication Letter was issued by the District Collector, Madurai R.C.No.996/mines/2023 Dated:12.10.2023
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Madurai District, vide R R.C.No.996/mines/2023 Dated:22.11.2023
- The proposed project falls under “B1” Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vides online Proposal No. SIA/TN/MIN/455777 Dated: 16.12.2023.

SCOPING –

- The proposal was placed in 448th SEAC meeting held on 23.02.2023 and the committee recommended for issue of ToR.
- The proposal was considered in 706th SEIAA meeting held on 27.03.2024 and issued ToR issued by SEIAA-TN vide ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024

PUBLIC CONSULTATION –

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

APPRAISAL –

Appraisal is the detailed scrutiny by the State Expert Appraisal Committee (SEAC) of the application and other documents like the final EIA & EMP Report, outcome of the Public Consultations including Public Hearing Proceedings, submitted by the proponent to the regulatory authority concerned for grant of environmental clearance.

1.5 TERMS OF REFERENCE (ToR)

The Transfer ToR was issued by the SEIAA vide ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024. The Details of the ToR Compliance is given in the Page No.

1.6 POST ENVIRONMENT CLEARANCE MONITORING

The respective proposed project proponents shall submit a half-yearly compliance report in respect of stipulated Environmental Clearance terms and conditions to MoEF & CC Regional Office & SEIAA after grant of EC on 1st June and 1st December of each calendar year as per MoEF & CC Notification S.O. 5845 (E) Dated: 26.11.2018.

1.7 GENERIC STRUCTURE OF EIA DOCUMENT

The overall contents of the EIA report follow the list of contents prescribed in the EIA Notification 2006 and the “Environmental Impact Assessment Guidance Manual for Mining of Minerals” published by MoEF & CC.

1.8 THE SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. 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, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the Summer season (March to May 2024) for various environmental components so as 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.

TABLE 1.4: ENVIRONMENT ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM10, PM 2.5, SO ₂ , NO ₂	Continuous 24-hourly samples twice a week for three months at 7 locations (2 Core & 5 Buffer)
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 6 locations – 4 ground water and 2 surface water samples; once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	7 locations – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period

7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk analysis done for the risk associated with mining.

Source: Field Monitoring Data

The data has been collected as per the requirement of the ToR issued by SEIAA – TN.

1.8.1 Regulatory Compliance & Applicable Laws/Regulations for Proposed Quarry

- Application for Quarrying Lease as per Tamil Nadu Minor Mineral Concession Rules, 1959
- Obtained Precise Area Communication Letter as per Tamil Nadu Minor Mineral Concession Rules, 1959 for Preparation of Mining Plan and obtaining Environmental Clearance
- The Mining Plan has been approved under Rule 41 & 42 as amended of Tamil Nadu Minor Mineral Concession Rules, 1959
- ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024.

2. PROJECT DESCRIPTION

2.0 GENERAL

The Proposed Rough Stone and gravel Quarry requires Environmental Clearance. There are One proposed and one existing quarry forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016 and the total extent of cluster is 8.24.23 ha

As the extent of cluster are more than 5 ha, the proposal falls under B1 Category as per the Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018, and requirement for EIA, EMP and Public Consultation for obtaining Environmental Clearance.

2.1 DESCRIPTION OF THE PROJECT

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.

Method is mining is common for the proposed quarry in the cluster. Rough Stone and gravel is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.2 LOCATION OF THE PROJECT

- ✚ The proposed quarry project falls in Thirumal Village, Kallikudi Taluk and Madurai District.
- ✚ Proposed quarry is located about 1.0 km South side of Thirumal Village
- ✚ The Thirumal Village is located about 8.0 km North East of Kallikudi Taluk.
- ✚ The area is marked in the Survey of India, Toposheet No. 58-K/02. The area lies between the Latitudes of 09° 42'26.88"N to 09°42'38.86"N and Longitudes of 78°02'42.36"E to 78°02'50.07"E

The project does not fall within 10 km radius of any Eco – sensitive zone, National Park, Tiger Reserve, Elephant Corridor and Biosphere Reserves.

TABLE 2.1: SITE CONNECTIVITY

Nearest Roadway	NH-44 Kanniyakumari – Bengaluru – 7.5km – West SH-154 Kallikudi – Kariapatti– 2km – South
Nearest Village	Thirumal– 1.0Km-North
Nearest Town	Kallikudi - 8.0km – SW
Nearest Railway	Kallikudi - 8.0km – SW
Nearest Airport	Madurai Airport – 15.0 Km –NE
Seaport	Kochi- 195km – West

Source: Survey of India Toposheet

TABLE 2.2: CO-ORDINATES – PROJECT BOUNDARY

Boundary Pillar No.	Latitude	Longitude
1	09° 42' 27.65"N	78° 02' 45.16"E
2	09° 42' 29.28"N	78° 02' 45.61"E
3	09° 42' 31.18"N	78° 02' 45.90"E
4	09° 42' 31.39"N	78° 02' 43.91"E
5	09° 42' 31.51"N	78° 02' 42.36"E
6	09° 42' 33.82"N	78° 02' 42.84"E
7	09° 42' 33.80"N	78° 02' 42.93"E
8	09° 42' 35.38"N	78° 02' 43.22"E
9	09° 42' 35.04"N	78° 02' 45.49"E
10	09° 42' 36.00"N	78° 02' 45.64"E
11	09° 42' 38.74"N	78° 02' 46.06"E
12	09° 42' 38.86"N	78° 02' 46.08"E
13	09° 42' 38.14"N	78° 02' 48.24"E
14	09° 42' 37.61"N	78° 02' 50.07"E
15	09° 42' 34.44"N	78° 02' 49.47"E
16	09° 42' 32.53"N	78° 02' 49.02"E
17	09° 42' 32.71"N	78° 02' 48.20"E
18	09° 42' 32.75"N	78° 02' 48.08"E
19	09° 42' 31.00"N	78° 02' 47.68"E
20	09° 42' 30.91"N	78° 02' 48.56"E
21	09° 42' 30.83"N	78° 02' 49.31"E
22	09° 42' 26.88"N	78° 02' 48.59"E
23	09° 42' 27.05"N	78° 02' 46.99"E
24	09° 42' 27.31"N	78° 02' 46.16"E

FIGURE 2.1: TOPOGRAPHICAL VIEW OF PROJECT AREA

FIGURE 2.2: GOOGLE IMAGE OF THE PROJECT AREA

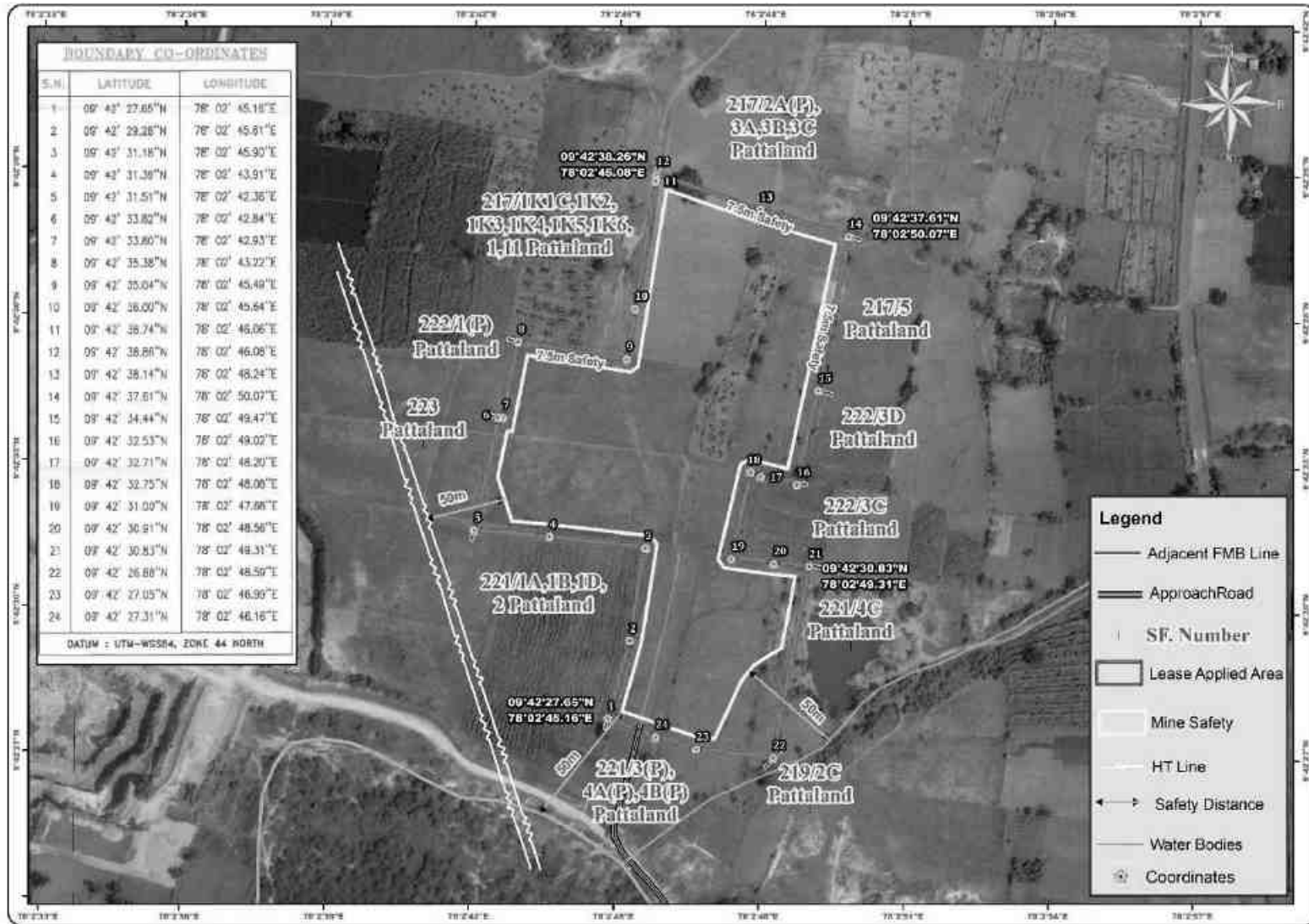


FIGURE 2.3: QUARRY LEASE PLAN / SURFACE PLAN



FIGURE 2.4: VILLAGE MAP SUPERIMPOSED ON GOOGLE EARTH IMAGE

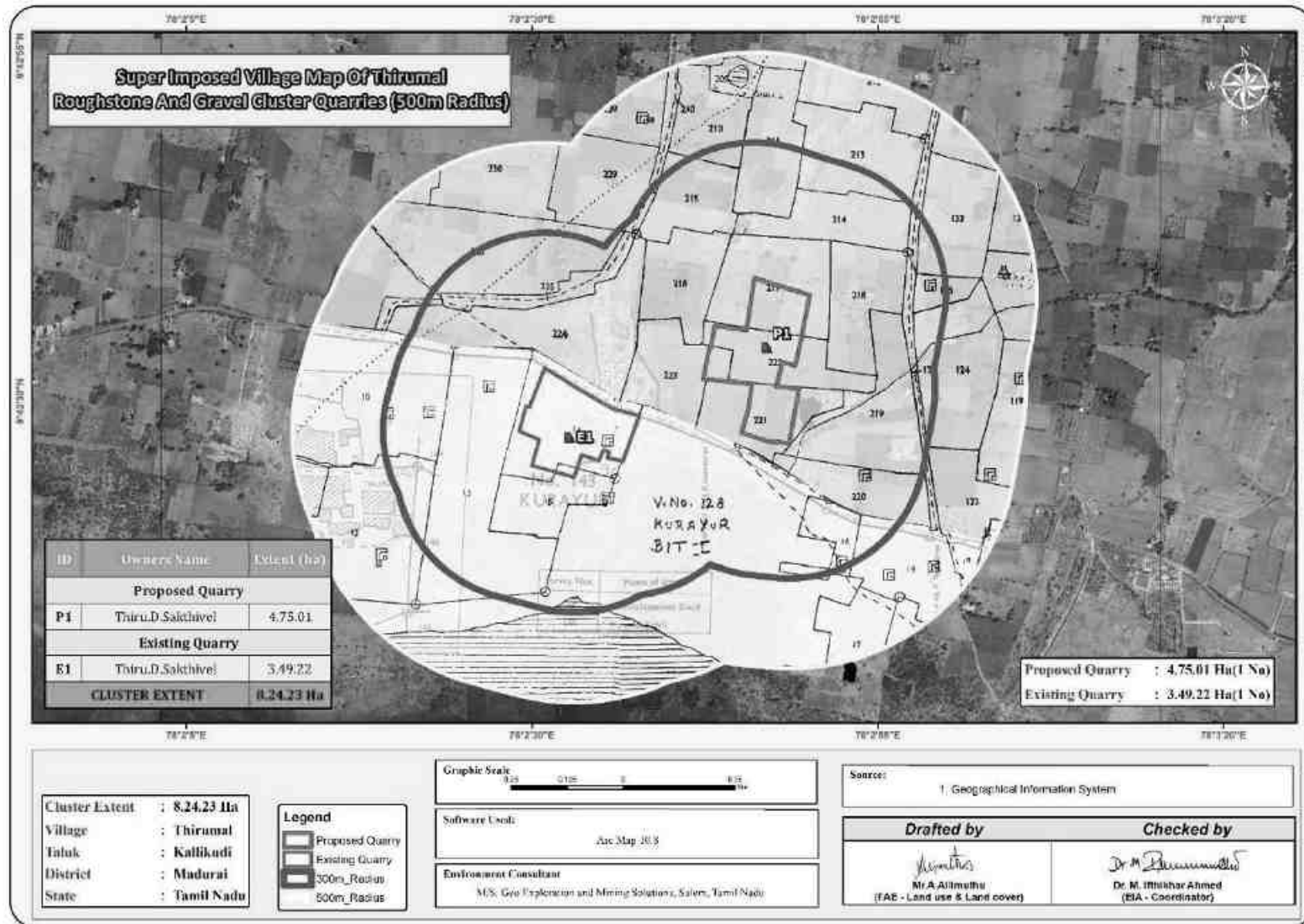


FIGURE 2.5: IMAGE SHOWING SURFACE FEATURES AROUND 10 KM RADIUS

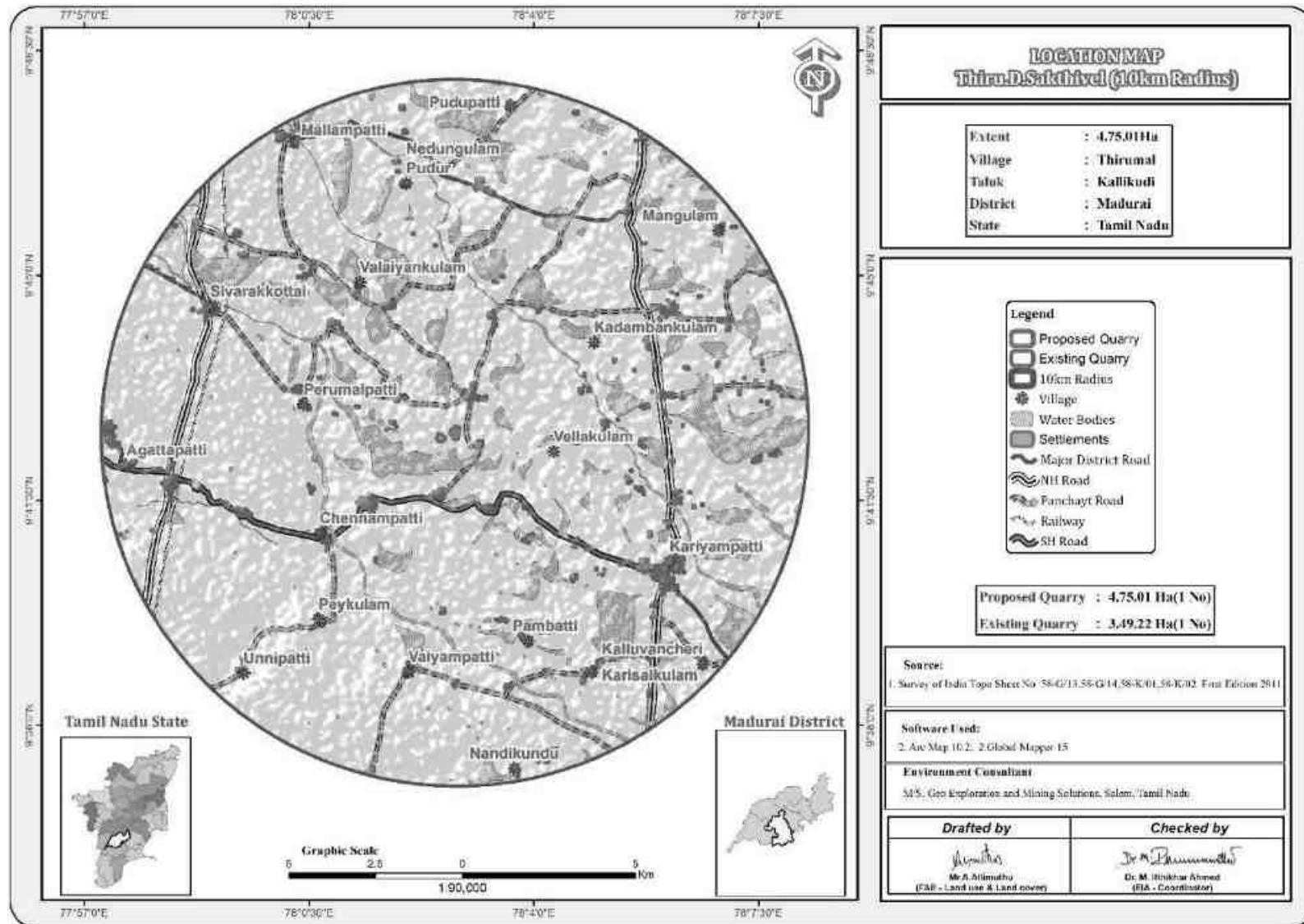


FIGURE 2.6: IMAGE SHOWING SURFACE FEATURES AROUND 5KM RADIUS

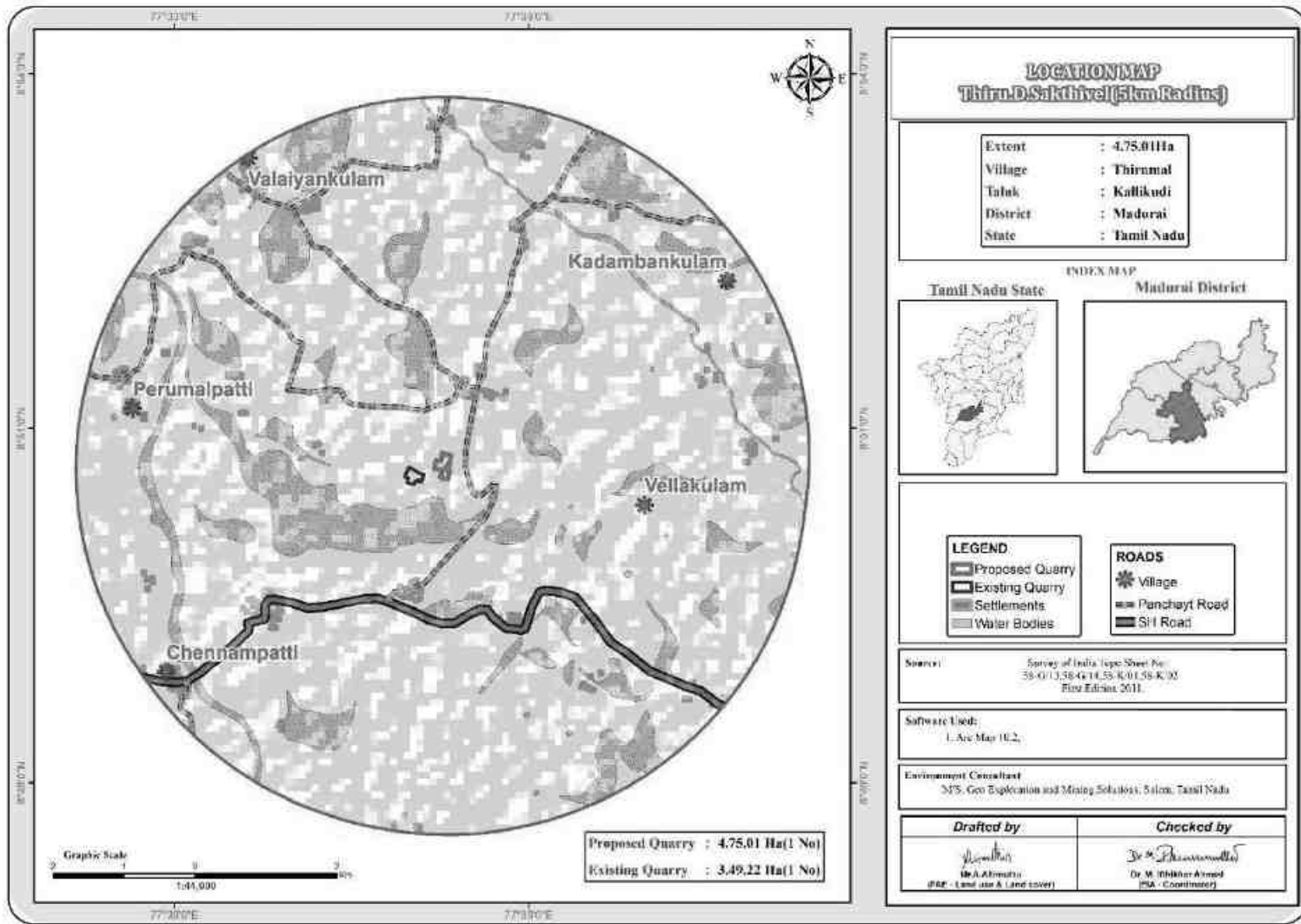
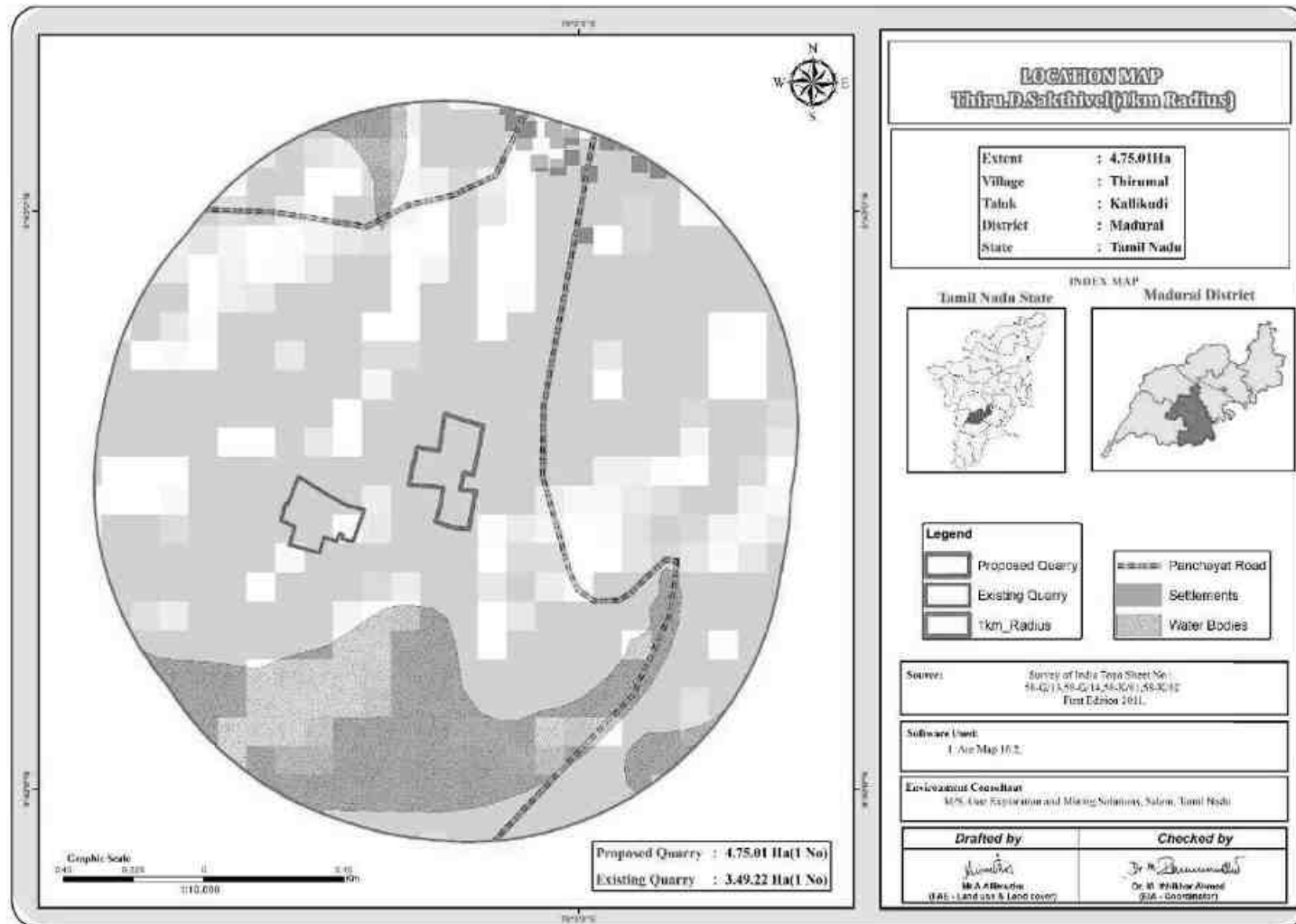


FIGURE 2.7: IMAGE SHOWING SURFACE FEATURES AROUND 1 KM RADIUS



2.2.1 Project Area

- Proposed Project is site specific
- There is No beneficiation or processing proposed inside the project area.
- There is no forest land involved in the proposed project and is devoid of major vegetation and trees.

TABLE 2.3: LAND USE PATTERN

DESCRIPTION	PRESENT AREA IN (HA)	AREA REQUIRED DURING THE FIRST FIVE YEARS (HA)	AREA AT THE END OF LEASE PERIOD (HA)
Area under quarry	Nil	3.65.08	3.65.08
Infrastructure	Nil	0.01.00	0.01.00
Roads	Nil	0.02.00	0.02.00
Green Belt	Nil	0.49.66	0.93.29
Un – utilized area	4.75.01	0.57.27	0.13.64
TOTAL	4.75.01	4.75.01	4.75.01

Source: Approved Mining Plans

2.2.2 Size or Magnitude of Operation

TABLE 2.4: OPERATIONAL DETAILS

PARTICULARS	DETAILS	
	Rough Stone (10Year Plan period)	Gravel (3 Years Plan period)
Geological Resources in m ³	21,37,545	95,002
Mineable Reserves in m ³	6,53,795	69,908
Year wise production for 10 years	6,53,795	69,908
Mining Plan Period	10 Years	
Number of Working Days	300 Days	
Production per day in m ³	217	78
No of Lorry loads (12m ³ per load)	18	7
Total Depth of Mining	47 m bgl (2 m Gravel + 45 m Rough Stone)	

2.3 GEOLOGY

2.3.1 Regional Geology

Madurai district of Tamil Nadu forms a part of southern Granulitic terrain and is predominantly occupied by crystalline rocks of Archaean to late Proterozoic age. Regionally, the rocks can be grouped under five categories namely –

1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet- sillimanite ± biotite ± cordierite ± spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.

2. Charnockite Group consisting of acid charnockite and pyroxene granulite.
3. Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (maficsultramafics).
4. Migmatite group made up of banded hornblende biotite gneiss, grey granitic gneiss, pink granitic gneiss and grey hornblende granite

Stratigraphy of the area –

Age	Group	Lithology
Holocene		Block cotton soil/clay±gypsum
Cenozoic		Kankar/calc-tufa
Neoproterozoic	Acid intrusives	Quartz veins Pegmatite Pink Granite
	Sivamalai syenite Complex	Nepheline-syenite
	Chalk Hills (Basic Intrusives)	Pyroxenite/Dunite
Archaean - Palaeoproterozoic	Peninsular Gneissic Complex (II) PGC (II)	Pink Granite Gneiss Hornblende Biotite gneiss
Archaean	Charnockite Group	Charnockite (Unclassified) Pyroxene Granulite Banded Magnetite Quartzite

Madurai District is predominantly occupied by hornblende Biotite gneisses of PGC (II) with enclaves of Magnetite Quartzite, Pyroxene Granulite and Charnockite. The area exposes several bands of Pyroxene Granulite which is medium grained, medium to dark grey in colour and stand out prominently in the gneissic country generally parallel to regional foliation. Charnockite is coarse grained, massive, many places it is foliated, grey coloured and greasy and exposed as bouldery outcrops and small knolls. It is well exposed in Central, Western and Southern parts of the Madurai District. The general strike of foliation varies from ENE-WSW, E-W with dipping towards NW and N respectively.

Hornblende-Biotite gneiss is well foliated, medium to coarse grained, pale grey and exposed as sheets and small knolls. Pink Granite gneiss occurs as thin bands and lensoidal bodies. It is a medium grained rock composed of alternating bands of mafic (mainly of biotite and hornblende) and felsic (Feldspar and Quartz) minerals. It is well recognized in Avinashi area.

Basic intrusives such as pyroxenite/dunite occurs as Outcrop and lensoidal bodies in the country rock and mostly concordant to the regional foliation. Many basic intrusive are reported in south and south-east of Madurai town. The trend of these bodies is east-west.

Nepheline syenite is a leucocratic, coarse-grained rock and composed mainly of Feldspar with Nepheline and shows pitted appearance due to removal of Nepheline. This alkaline rock is available in and around Sivanmalai area only.

Acid intrusives comprising pink granite, pegmatite and quartz veins are traversed country rocks in micro (cm wide-meter long) to meso-scale (few meters wide and several meter long) extend. Granite is exposed around 9 km SW of Avanashi. Small scale pegmatite and quartz veins are noticed almost in all the rock types.

Acid intrusives are overlain by sediments of Quaternary age, represented by Kankar and black cotton soil with Gypsum. Most of the area is covered by brown and red brown soil. Some part of the area covered with black cotton soil contains Gypsum as lumps. Black cotton soil covers south-western part of the district.

Source: District Survey Report for Minor Minerals Madurai District – May 2019

<https://cdn.s3waas.gov.in/s3f5f8590cd58a54e94377e6ae2eded4d9/uploads/2019/06/2019061089.pdf>

2.3.2 Local Geology:

The study area follows the regional trend and mainly comprises of Hard Rock Formation as a homogeneous formation / Batholith formation of Charnockite. The project areas is plain terrain, the project areas is covered with gravel formation of 2m thickness; Massive Charnockite formation is found after 2 m gravel formation which is clearly inferred from the nearby existing quarry pit.

2.3.3 Hydrogeology

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district. The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In general there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100 m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti Timmarasanayakanur, Thirali Peraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period.

Aquifer Systems:

Occurrence and storage of groundwater depend upon three factors viz., Geology, Topography and rainfall in the form of precipitation. Apart from Geology, wide variation in topographic profile and intensity of rainfall constitutes the prime factors of groundwater recharge. Aquifers are part of the more complex hydro geological system and the behaviour of the entire system cannot be interpreted easily. In hard rock terrain the occurrence of Ground Water is limited to top weathered, fissured and fractured zone which extends to maximum 30 m on an average it is about 10-15 m in Madurai District.

In Sedimentary formations, the presence of primary inter granular porosity enhances the transmitting capacity of groundwater where the yield will be appreciable. The sedimentary area which occupies the eastern part of the District along the coastal tract is more favourable for groundwater recharge. Ground Water occurs both in semi

confined and confined conditions. A brief description of occurrence of groundwater in each formation is furnished below.

Alluvial Formations

In the river alluvium groundwater occurs under water table condition. The maximum thickness is 37 m and the average thickness of the aquifer is approximately 12 m. These formations are porous and permeable which have good water bearing zones.

Tertiary Cuddalore sandstone

Tertiary formations are represented by Cuddalore Sandstone and characterised as fluvial to brackish marine deposits. Predominantly this formation is divided into Lower and Upper Cuddalore formations. In the Upper Cuddalore formations the groundwater occurs in semi confined conditions, whereas in the Lower Cuddalore the groundwater occurs in confined condition with good groundwater potential.

Cretaceous Formations

Groundwater occurring in the lens shape in the sandy clay lenses and fine sand is underlain by white and black clay beds which constitute phreatic aquifer depth which ranges 10m to 15m below ground level. Phreatic aquifer in Limestone is potential due to the presence of Oolitic Limestone.

Hard Rock Formations

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less in other type of rocks when compared to gneissic formation. The groundwater potential is low, when compared with the gneissic formations

Granitic Gneiss

Groundwater occurs under water table conditions in weathered, jointed and fractural formations. The pore space developed in the weathered mantle acts as shallow granular aquifers and forms the potential water bearing and yielding zones water table is shallow in canal and tank irrigation regions and it is somewhat deeper in other regions.

Charnockite

Groundwater occurs under water table conditions but the intensity of weathering, joint, fracture and its development is much less when compared to gneissic formations. The groundwater potential is low, when compared with the gneissic formations.

Aquifer Parameters

The boundaries of this deposit are well defined in Theniar sub basin where the thickness varies from 40 to 60m below ground level. In other areas the thickness of valley fill sediments slightly varies between 30 and 40m below ground level. Recharge is mainly from precipitation and surface runoff during monsoon seasons. The range of aquifer parameter values of valley fill sediments are furnished below

TABLE 2.5: RANGE OF AQUIFER PARAMETERS

Name	T (m ² /d)	K (m/day)	Yield of wells (lpm)
Alluvium	210-1500	19.57 – 48.93	315 - 1080
Hard rocks	15-60	0.98-2.45	45-135
Valley fill sediments	75-150	1.95-4.40	225-450

Source: <http://nwm.gov.in/sites/default/files/Notes%20on%20Madurai%20District.pdf>

FIGURE 2.8: REGIONAL GEOLOGY MAP

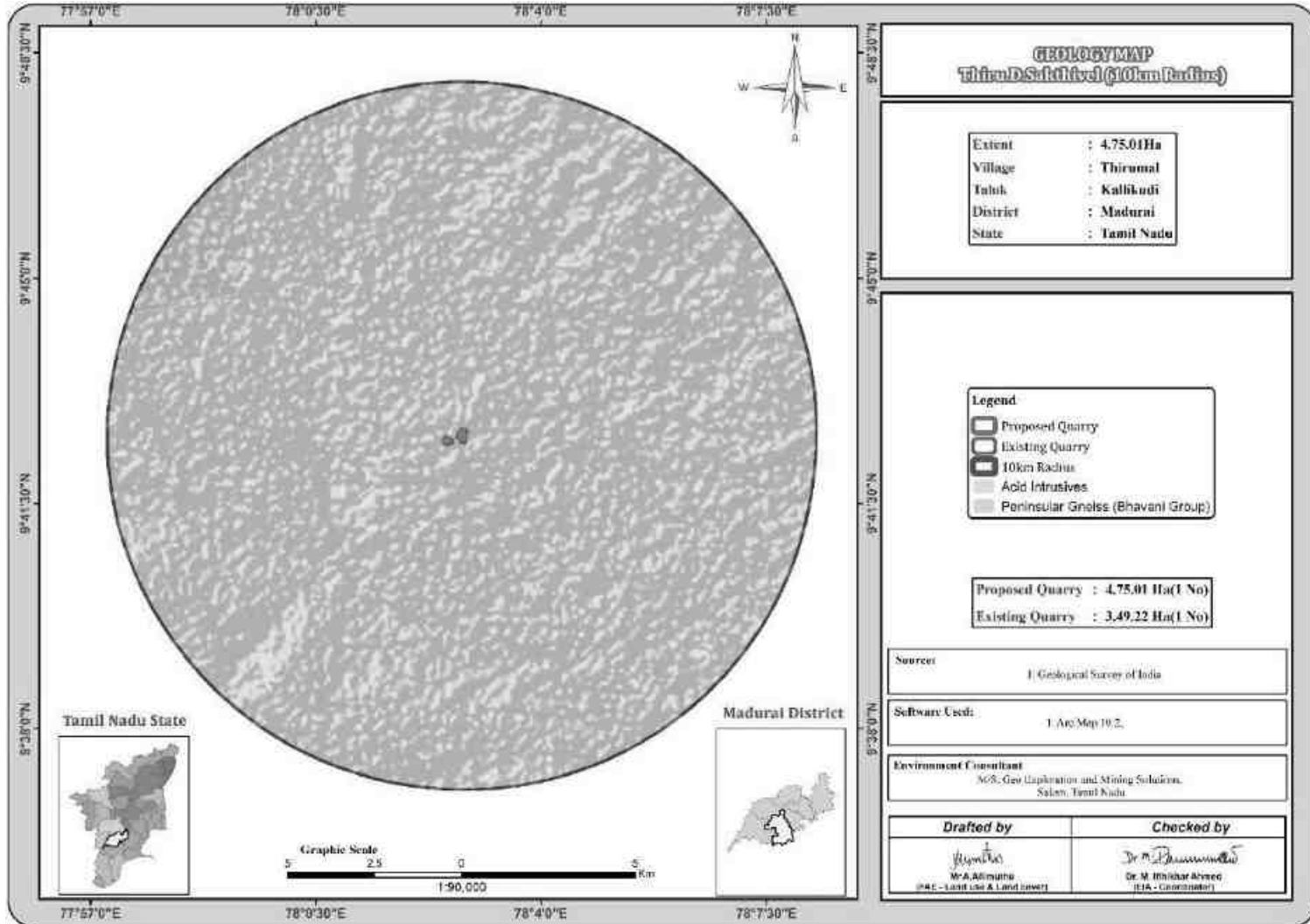


FIGURE 2.9: GEOMORPHOLOGY MAP

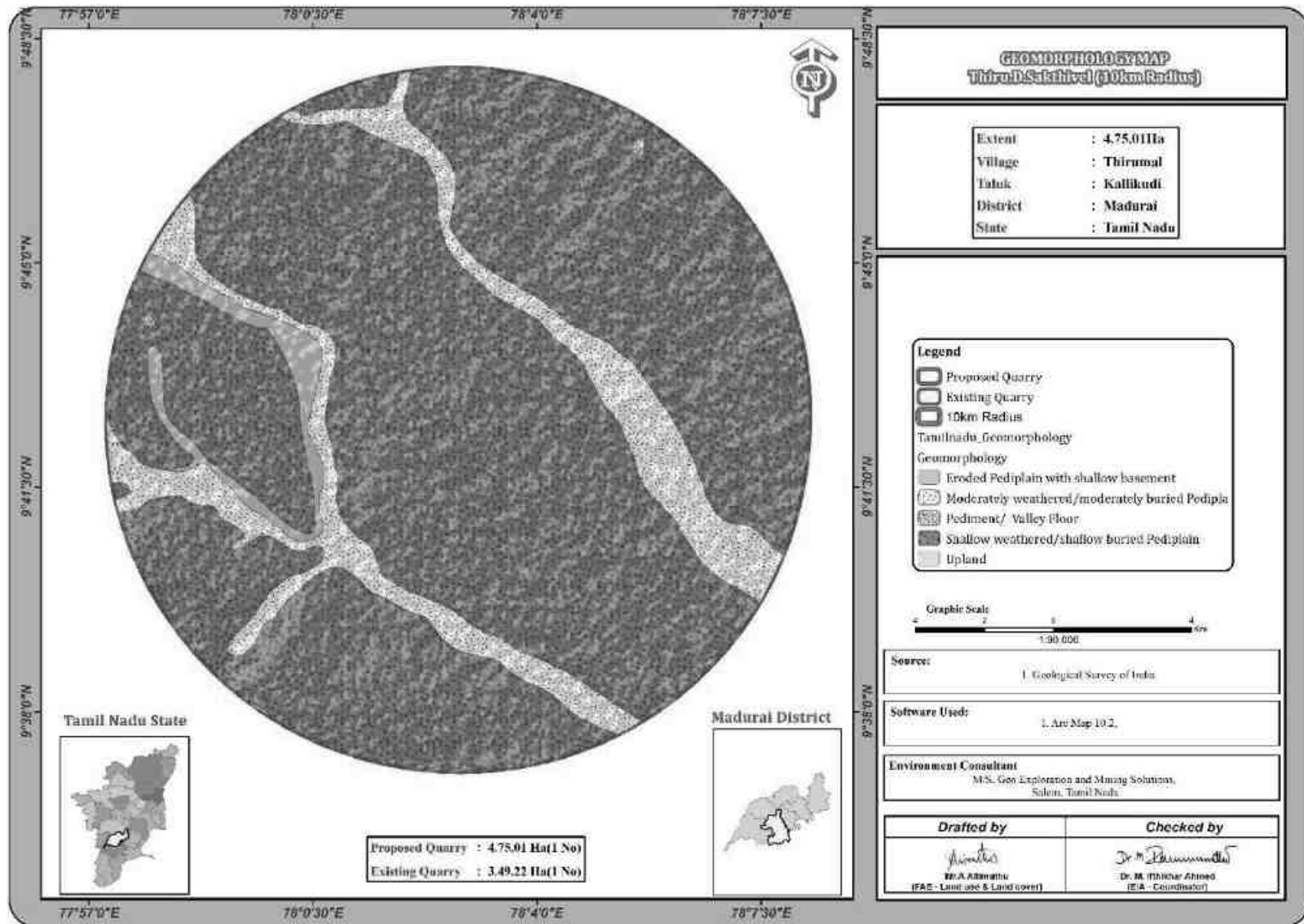
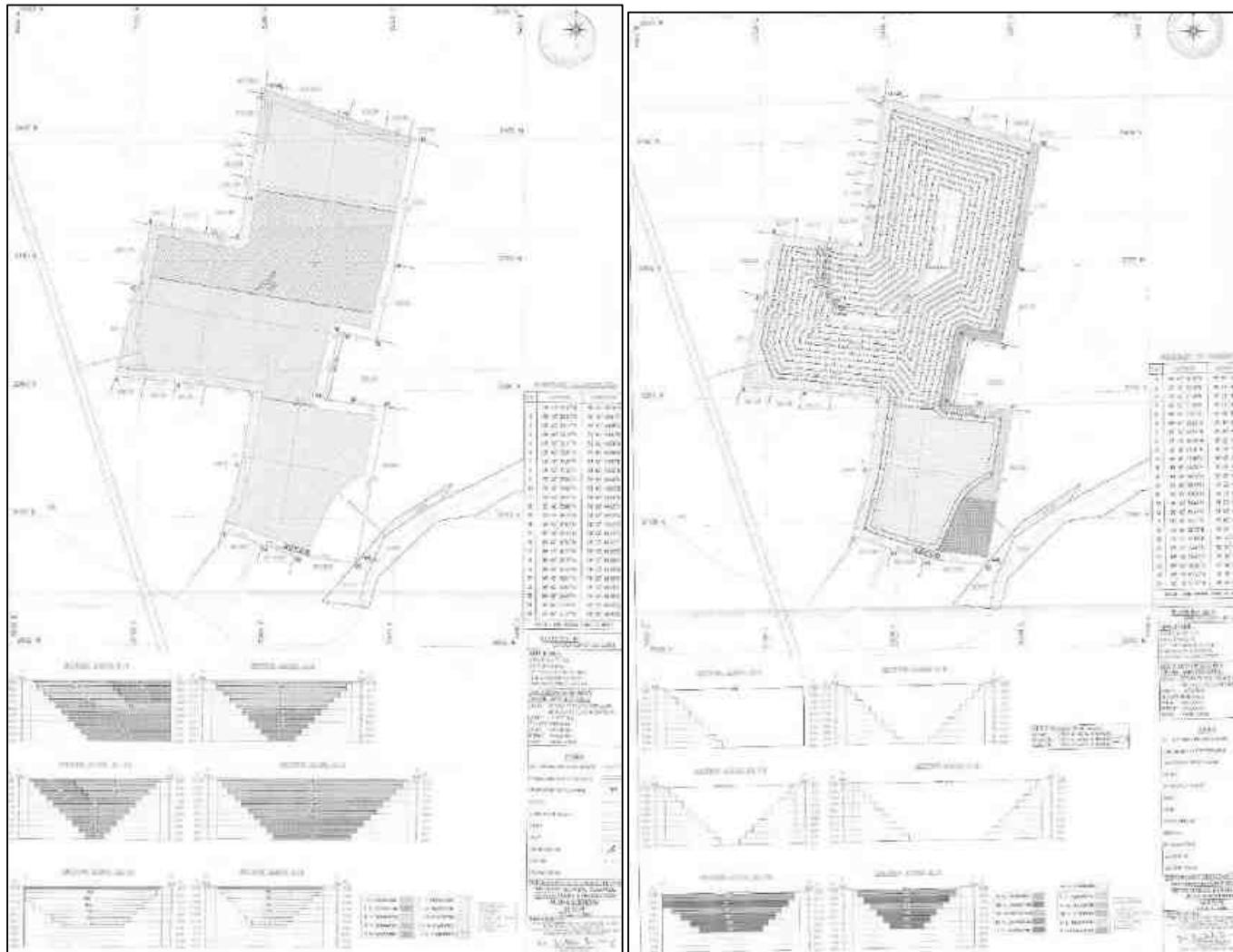
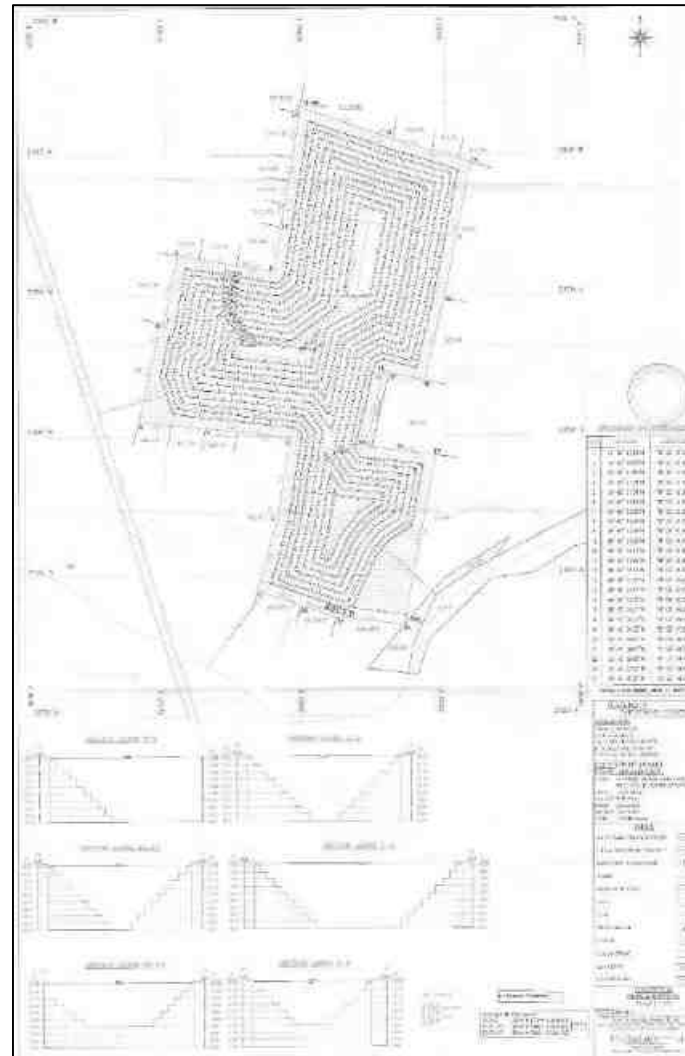


FIGURE 2.10: TOPOGRAPHY, GEOLOGICAL, YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS



Source: Approved Mining Plan

FIGURE 2.11: CLOSURE PLAN AND SECTIONS



Source: Approved Mining Plan

2.4 RESOURCES AND RESERVES

The Resources and Reserves of Rough Stone and Gravel were calculated based on Cross-Section Method by plotting sections to cover the maximum lease area for all the proposed projects.

Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (Safety Barrier all around the applied area) and safety distance as per precise area communication letter and deducting the locked up reserves during bench formation (Also called as Bench Loss) and the Mineable Reserves is calculated considering there is no waste / overburden / side burden (100% Recovery Anticipated) for all the proposed projects.

TABLE 2.6: AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT

	ROUGH STONE (m³)	GRAVEL (m³)
Geological Resource in m³	21,37,545	95,002
Mineable Resource in m³	6,53,795	69,908

Source: Approved Mining Plan

TABLE 2.7: YEAR-WISE PRODUCTION PLAN FOR FIRST FIVE YEARS

YEAR	ROUGH STONE (m³)	GRAVEL (m³)
I	1,02,400	19,856
II	1,17,500	19,616
III	1,03,200	30,436
IV	1,18,575	
V	79,650	
TOTAL	5,21,325	69,908

TABLE 2.7A: YEAR-WISE PRODUCTION PLAN FOR NEXT FIVE YEARS

YEAR	ROUGH STONE (m³)
I	39,655
II	32,830
III	24,510
IV	17,390
V	18,085
TOTAL	1,32,470

Source: Approved Mining Plan

Disposal of Waste

There is no waste anticipated in these Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%). Top layer of Gravel formation will be removed and sold to needy customers directly.

Conceptual Mining Plan/ Final Mine Closure Plan

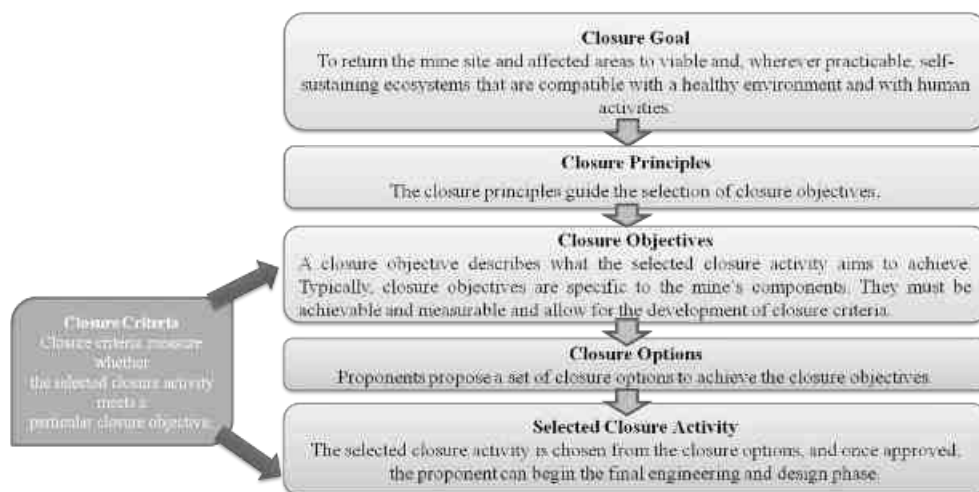
The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.

TABLE 2.8: ULTIMATE PIT DIMENSION

PROPOSAL			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	108	107	47 m bgl
II	100	146	47 m bgl
III	106	83	32 m bgl

Source: Approved Mining Plan

- At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem
- Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- The principal closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.

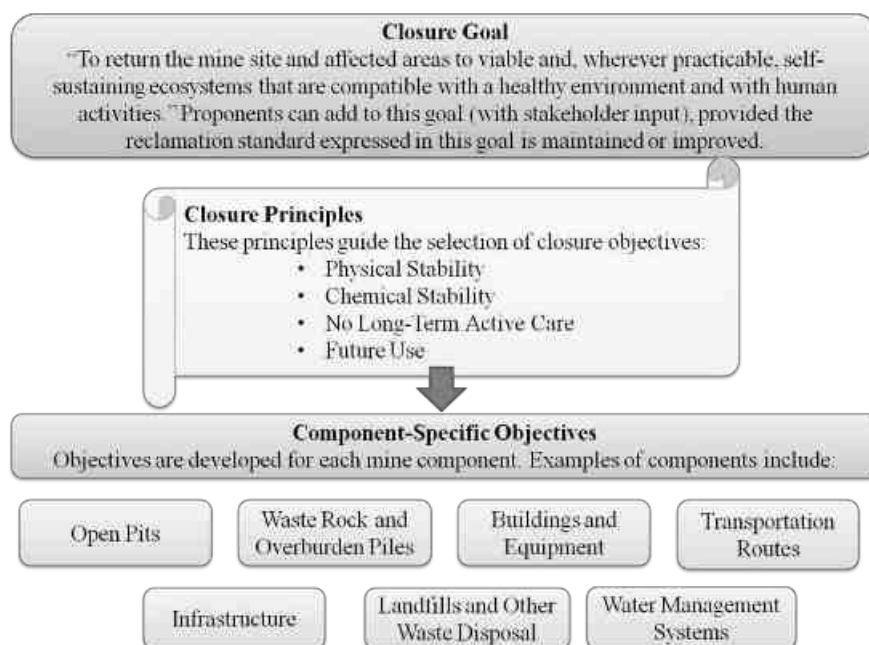


Closure Objectives –

- Access to be limited, for the safety of humans and wildlife.
- The open pit mine workings and pit boundary are physically and geo-technically stable.
- Water quality in flooded pits is safe for humans, aquatic life, and wildlife.
- Discharge of contaminated drainage has been minimized and controlled.
- Original or desired new surface drainage patterns have been established.
- For flooded pits, in-pit aquatic habitat has been established where practical and feasible.
- Emergency access and escape routes from flooded pits for humans and wildlife are in place.
- Dust levels are safe for people, vegetation, aquatic life, and wildlife.

Closure Planning & Options Considerations in Mine Design –

- The closure of mine is well planned at the initial stage of planning & design consideration by the internal and external stake holders
- Construction of 2m height bund all along the mine pit boundary and ensure its stability all time & construction of garland drain along the natural slope to avoid sliding and collection of soil to the pit & surface runoff during rainfall
- After complete exploitation of mineral, the lowest bench foot wall side will be maintained as plain surface without any sump pits to avoid any accidents
- All the sharp edges will be dressed to smoother face before the closure of mine and ensure no loose debris on hanging wall side
- There is a river on southern side of the project area. The river will not be hindered by any of mine closure activities
- The project proponent as a part of social responsibilities assures to supply the stored mine pit water to the nearby villages after effective treatment process as per the standards of TNPCB & TWAD
- Native species will be planted in 3 row patterns on the boundary barriers and 1st bench, a full-time sentry will be appointed at the gate to prevent inherent entry of public & cattle.
- The access road to the quarry will be cut-off immediately after the closure
- The layout design shall be prepared and get approved from Department of Geology and Mining.
- The proponent is instructed to construct as per the layout approved
- Physical and chemical stability of structures left in place at the site, the natural rehabilitation of a biologically diverse, stable environment, the ultimate land use is optimized and is compatible with the surrounding area and the requirements of the local community, and taking the needs of the local community into account and minimizing the socio-economic impact of closure
- There will be a positive change in the environmental and ecology due to the mine closure



Post-Closure Monitoring –

The purpose of post-closure monitoring with respect to open pit mine workings is to ensure the attainment of closure objectives.

- Monitor physical and geotechnical stability of remnant pit walls.
- Monitor the ground regime in pit walls to confirm achievement of design objectives.
- Monitor water level in pit to confirm closure objectives regarding fish, fish habitat, and wildlife safety are being achieved.
- Sample water quality and quantity at controlled pit discharge points.
- Identify and test unanticipated areas where water management is an issue.
- Inspect integrity of barriers such as berms & fences.
- Monitor wildlife interactions with barriers to determine effectiveness.
- Inspect aquatic habitat in flooded pits where applicable.
- Monitor dust levels.

TABLE 2.9: MINE CLOSURE BUDGET

Activity	Year					Cost	Total Cost
	I	II	III	IV	V		
Plantation in Nos	240	-	-	-	-	@ 200 Rs/ Saplings including maintenance	Rs 4,80,000
Plantation cost	4,80,000	-	-	-	-		
Renovation of Wire Fencing (1200 meters)	3,60,000					@ 300Rs per meter	Rs 3,60,000
Renovation of Garland Drain (1100 meters)	3,30,000					@ 300Rs per meter	Rs 3,30,000
TOTAL							Rs 11,70,000

Source: Proposed by FAE's and EC

2.5 METHOD OF MINING

Proposed Method of Mining is common for the Proposed Project – The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting.

Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.5.1 Drilling & Blasting Parameters

Drilling & Blasting will be carried out as per parameters given below: -

Spacing	–	1.2m
Burden	–	1.0 m
Depth of hole	–	1.5 m
Charge per hole	–	0.50 – 0.75kg
Powder factor	–	6.0 tonnes/kg
Diameter of hole	–	32 mm
Peak production Capacity	=	218m ³ of Rough stone per day
Spacing X Burden X Depth	=	1.2m X 1.0m X 1.5m = 1.8m ³
	=	1.8m ³ X 2.6 (Bulk Density) = 4.6Ts per hole

hence for the peak production of 218m³ (4.6Ts) = 188 Nos of holes to be drilled per day

Explosives per hole = ½ kg hence 94kg of Explosives will be utilized maximum considering the peak production.

Type of Explosives to be used –

Slurry explosives (An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener), NONEL / Electric Detonator & Detonating Fuse

Storage of Explosives –

No proposal for storage of explosives within the project area, the respective project proponents have made agreement with authorized explosives agencies for carrying out blasting activities and competent person as per DGMS guidelines will be employed for safety and supervision of overall quarrying activities.

The explosives will be sourced from the blasting agency on daily basis and the blasting will be carried out under the supervision of competent qualified Blaster and it will be ensured that there shall be no balance of explosive stock; any balance stock will be taken back by the supplier.

2.5.2 Extent of Mechanization

TABLE 2.10 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	6	1.2m to 2.0m	Compressed air
2	Compressor	2	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker Unit 4	1	300 HP	Diesel Drive
4	Trucks	3	20 Tonnes	Diesel Drive
5	Water Sprinkler	1	10000 lit	Diesel Drive

Source: Approved Mining Plans

2.6 GENERAL FEATURES

2.6.1 Existing Infrastructures

Infrastructures like Mine office, Temporary Rest shelters for workers, Latrine and Urinal Facilities will be constructed as per the Mine Rule after the grant of quarry lease in all the proposed quarries.

2.6.2 Drainage Pattern

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

2.6.3 Traffic Density

The traffic survey conducted based on the transportation route of material, the Rough Stone is proposed to be transported mainly through Kurayur to Kariapatti Road (SH) and connecting to Kurayur to Thirumal Road (PR) Panchayat Road on Eastern Side.

Traffic density measurements were performed at two locations

1. Panchayat Road Kurayur to Thirumal Road
2. State Highway Kurayur to Kariapatti Road

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

TABLE.2.11: TRAFFIC SURVEY LOCATIONS

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Panchayat Road Kurayur to Thirumal Road	1.3Km_S	Panchayat Road
TS2	State Highway Kurayur to Kariapatti Road	1.9Km_SE	State Highway

Source: On-site monitoring by GEMS FAE & TM

TABLE 2.12: EXISTING TRAFFIC VOLUME

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	80	240	18	18	117	59	317
TS2	210	630	85	85	368	184	899

Source: On-site monitoring by GEMS FAE & TM

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

TABLE 2.13: ROUGH STONE & GRAVEL HOURLY TRANSPORTATION REQUIREMENT

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day Cumulatively	Volume in PCU

10 tonnes	18	54
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Source: Data analysed from Approved Mining Plan

FIGURE.2.12: MINERAL TRANSPORTATION ROUTE MAP



Proposed Transportation Route:

1. The Rough stone will be transported to the Crusher which is located 1000m Southwest side of the project site.
2. Existing approach road is located on the south side
3. No Major Habitation, Schools in the proposed transportation route.

TABLE 2.14: SUMMARY OF TRAFFIC VOLUME

Route	Existing Traffic volume in PCU	Incremental traffic due to the project	Total traffic volume	Hourly Capacity in PCU as per IRC – 1960 guidelines
Panchayat Road Kurayur to Thirumal Road	317	18	335	1200
State Highway Kurayur to Kariapatti Road	899	18	917	1500

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

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

2.6.4 Mineral Beneficiation and Processing

There is no proposal for the mineral processing or ore beneficiation in any of the proposed project

2.7 PROJECT REQUIREMENT

2.7.1 Water Source & Requirement

Detail of water requirements in KLD as given below:

TABLE 2.15: WATER REQUIREMENT FOR THE PROJECT

PROPOSAL		
*Purpose	Quantity	Source
Dust Suppression	0.9 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Green Belt development	0.8 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose	0.4 KLD	Water Tankers
Total	2.1 KLD	

Source: Prefeasibility report

* Drinking water will be sourced from Approved Water Vendors

2.7.2 Power and Other Infrastructure Requirement

No proposed projects require power supply for the mining operations. The quarrying activity is proposed during day time only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Electricity for use in office and other internal infrastructure will be obtained from SEB by respective project proponent.

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

2.7.3 Fuel Requirement

High speed Diesel (HSD) will be used for mining machineries. Diesel will be brought from nearby Fuel Stations.

Average diesel consumption is around = 500 Liters of HSD / day per proposed project.

2.7.4 Project Cost

TABLE 2.16: PROJECT COST OF PROPOSED PROJECT

Project Cost Rs.3,15,79,000/-

Source: Approved Mining Plan & Prefeasibility Report

2.8 EMPLOYMENT REQUIREMENT:

The following manpower's are proposed in the mining plan to carry out the day-to-day quarrying activities, the same employment is maintaining aimed at the proposed production target and also to comply with the statutory provisions of The Metalliferous mines regulations, 1961 for all the proposed projects.

TABLE 2.17: PROPOSED MANPOWER DEPLOYMENT

Mines Foreman	1
Blaster / Mate	1
Jack hammer operator	12

Excavator Operator	1
Tipper Driver	4
Water sprinklers	2
Labour & Helper	4
Cleaner & Co-operator	8
Security	1
Total	34

Source: Approved Mining Plan & Pre-Feasibility report.

2.9 PROJECT IMPLEMENTATION SCHEDULE

The mining operation will commence after the grant of Environmental Clearance, Consent to operate (CTO), Execution of Lease Deed and Obtaining permission from the DGMS (Notice of Opening).

TABLE 2.18: EXPECTED TIME SCHEDULE

Sl.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1 st	2 nd	3 rd	4 th	5 th	
1	Environmental Clearance						
2	Consent to Operate						
3	Execution of Lease deed						
4	Permission from DGMS						
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

Source: Anticipated based on Timelines framed in EIA Notification & CPCB Guidelines

3. DESCRIPTION OF ENVIRONMENT

3.0 GENERAL

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 2024 to May 2024 with CPCB guidelines for the following attributes –

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

Environmental data has been collected with reference to cluster quarries by EHS 360 Labs Private Limited, – An accredited by ISO/IEC 17025:2017 (NABL) Laboratory

Study Area

An area of 10 km radius (aerial distance) from the periphery of the cluster is considered for EIA study. The study area has been divided into two zones viz **core zone** and **buffer zone**.

- Core zone is considered as cluster area
- Buffer zone taken as 10km radius from the periphery of the Cluster. Both Core zone and Buffer zone is taken as the study area.

Study Period

The baseline study was conducted during the summer season i.e., March 2024 to May 2024.

Study Methodology

- The project area was surveyed in detail with the help of Total Station Survey instruments and pillars were marked. The boundary coordinates were superimposed on the satellite imagery to understand the relief of the area, besides Land use pattern of the area was studied through the Bhuvan (ISRO)
- Soil samples were collected and analysed for relevant physio-chemical characteristics in order to assess the impact due to mining activities and to recommend saplings for Greenbelt development.
- Ground water samples were collected from the existing bore wells, Surface water was collected from water bodies in the buffer zone and analysed as per CPCB Guidelines.
- An onsite meteorological station was setup in cluster area, to collect data about wind speed, wind direction, temperature, relative humidity, rainfall and general weather conditions were recorded throughout the study period.
- Air quality Data's were collected by installation of Respiratory Dust Samplers (RDS) for Fugitive dust, PM₁₀ and SO₂, NO_x with gaseous attachments & Fine Dust Samplers (FDS) for PM_{2.5} and other parameters as per NAAQ norms and analysed for primary air pollutants to work out the existing status of air quality.

- The Noise level measurements were also made at various locations in different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone.
- Baseline biological studies were carried out to assess the ecology of the study area to study the existing flora and fauna pattern of the area.
- Socio-Economic survey was conducted at village and household level in the study area to understand the present socio-economic conditions and assess the extent of impact due to the proposed mining project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of samples analysis, etc., are given below 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 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 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/Auto matic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM10 PM2.5 SO2 NOX Fugitive Dust	24 hourly twice a week (March 2024 – May 2024)	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.

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

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

3.1 LAND ENVIRONMENT

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

3.1.1 Land Use/ Land Cover

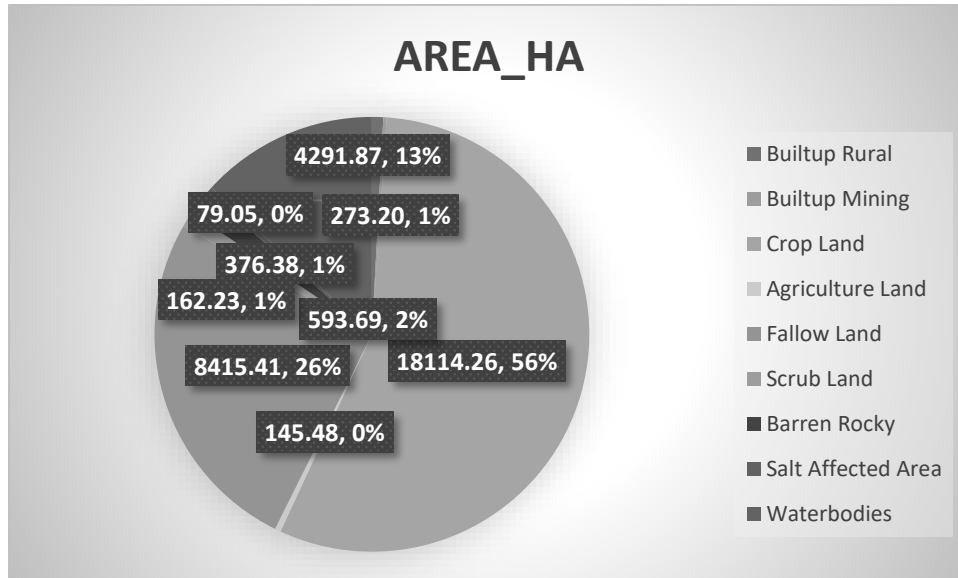
A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through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

TABLE 3.2: LAND USE / LAND COVER TABLE 10 KM RADIUS

S.No	CLASSIFICATION	AREA_HA	AREA_%
BUILTUP			
1	Builtup Rural	273.20	0.84
2	Builtup Mining	79.05	0.24
AGRICULTURAL LAND			
3	Crop Land	18114.26	55.82
4	Agriculture Land	145.48	0.45
5	Fallow Land	8415.41	25.93
BARREN/WASTE LANDS			
6	Scrub Land	376.38	1.16
7	Barren Rocky	593.69	1.83
8	Salt Affected Area	162.23	0.50
WETLANDS/ WATER BODIES			
9	Waterbodies	4291.87	13.23
TOTAL		32451.58	100.00

Source: Survey of India Toposheet and Landsat Satellite Imagery

FIGURE 3.1: PIE DIAGRAM OF LAND USE AND LAND COVER ANALYSIS



Source: Table 3.2

FIGURE 3.2: PHYSIOGRAPHIC MAP 10KM RADIUS

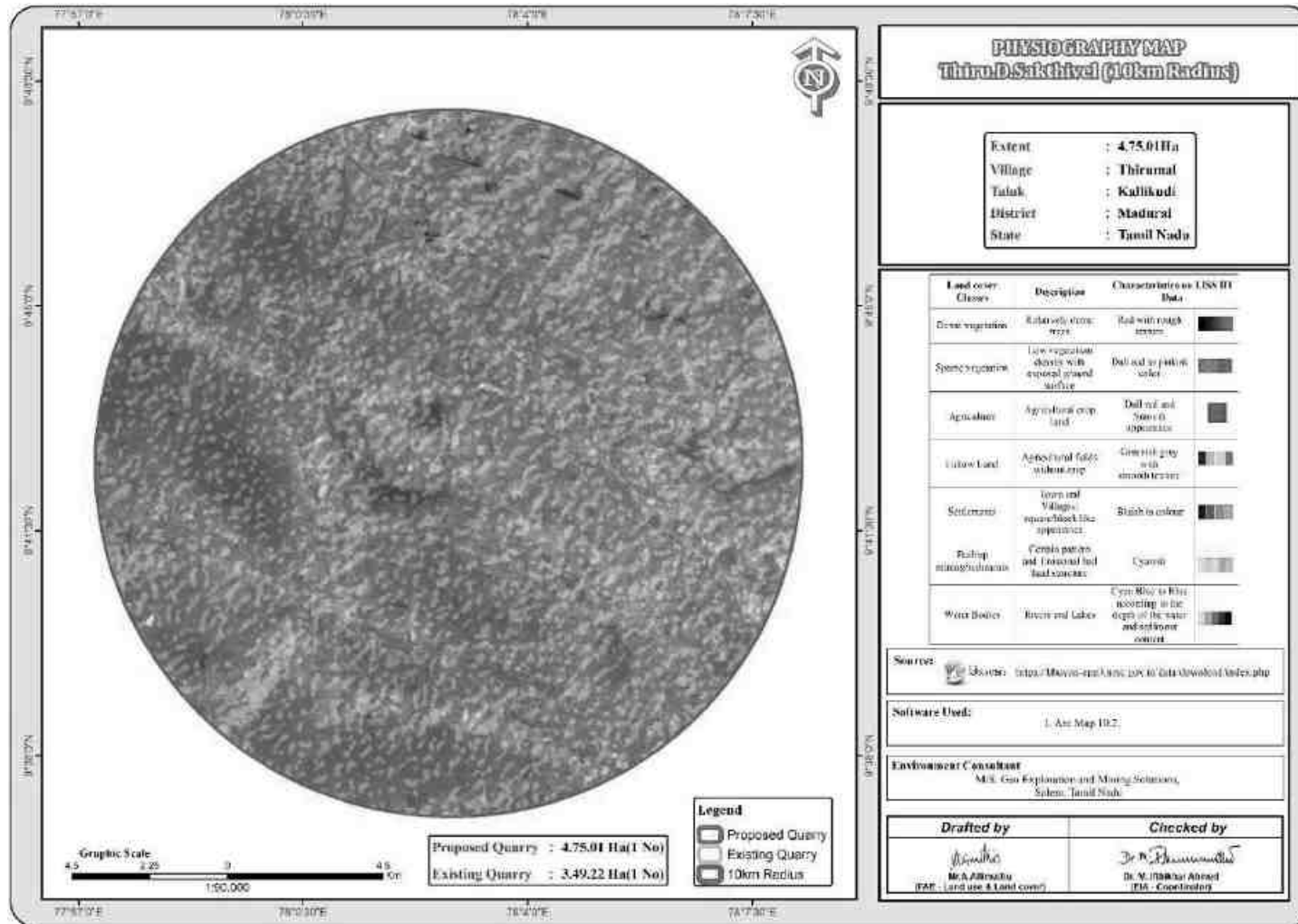
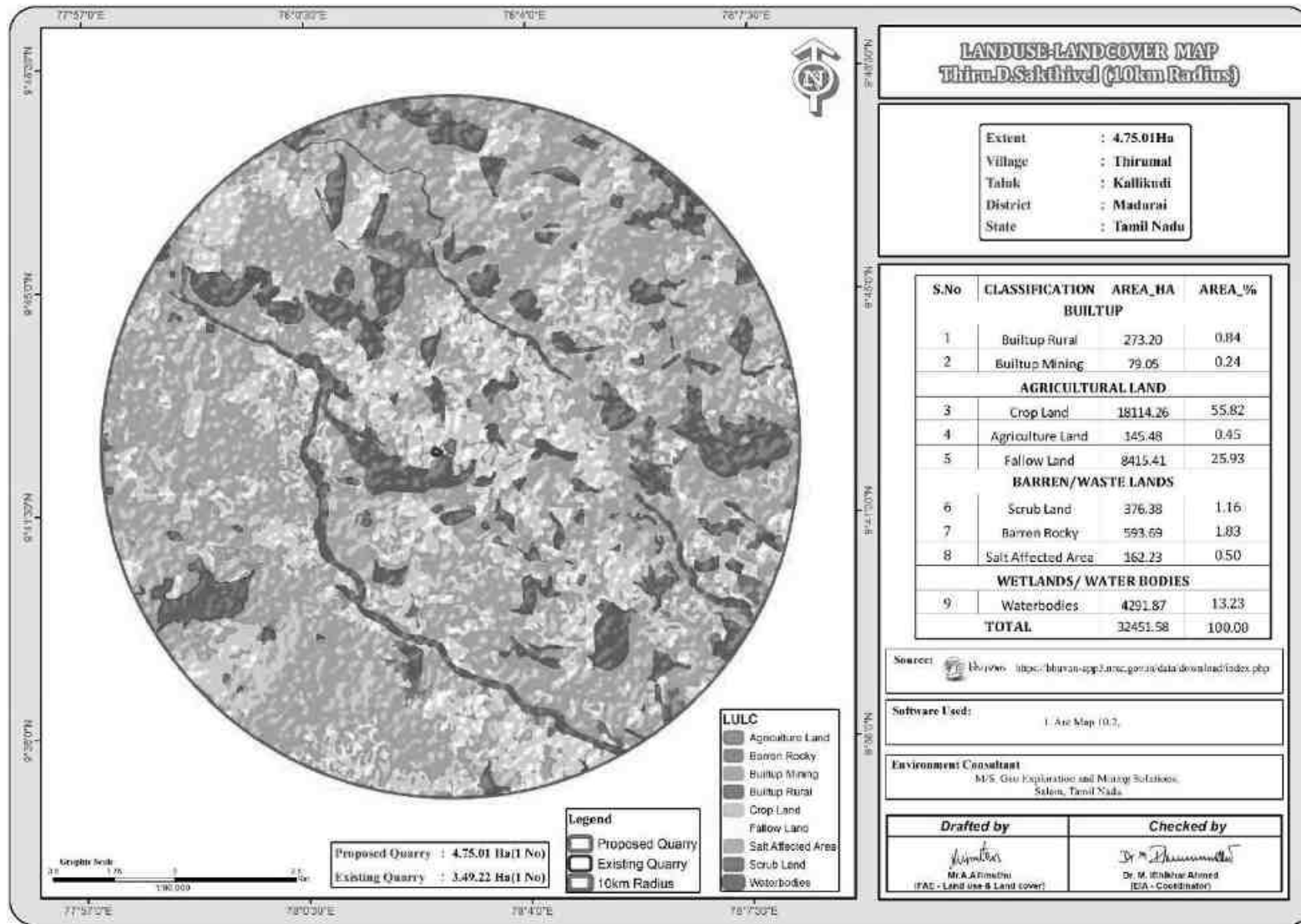


FIGURE 3.3: LAND USE LAND COVER MAP 10KM RADIUS



From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture land (includes crop land, plantation and fallow land) 82.2% followed by Built-up Lands 0.84%, Scrub Land 3.49%; Water bodies 13.23% and Mining – 0.24%.

The total mining area within the study area is 79.05 ha i.e., 0.24%. The cluster area of 8.24.23ha contributes about 10% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.1.2 Topography

The project area exhibits plain terrain having gentle slope towards Southeast side, the southwest of the area is existing Rough stone and gravel quarry. to utilize temporary storage of Crushed materials.

3.1.3 Drainage Pattern of the Area

The drainage pattern of the area is dendritic – sub dendritic. Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land. There are no streams, canals or water bodies crossing within the project area.

3.1.4 Seismic Sensitivity

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

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

3.1.5 Environmental Features in the Study Area

There is no Wildlife Sanctuaries, National Park and Archaeological monuments within project area. No Protected and Reserved Forest area is involved in the project area. Therefore, there will be no need to acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e. 10 km radius, are given in the below Table 3.3.

TABLE 3.3: DETAILS OF ENVIRONMENT SENSITIVITY AROUND THE CLUSTER

Sl.No	Sensitive Ecological Features	Name	Arial Distance in km from Cluster
1	National Park / Wild life Sanctuaries	Koothankulam Kodankulam Birds Sanctuary 23km - NW	23km - NW
2	Reserve Forest	Sathankulam R.F.	13 Km NW
3	Lakes/Reservoir/ Dams/Stream/Rivers	Gundar River	3.8km SW
4	Tiger Reserve/ Elephant Reserve/ Biosphere Reserve	None	Nil within 10KM Radius
5	Critically Polluted Areas	None	Nil within 10km Radius
6	Mangroves	None	Nil within 10km Radius
7	Mountains/Hills	None	Nil within 10km Radius
8	Notified Archaeological Sites	None	Nil within 10km Radius
9	Industries/ Thermal Power Plants	None	Nil within 10km Radius
10	Defence Installation	None	Nil within 10km Radius

Source: Survey of India Toposheet

TABLE 3.4: NEARBY WATER BODIES FROM THE PROPOSED PROJECT SITE

Sl.No	NAME	DISTANCE & DIRECTION
1	Odai	50m Safety_SE
2	Tank	370m_S
3	Tank	900m_NW
4	Gundar River	3.8Km_SW
5	Lake	6.4Km_NE

Source: Village Cadastral Map and Field Survey

3.1.6 Soil Environment

Soil quality of the study area is one of the important components of the land environment. The composite soil samples were collected from the study area and analysed for different parameters. The locations of the monitoring sites are detailed in Table 3.5 and Figure 3.3.

The objective of the soil sampling is -

- To determine the baseline soil characteristics of the study area; study the impact of proposed activity on soil characteristics and study the impact on soil more importantly agriculture production point of view.

TABLE 3.5: SOIL SAMPLING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Project Area	Core Zone	9°42'32.40"N 78° 2'43.46"E

2	S-2	Tirumal	1km NE	9°43'3.67"N 78° 3'13.90"E
3	S-3	Chennampatti	5km SW	9°40'39.32"N 78° 0'47.18"E
4	S-4	Arasapatti	6km NW	9°45'10.85"N 78° 0'32.85"E
5	S-5	Pullur	4.2km NE	9°42'34.91"N 78° 5'9.02"E
6	S-6	Pampatti	6km SE	9°39'37.98"N 78° 3'55.28"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Methodology –

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected by auger boring into the soil up to 90-cm depth. Six (6) locations were selected for soil sampling on the basis of soil types, vegetative cover, industrial & residential activities including infrastructure facilities, which would accord an overall idea of the soil characteristics. The samples were analysed for physical and chemical characteristics. The samples were sent to laboratory for analysis. The samples were filled in Polythene bags, coded and sent to laboratory for analysis and the details of methodology in respect are given in below Table 3.6.

TABLE 3.6: METHODOLOGY OF SAMPLING COLLECTION

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

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Soil Testing Result –

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium. The standard classifications of soil and physico-chemical characteristics of the soils are presented below in Table 3.6 & Test Results in Table 3.7.

FIGURE. 3.5 PHOTO SHOWING LOCATION OF SOIL SAMPLING



FIGURE 3.6: SOIL SAMPLING LOCATIONS AROUND 10 KM RADIUS

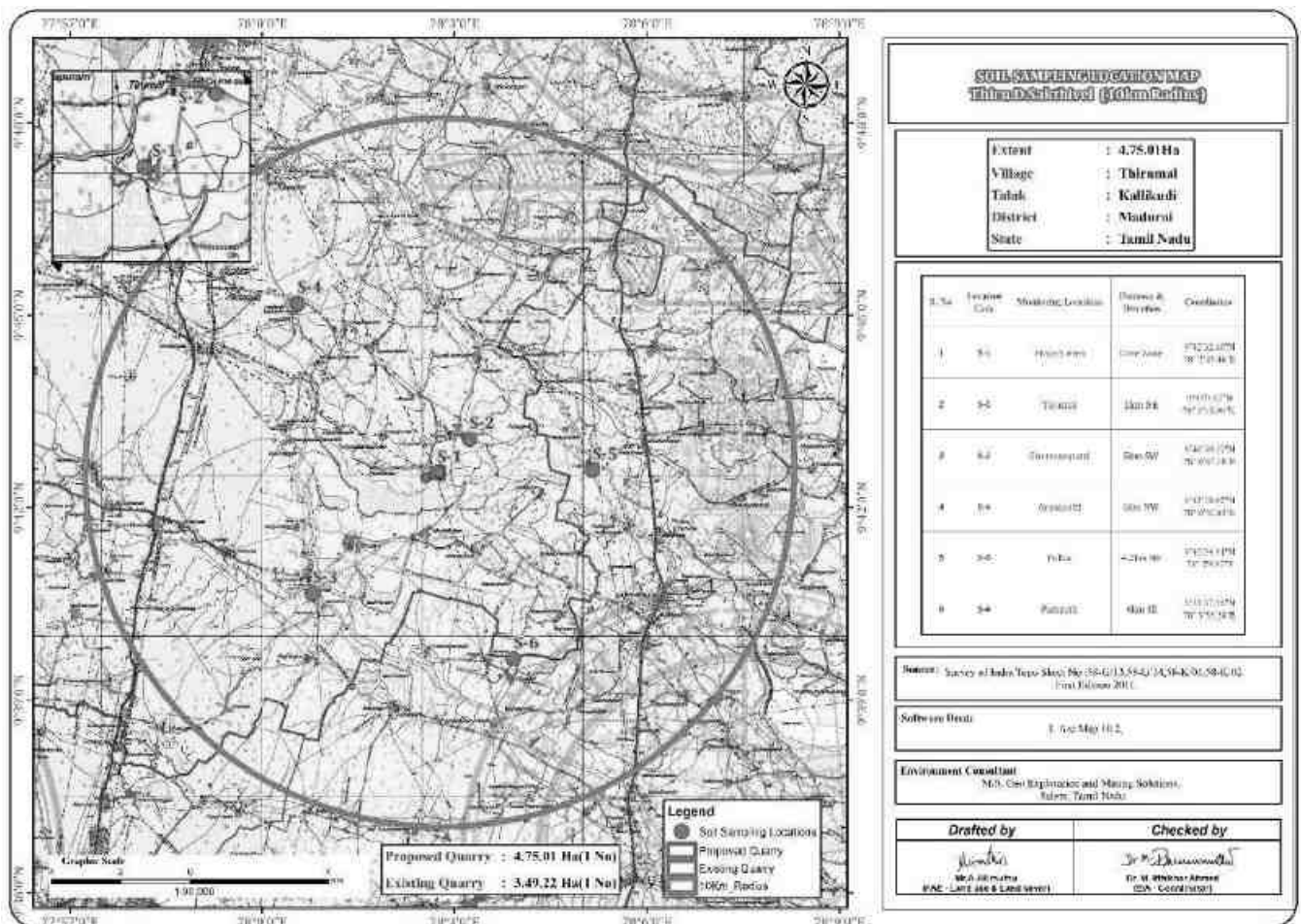


FIGURE 3.7: SOIL MAP

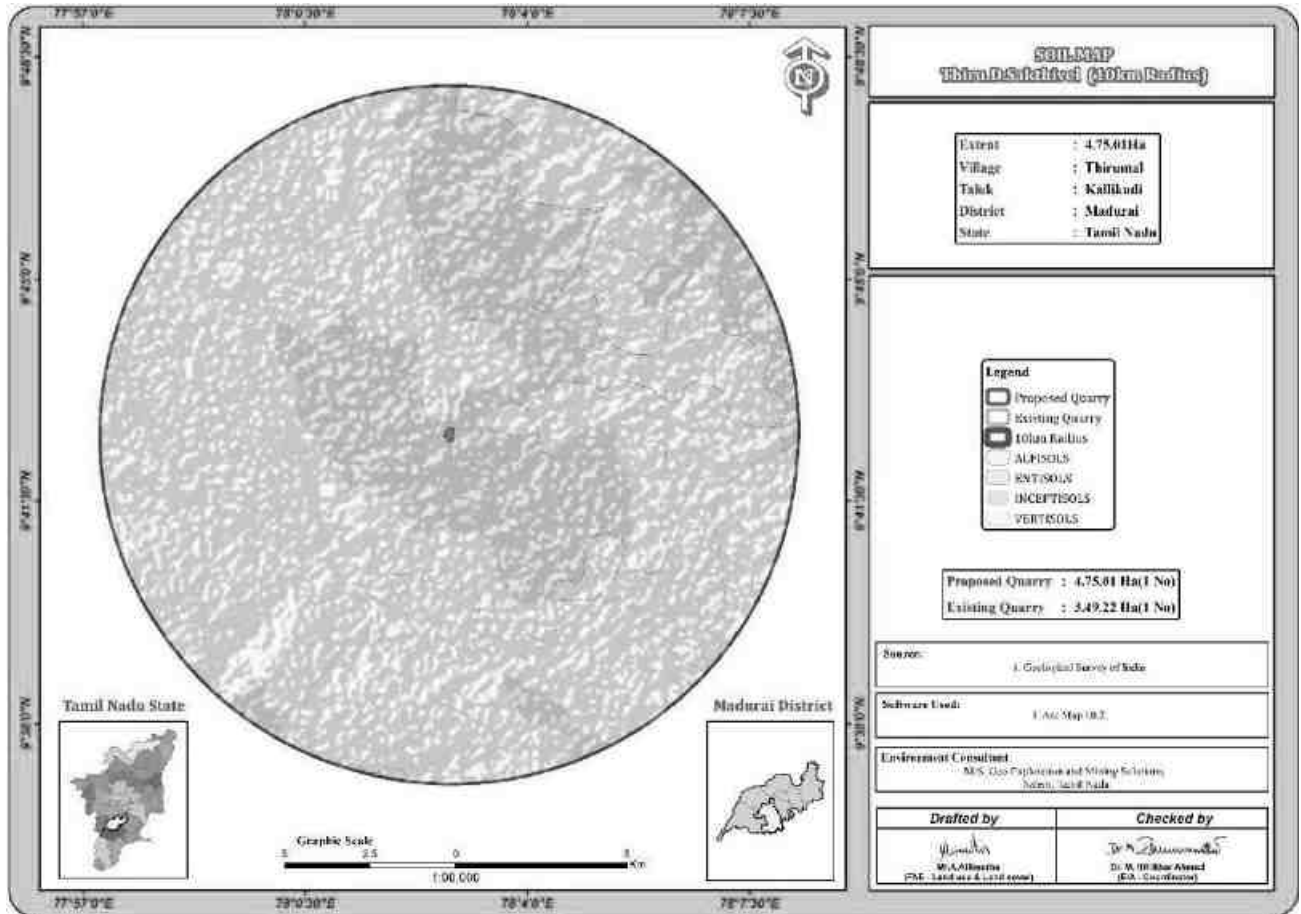


TABLE 3.7: SOIL QUALITY OF THE STUDY AREA

S. No	Test Parameters	Protocols	S-1 Core Zone	S-2 Thirumal	S-3 Chennampatti	S-4 Arasapatti	S-5 Pullur	S-6 Pampatti
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.76	8.56	8.49	8.68	8.02	8.44
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff: 2016)	786.2 µmhos/cm	625 µmhos/cm	405 µmhos/cm	466 µmhos/cm	357 µmhos/cm	459 µmhos/cm
03	Texture:							
	Clay	By Gravimetric Method	32.5%	33.5%	29.1%	35.5%	32.9%	30.1%
	Sand		30.9%	32.4%	33.0%	34.2%	31.0%	32.6%
	Silt		36.6%	34.1%	37.9%	30.3%	36.1%	37.3%
04	Water Holding Capacity	By Gravimetric Method	48.1 %	46.6%	47.3%	45.3%	45.5%	46.56%
05	Bulk Density	By Cylindrical Method	1.01g/cm ³	1.04 g/cm ³	1.06 g/cm ³	1.01 g/cm ³	1.06 g/cm ³	1.05 g/cm ³
06	Porosity	By Gravimetric Method	46.6 %	47.8 %	46.6%	46.8%	47.1%	48.12%
07	Calcium as Ca	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	46.7mg/kg	50mg/kg	46.5mg/kg	70 mg/kg	66 mg/kg	62.4 mg/kg
08	Magnesium as Mg		35 mg/kg	44.3 mg/kg	32.2 mg/kg	45.2 mg/kg	40.2 mg/kg	26.6 mg/kg
09	Manganese as Mn		15.5 mg/kg	23.3 mg/kg	23.3 mg/kg	18.8 mg/kg	23.0 mg/kg	28.2 mg/kg
10	Zinc as Zn		3.2 mg/kg	5.01 mg/kg	3.01 mg/kg	4.4 mg/kg	2.14 mg/kg	5.15 mg/kg
11	Boron as B		2.61 mg/kg	6.62 mg/kg	4.02mg/kg	2.01mg/kg	4.3 mg/kg	1.04 mg/kg
12	Chloride as Cl	APHA 23rd Edn 2019 4500 Cl B	58.3 mg/kg	21.2 mg/kg	44 mg/kg	46.8 mg/kg	28.8 mg/kg	22.7 mg/kg
13	Total Soluble Sulphate as SO ₄	IS: 2720 Part 22: 1972 (Reaff: 2015)	0.0011 %	0.0018 %	0.0021%	0.0023%	0.0021%	0.0015%
14	Potassium as K	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	28 mg/kg	15.3 mg/kg	5.5 mg/kg	26 mg/kg	15 mg/kg	16.4 mg/kg
15	Total Phosphorus as P	IS 10158: 1982 (Reaff: 2019)	4.1 mg/kg	2.5 mg/kg	2.05 mg/kg	4.35 mg/kg	3.05 mg/kg	7.01 mg/kg
16	Total Nitrogen as N	IS 14684: 1999 (Reaff:2019)	402.3 mg/kg	440 mg/kg	420 mg/kg	410 mg/kg	576.4mg/kg	401.2mg/kg
17	Cadmium as Cd	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	BDL (DL: 1.0 mg/kg)					
18	Total Chromium as Cr		1.06	2.55	3.06	3.68	3.21	5.05
19	Copper as Cu		BDL (DL: 1.0 mg/kg)					
20	Lead as Pb		2.1 mg/kg	1.09 mg/kg	1.05 mg/kg	2.05 mg/kg	2.13 mg/kg	1.05 mg/kg
21	Iron as Fe		3.05 mg/kg	2.02 mg/kg	1.34 mg/kg	4.01 mg/kg	7.16 mg/kg	2.02 mg/kg
22	Organic Matter	IS: 2720 Part 22: 1972 (Reaff: 2015)	1.77%	2.10%	2.05%	2.67%	2.65%	2.26%
23	Organic Carbon	IS: 2720 Part 22: 1972 (Reaff: 2015)	1.03%	1.22%	1.19%	1.55%	1.54%	1.31%
24	Cation Exchange Capacity	USEPA 9080 – 1986	41 meg /100g of soil	37.4 meg /100g of soil	37.7 meg /100g of soil	35.2 meg /100g of soil	47.58 meg /100g of soil	33 meg /100g of soil

Source: Sampling Results by EHS360 Labs Private Limited

Interpretation & Conclusion

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 1.01 – 1.06 g/cc. The Water Holding Capacity ranging from 45.3- 48.1% and Porosity of the soil samples is found to be medium i.e. ranging from 46.6 – 48.12 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 8.02 to 8.76
- The available Nitrogen content range between 401.2 to 576.4 mg/kg
- The available Phosphorus content range between 2.05 to 7.01 mg/kg
- The available Potassium range between 5.5 to 28 mg/kg

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 water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

3.2.1 Surface Water Resources:

Gundar River is the major surface water body in the study area and the rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of drinking water for few months after rainy season.

3.2.2 Ground Water Resources:

Groundwater occurs in all the crystalline formations of oldest Achaeans and Recent Alluvium. The occurrence and behaviour of groundwater are controlled by rainfall, topography, geomorphology, geology, structures etc.

Ground water is occurring in phreatic conditions in weathered and fractured gneiss rock formation. The weathering is controlled by the intensity of weathering and fracturing. Dug wells as wells as bore wells are more common ground water abstraction structures in the area. The diameter of the dug well is in the range of 7 to 10 m and depth of dug wells range from 7.6 to 13m bgl. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigation for one or two crops in monsoon period.

3.2.3 Methodology

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

- Drainage pattern;
- Location of Residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions

Two (2) surface water and Four (4) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.9 and shown as Figure 3.6.

TABLE 3.8: WATER SAMPLING LOCATIONS

S.NO	CODE	LOCATIONS	DISTANCE & DIRECTION	COORDINATES
GROUND WATER				
1	WW-1	Near Project Area	120m East	9°42'37.89"N 78° 2'53.86"E
2	WW-2	Chennampatti	4.8km SW	9°40'41.83"N 78° 0'52.35"E
3	BW-1	Near Project Area	280m SE	9°42'26.25"N 78° 2'57.79"E
4	BW-2	Pullur	4.2km NE	9°42'45.45"N 78° 5'5.82"E
SURFACE WATER				
5	SW-1	Kurayur Tank	870m SW	9°41'59.83"N 78° 2'38.31"E
6	SW-2	Kamandala Stream Sivarakottai	7.2km NW	9°44'30.97"N 77°59'10.90"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE.3.8 PHOTO SHOWING WATER SAMPLING LOCATION



FIGURE 3.9: WATER SAMPLING LOCATIONS AROUND 10 KM RADIUS

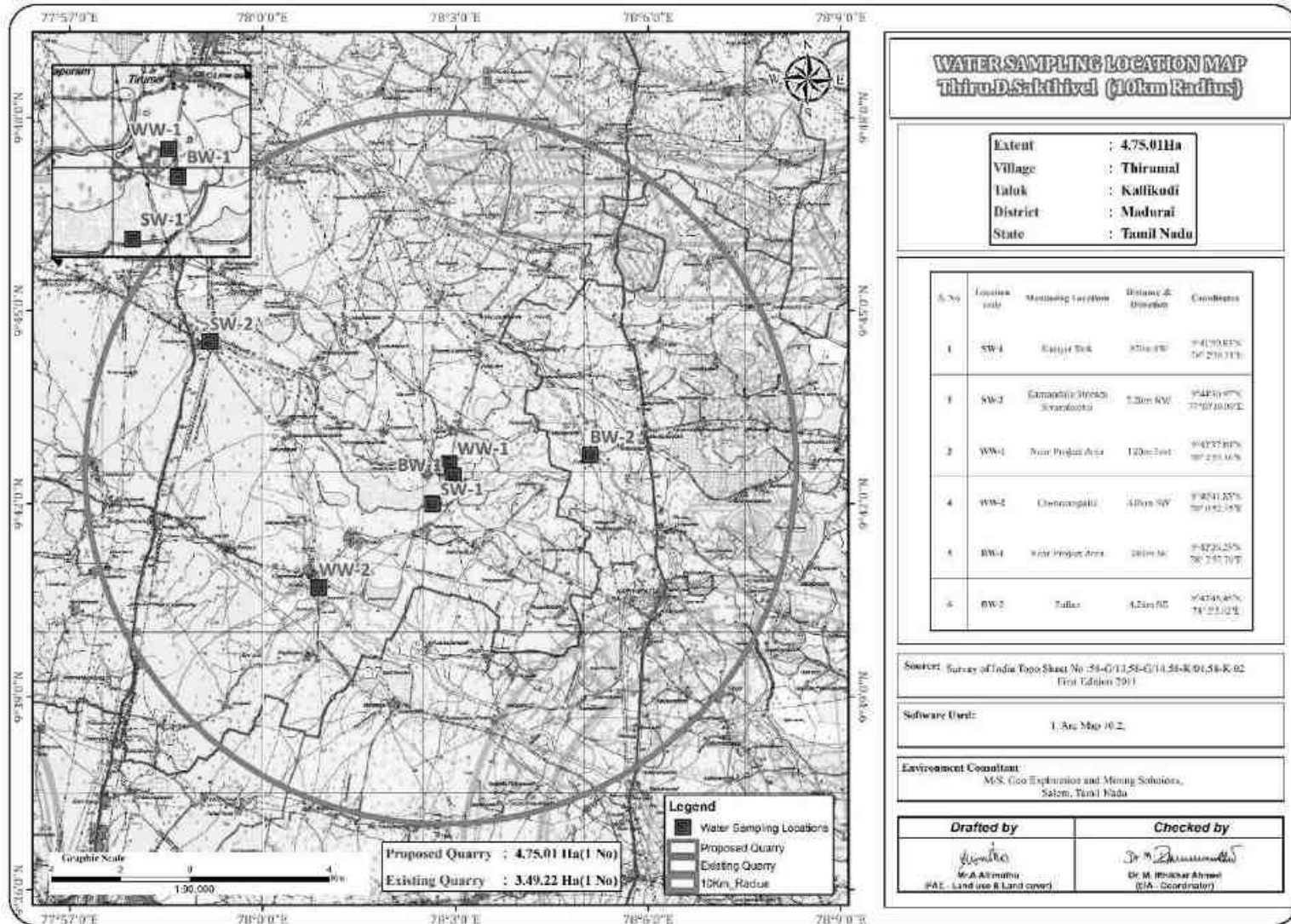


TABLE 3.9: GROUND WATER SAMPLING RESULTS

S.No.	Parameters	Test Method	WW1- Near Project Area	WW2- Chennampatti	BW-1 Near Project Area	BW-2 Pullur
	Discipline: Chemical	Group: Water				
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5	5	5	5
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	7.31	7.88	7.61	8.01
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	959 µmhos/cm	824 µmhos/cm	993 µmhos/cm	1040 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	1.0 NTU	1.0 NTU	1.0 NTU	1.0 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	566.0mg/l	486 mg/l	586 mg/l	613 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	195.03 mg/l	157.71 mg/l	198.51 mg/l	218.40 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	36.8 mg/l	28.6mg/l	32.1 mg/l	38.1 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	25.1 mg/l	21 mg/l	28.8 mg/l	30.0mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	180.4 mg/l	150 mg/l	180 mg/l	215 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	124 mg/l	97.5 mg/l	131 mg/l	135 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	55.7 mg/l	63.7 mg/l	75 mg/l	65.5 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.22 mg/l	0.18 mg/l	0.29 mg/l	0.34 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)			
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.20 mg/l	0.16 mg/l	0.22 mg/l	0.25 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	4.4 mg/l	5.5 mg/l	5.3 mg/l	6.2mg/l
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)			
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)			
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)			
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)			
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)			
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)			
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)			
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)			
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)			
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)			
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)			
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)			
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)			
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)			
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)			
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)			
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)			
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)			
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)			
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)			
	Discipline: Biological					
	Group: Water					
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	200 MPN/100ml	114 MPN/100ml	150 MPN/100ml	180 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml	< 1.8 MPN/100ml

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

TABLE 3.10: SURFACE WATER SAMPLING RESULTS

S.No.	Parameters	Test Method	SW-1- Kuravur Lake	SW-2 Kamandala stream sivarakottai
	Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	5 Hazen	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.55	7.43
4	Conductivity @ 25°C	IS 3025 Part 14:2013	990 µmhos/cm	917 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	4.5 NTU	3.1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	584 mg/l	541.0 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	195.86 mg/l	190.20 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	34.5mg/l	32.4 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	26.7 mg/l	26.6mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	187 mg/l	170 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	136 mg/l	110 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	71.4 mg/l	43.1 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.31 mg/l	0.17 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.25 mg/l	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	7.12 mg/l	5.9 mg/l
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	9.7 mg/l	7.7 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	50 mg/l	30.0 mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.4 mg/l	5.2 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	2.31 mg/l	1.02 mg/l
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	22.3 mg/l	14.4 mg/l
	Discipline: Biological	Group: Water		
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	510 MPN/100ml	470 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	140 MPN/100ml	110 MPN/100ml

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

3.2.4 Interpretation & Conclusion

Surface Water

Ph:

The pH varied from 7.43 to 7.55 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids varied from 541 to 584 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 110 – 136 mg/l. Nitrates varied from 5.9 to 7.12 mg/l, while sulphates varied from 43.1 to 71.4 mg/l.

Ground Water

The pH of the water samples collected ranged from 7.31 to 8.01 and within the acceptable limit of 6.5 to 8.5. PH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 486 - 613 mg/l in all samples. The Total hardness varied between 157.71 – 218.40 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.2.5 Hydrology and Hydrogeological studies

The district is underlain by hard rock formation fissured and fractured crystalline rocks constitute the important aquifer systems in the district. Geophysical prospecting was carried out in that area by SSRMP-80 Instrument by qualified Geo physicist with the help of IGIS software and it was inferred that the low resistance encountered at the depth between 57m. The maximum depth proposed out of proposed project is 47m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area. There is no necessity of stream, channel diversion due to these proposed projects.

During the rainy season there is a possibility of collection of seepage water from the subsurface levels which will be collected and stored in the mine sump pits and will be used for dust suppression and greenbelt development and during the end of the life of the mine this collected water will act as a temporary reservoir.

TABLE 3.11: SUMMER SEASON WATER LEVEL OF OPEN WELLS 1 KM RADIUS

S. No	LABEL	LONGITUDE	LATITUDE	Mar-24	Apr-24	May-24
1	OW1	9° 42' 47.749"N	78° 02' 30.53"E	11.2	11.7	12.2
2	OW2	9° 42' 55.711"N	78° 02' 41.24"E	11.5	12	12.5
3	OW3	9° 42' 56.170"N	78° 03' 15.59"E	11.8	12.3	12.8
4	OW4	9° 42' 30.284"N	78° 03' 11.75"E	11.7	12.2	12.7
5	OW5	9° 42' 16.712"N	78° 02' 55.38"E	11.4	11.9	12.4
6	OW6	9° 42' 17.218"N	78° 02' 19.88"E	11.9	12.4	12.9
7	OW7	9° 42' 34.546"N	78° 02' 07.96"E	11.3	11.8	12.3

Source: Onsite monitoring data

FIGURE 3.10: OPEN WELL CONTOUR MAP -MARCH- MAY 2024

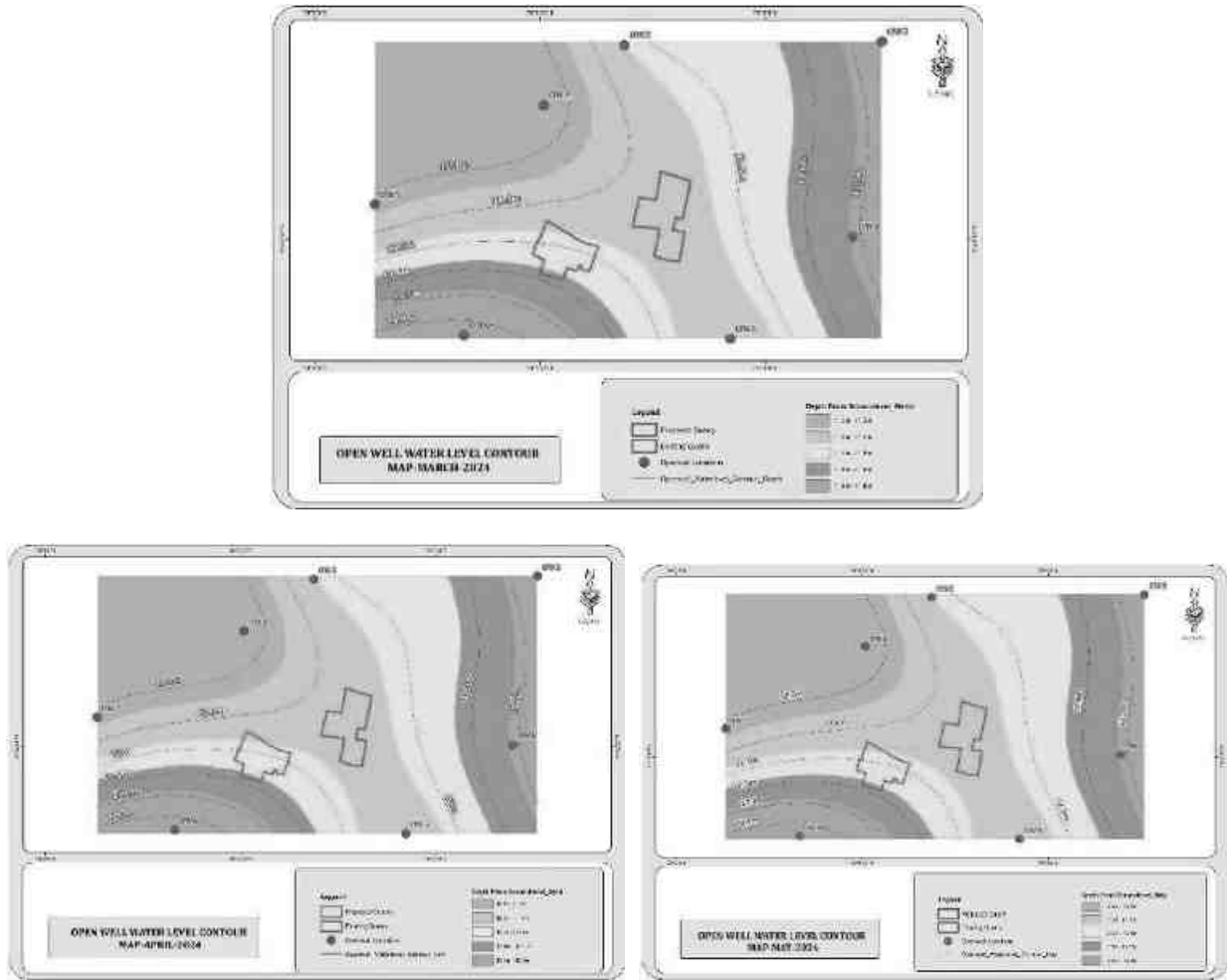


TABLE 3.12: SUMMER SEASON WATER LEVEL OF BOREWELLS 1 KM RADIUS

S.No	Name	LONGITUDE	LATITUDE	Mar-24	Apr-24	May-24
1	BW1	9° 42' 37.284"N	78° 02' 04.99"E	56	56.6	57.2
2	BW2	9° 43' 00.371"N	78° 02' 46.12"E	56.3	56.9	57.5
3	BW3	9° 42' 58.670"N	78° 03' 11.31"E	56.1	56.7	57.3
4	BW4	9° 42' 25.116"N	78° 03' 08.29"E	56.5	57.1	57.7
5	BW5	9° 42' 14.975"N	78° 03' 01.33"E	56.2	56.8	57.4
6	BW6	9° 41' 58.897"N	78° 02' 48.52"E	56.7	57.3	57.9
7	BW7	9° 42' 30.525"N	78° 02' 05.50"E	56.4	57	57.6
8	BW8	9° 42' 18.684"N	78° 02' 08.92"E	56.6	57.2	57.8

Source: Onsite monitoring data

FIGURE 3.11: BOREWELL CONTOUR MAP – MARCH- MAY 2024



FIGURE 3.12: DRAINAGE MAP AROUND 10 KM RADIUS FROM PROJECT SITE

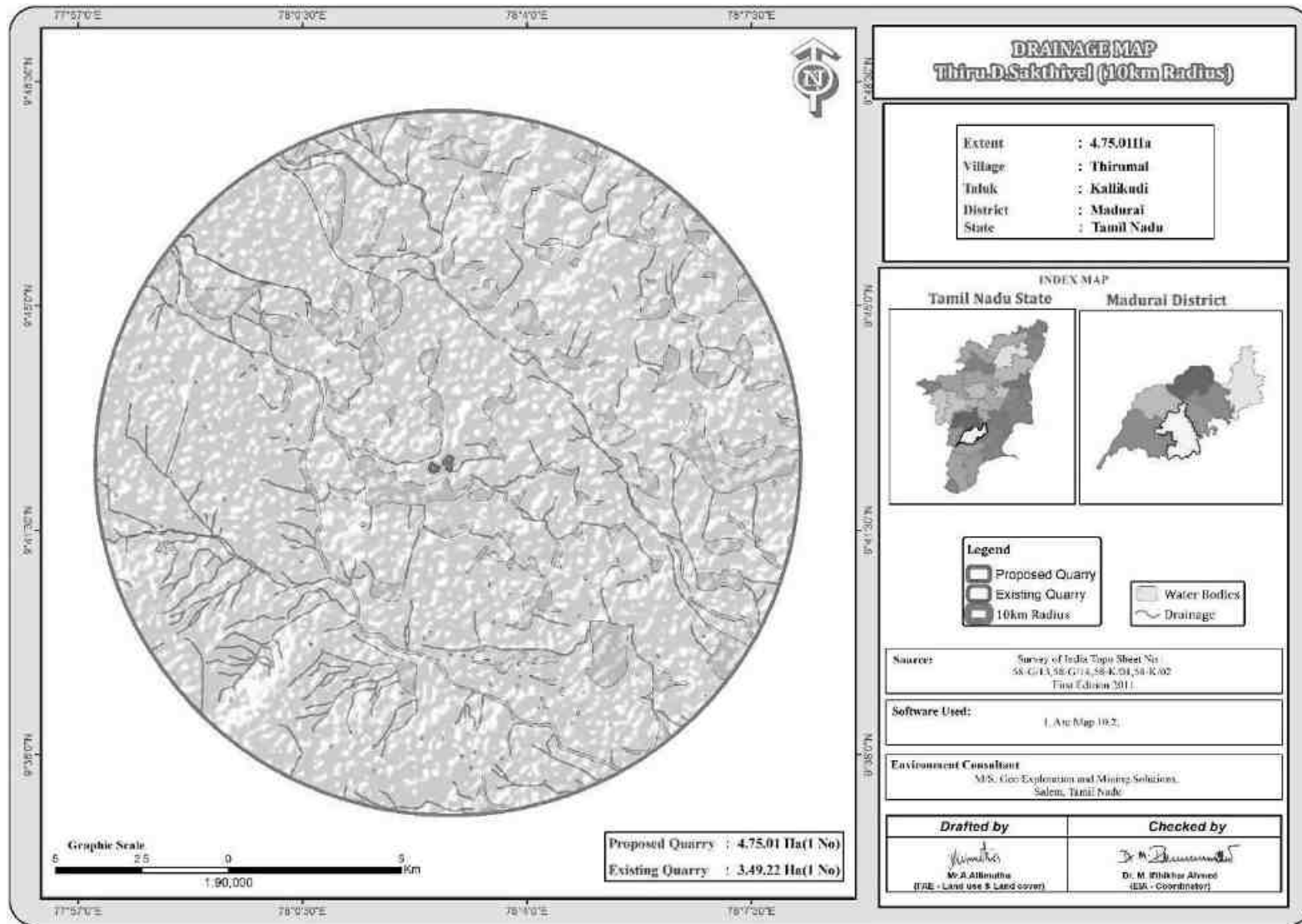
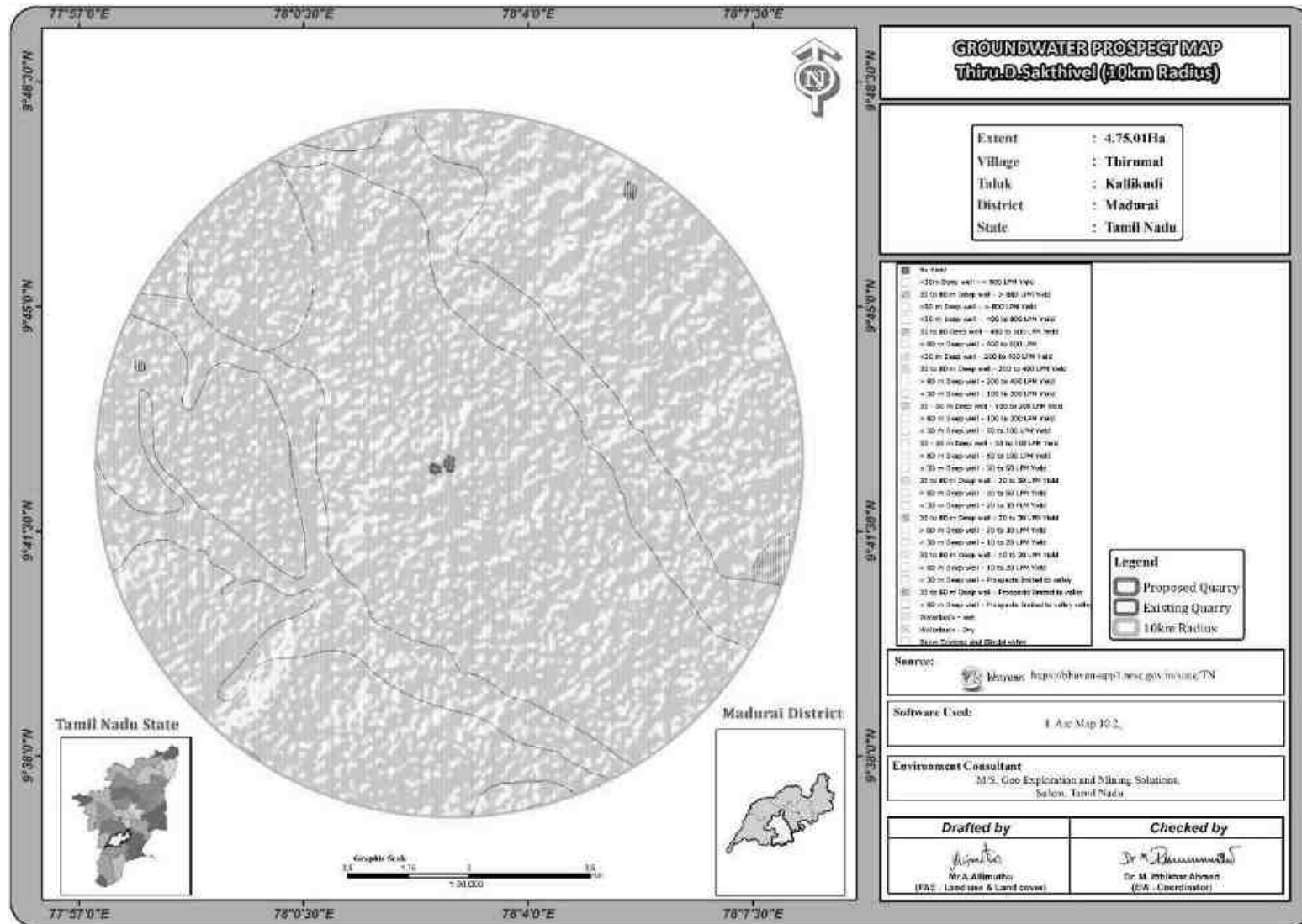


FIGURE 3.13: GROUND WATER PROSPECT MAP



3.2.5.1 Methodology and Data Acquisition

Electric Resistivity Method is well established for delineating lateral as well vertical discontinuities in the resistive structure of the Earth's subsurface. The present study makes use of vertical electric sounding (VES) to delineate the Vertical Resistivity structure at depth. Schlumberger electrode set up was employed for making sounding measurements. Since it is least influenced by lateral inhomogeneities and is capable of providing higher depth of investigation. This is four electrodes collinear set up where in the outer electrodes send current into the ground and the inner electrodes measure the potential difference.

The present study utilizes maximum current electrode separation $AB/2$. The data from this survey are commonly arranged and contoured in the form of Pseudo-section that gives an approximate of the subsurface resistivity. This technique is used for the inversion of Schlumberger VES data to predict the layer parameter namely layer resistivity and Geo electric layer thickness. The main goal of the present study is to search the vertical inhomogeneities that is consistent with the measured data.

For a Schlumberger among the Apparent resistivity can be calculated as follows

$$\rho_a = \frac{G\Delta V}{I}$$

ΔV = potential difference between receiving electrodes

G = Geometric Factor.

Rocks show wide variation in resistivity ranging from 10⁻⁸ more than 10⁺¹⁴ ohmmeter. On a broad classification, one can group the rocks falling in the range of 10⁻⁸ to 1 ohmmeter as good conductors. 1 to 10⁶ ohmmeter as intermediate conductors and 10⁶ to 10¹² ohmmeter as more as poor conductor. The resistivity of rocks and subsurface lithology, which is mostly dependent on its porosity and the pore fluid resistivity is defined by Archie's Law,

$$\rho_r = F\rho_w = a \phi^m \rho_w$$

ρ_r = Resistivity of Rocks

ρ_w = Resistivity of water in pores of rock

F = Formation Factor

ϕ = Fractional pore volume

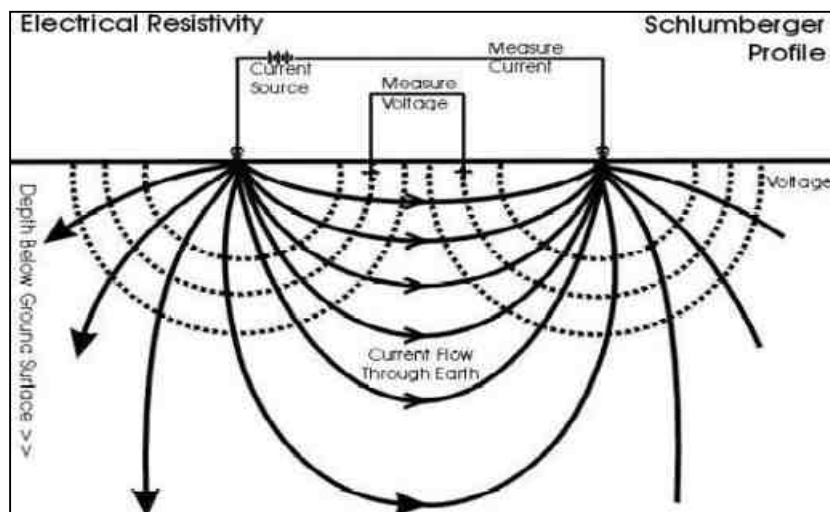
a = Constants with values ranging from 0.5 to 2.5

3.2.5.2 Survey Layout

The layout for a resistivity survey depends on the choice of the current and potential electrode arrangement, which is called electrode array. Here the present study is considered with Schlumberger array. In which the distance may be used for current electrode separation while potential electrode separation is kept on third to one fifth of the same. One interesting aspect in VES is the principle of reciprocity, which permits interchange of the potential and current electrode without any effect on the measured apparent resistivity.

The field equipment deployed for the study is in a deep resistivity meter with a model of SSR – MP – AT. This Signal stacking Resistivity meter is a high-quality data acquisition system incorporating several innovation features for Earth resistivity. In the presence of random earth Noises the signal to noise ration can be enhanced by \sqrt{N} where N is the number of stacked readings. This SSR meter in which running averages of measurements $[1, (1+2)/2, (1+2+3)/3 \dots (1+2\dots+16/16)]$ up to the chosen stacks are displayed and the final average is stored automatically, in memory utilizing the principles of stacking to achieve the benefit of high signals to noise ratio. Based on these above significations the signal stacking resistivity meter was used for (VES) Vertical Electric Resistivity Sounding.

RESISTIVITY SURVEY PROFILE



Measurements of ground Resistivity is essentially done by sending a current through two electrodes called current electrodes (C₁& C₂) and measuring the resulting potential by two other electrodes called potential electrode (P₁& P₂). The amount of current required to be sent into the ground depends on the contact resistance at the current electrode, the ground resistivity and the depth of interest.

3.2.5.3 Data Presentation

It was inferred that the low resistance encountered at the depth between 57m. The maximum depth proposed out of proposed project is 47m BGL. Hence there is no possibilities of water table intersection during the entire mine life period besides it is also inferred topographically that there are no major water bodies intersecting the project area.

3.2.5.4 Geophysical Data Interpretation

The geophysical data's was obtained to study the lateral variations, vertical in homogeneities in the sub – surface with respect to the availability of groundwater. From the interpreted data, it has inferred that the area has moderate groundwater potential in the investigated area. This small quarrying operation will not have any significant impact on the natural water bodies.

3.3 AIR ENVIRONMENT

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

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the cluster forms the baseline information. The sources of air pollution in the region are mostly due to vehicular traffic, dust arising from unpaved village road and domestic & agricultural activities. The prime objective of the baseline air quality study was to establish the existing ambient air quality of the study area. These will also be useful for assessing the conformity to standards of the ambient air quality during the operation of proposed projects in cluster.

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

3.3.1 Meteorology & Climate

Meteorology is the key to understand the Air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A temporary meteorological station was installed at project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

Climate –

The Madurai lies on 140m above sea level. The climate here is tropical. The summers are much rainier than the winters in Madurai. This location is classified as Aw by Köppen and Geiger.

- The average annual temperature is 28.8°C | 83.9 °F.
- The precipitation here is around 840 mm | 33.1 inch per year.
- The driest month is February, with 14 mm | 0.6inch. The greatest amount of precipitation occurs in October, with an average of 191 mm | 7.5 inch.
- The warmest month of the year is May, with an average temperature of 31.7 °C | 89.1°F.
- The lowest average temperatures in the year occur in January, when it is around 25.5°C | 77.9°F.
- The difference in precipitation between the driest month and the wettest month is 177mm | 7inch. The variation in temperatures throughout the year is 6.2°C | 43.2°F.

Source: <https://en.climate-data.org/asia/india/tamil-nadu/madurai-5892/>

Rainfall –

TABLE 3.13: RAINFALL DATA

Actual Rainfall in mm					Normal Rainfall in mm
2017	2018	2019	2020	2021	
904.6	734.1	671.9	915.5	1095.2	985

Source: <https://www.twadboard.tn.gov.in/content/madurai>

TABLE 3.14: METEOROLOGICAL DATA RECORDED AT SITE

S.No	Parameters		Mar 2024	Apr- 2024	May - 2024
1	Temperature (°C)	Max	32.57	34.32	34.83
		Min	28.01	31.88	27.23
		Avg	30.29	33.1	31.03
2	Relative Humidity (%)	Avg	52.68	54.78	68.28

3	Wind Speed (m/s)	Max	4.7	4.69	5.54
		Min	1.95	2.21	1.62
		Avg	3.32	3.45	3.58
4	Cloud Cover (OKTAS)		0-8	0-8	0-8
5	Wind Direction		ENE,SSE	SSE,ENE	WSW,SW

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

Correlation between Secondary and Primary Data

The meteorological data collected at the site is almost similar to that of secondary data collected from IMD Madurai_Agro. A comparison of site data generated during the three months with that of IMD, Madurai_Agro reveals the following:

- The average maximum and minimum temperatures of IMD, Madurai_Agro showed a higher in respect of on-site data i.e. in Thirumal village.
- The relative humidity levels were lesser at site as compared to IMD, Madurai_Agro.
- The wind speed and direction at site shows similar trend that of IMD, Madurai_Agro.

Wind rose diagram of the study site is depicted in Figure. 3.8. Predominant downwind direction of the area during study season is North-East to South East.

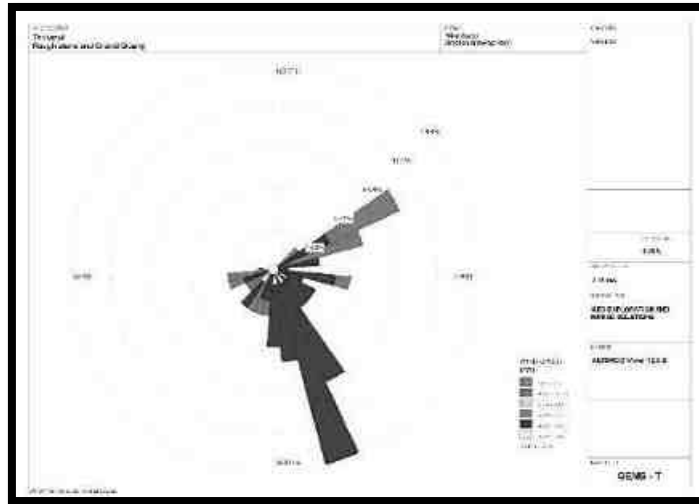


FIGURE. 3.14 WIND ROSE

In the abstract of collected data wind rose were drawn on presented in figure No.3.14 during the monitoring period in the study area

1. Predominant winds were from NE& SE
2. Wind velocity readings were recorded between 0.00 to 5.70m/s
3. Calm conditions prevail of about 0.00 % of the monitoring period
4. Temperature readings ranging from 27.33 to 34.83 °C
5. Relative humidity ranging from 52.68 to 68.28 %
6. The monitoring was carried out continuously for three months

3.3.2 Methodology and Objective

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

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

3.3.3 Sampling and Analytical Techniques

TABLE 3.15: METHODOLOGY AND INSTRUMENT USED FOR AAQ ANALYSIS

Parameter	Method	Instrument
PM _{2.5}	Gravimetric Method Beta attenuation Method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM ₁₀	Gravimetric Method Beta attenuation Method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO ₂	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO _x	IS-5182 Part II (Jacob & Hochheiser modifiedmethod)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling Methodology followed by EHS360 Labs Private Limited & CPCB Notification

TABLE 3.16: NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutant	Time Weighted Average	Concentration in ambient air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive area (Notified by Central Govt.)
1	Sulphur Dioxide (µg/m ³)	Annual Avg.*	50.0	20.0
		24 hours**	80.0	80.0
2	Nitrogen Dioxide (µg/m ³)	Annual Avg.	40.0	30.0
		24 hours	80.0	80.0

3	Particulate matter (size less than 10µm) PM10 (µg/m3)	Annual Avg.	60.0	60.0
		24 hours	100.0	100.0
4	Particulate matter (size less than 2.5 µm PM2.5 (µg/m3)	Annual Avg.	40.0	40.0
		24 hours	60.0	60.0

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

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

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

3.3.4 Frequency & Parameters for Sampling

Ambient air quality monitoring has been 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 to May 2024. The baseline data of ambient air has been generated for PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂) & Nitrogen Dioxide (NO₂) Monitoring has been carried out as per the CPCB, MoEF guidelines and notifications.

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

3.3.5 Ambient Air Quality Monitoring Stations

Seven monitoring stations were set up in the study area as depicted in Figure 3.6.1 for assessment of the existing ambient air quality. Details of the sampling locations are as per given below.

TABLE 3.17: AMBIENT AIR QUALITY (AAQ) MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Project Area	Core Zone	09°42'38.19"N 78° 2'46.12"E
2	AAQ-2	Near Project Area	370m SE	9°42'20.74"N 78° 2'59.19"E
3	AAQ-3	Tirumal	1km NE	9°43'5.41"N 78° 3'12.32"E
4	AAQ-4	Chennampatti	4.5km SW	9°40'53.84"N 78° 0'47.55"E
5	AAQ-5	Arasapatti	6km NW	9°45'9.39"N 78° 0'35.32"E
6	AAQ-6	Pullur	4.2km NE	9°42'42.52"N 78° 5'5.45"E
7	AAQ-7	Pampatti	6km SE	9°39'16.42"N 78° 3'52.37"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS.

FIGURE.3.15 PHOTO SHOWING AIR SAMPLING LOCATION



FIGURE 3.16: AMBIENT AIR QUALITY LOCATIONS AROUND 10 KM RADIUS

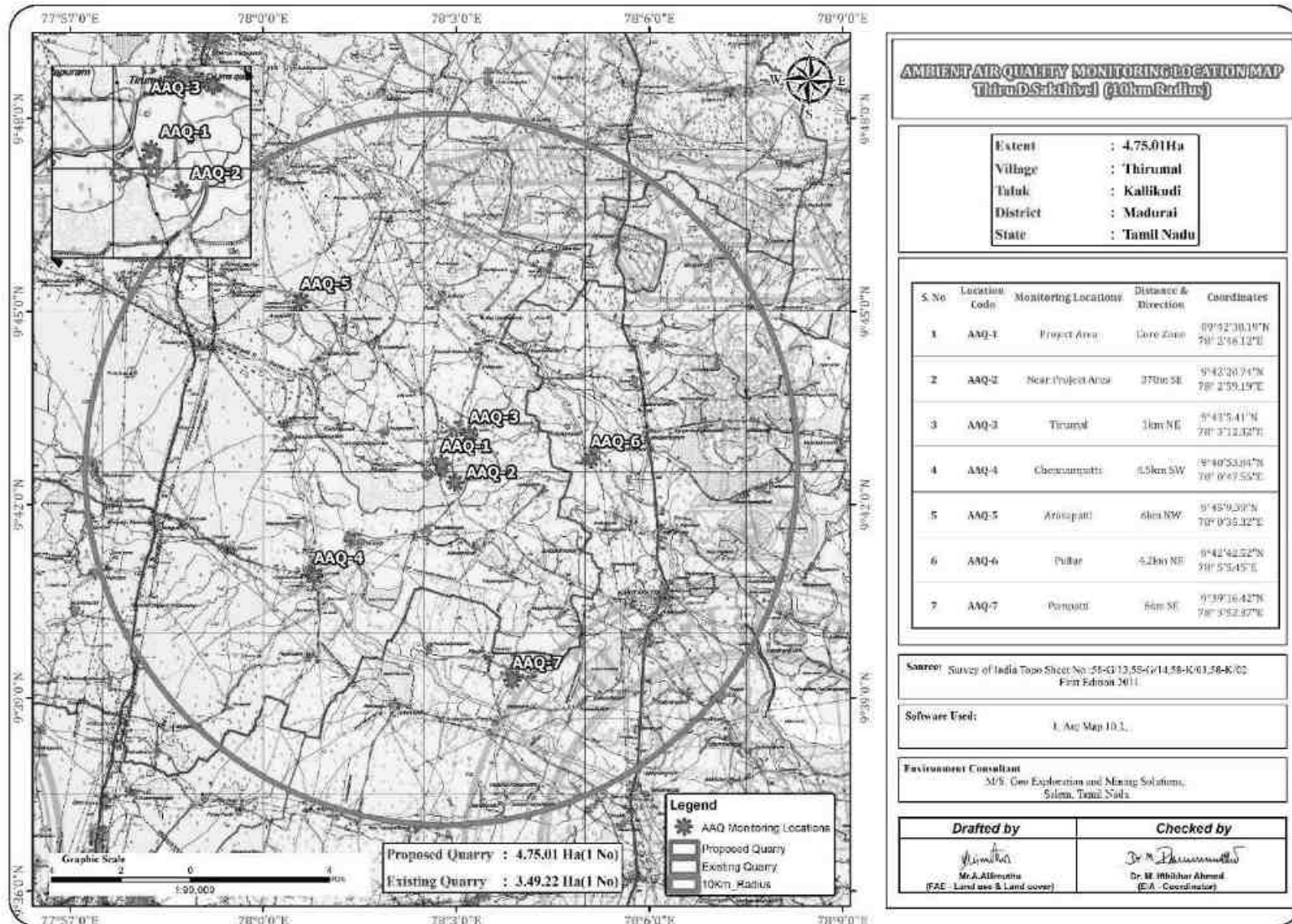


TABLE 3.18: SUMMARY OF AAQ – 1 to AAQ – 7

PM10	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	46.0	43.5	41.8	43.1	43.1	42.3	43.8
Minimum	45.0	42.3	40.1	41.4	42.1	40.1	42.2
Maximum	47.7	45.9	43.9	44.9	44.3	43.9	45.6
NAAQ Norms	100.0	100.0	100.0	100.0	100.0	100.0	100.0

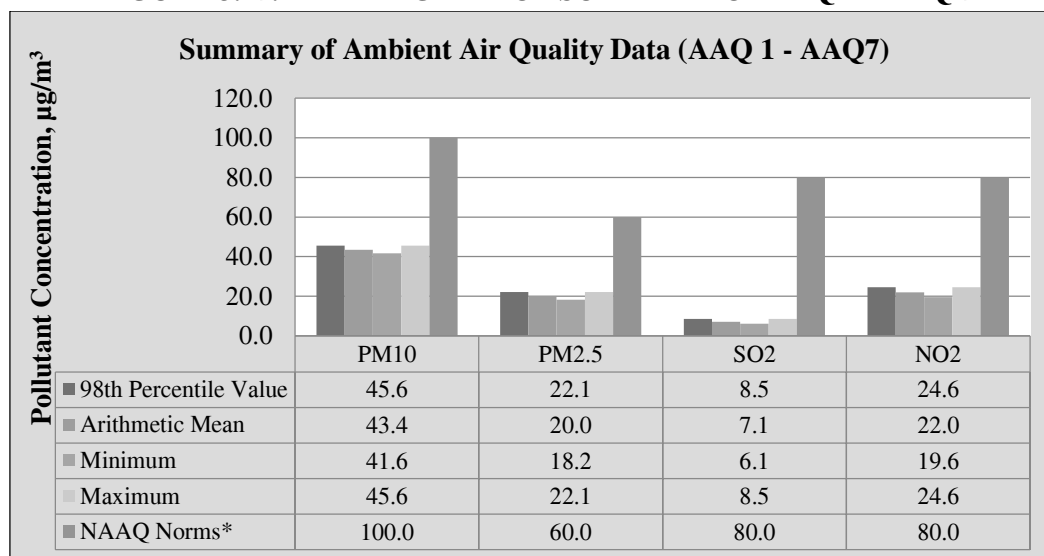
PM2.5	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	23.7	21.2	18.9	19.0	20.4	19.2	18.2
Minimum	22.1	19.8	17.2	0.0	19.1	18.1	16.3
Maximum	24.8	22.4	19.9	0.0	21.8	21.2	19.7
NAAQ Norms	60.0	60.0	60.0	60.0	60.0	60.0	60.0

SO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	7.0	6.7	6.6	6.5	7.4	7.4	6.9
Minimum	5.3	5.5	6.1	6.0	6.1	6.1	6.0
Maximum	8.4	7.9	7.2	6.9	8.2	8.8	7.7
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

NO₂	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Arithmetic Mean	21.7	22.8	20.8	20.3	22.8	21.7	20.3
Minimum	20.5	21.4	19.5	19.0	21.5	18.6	19.1
Maximum	23.1	24.9	21.9	22.9	24.6	23.6	21.6
NAAQ Norms	80.0	80.0	80.0	80.0	80.0	80.0	80.0

TABLE 3.19: ABSTRACT OF AMBIENT AIR QUALITY DATA

1	Parameter	PM10	PM2.5	SO ₂	NO ₂
2	No. of Observations	260	260	260	260
3	10 th Percentile Value	41.6	18.2	6.1	19.4
4	20 th Percentile Value	42.1	18.4	6.3	19.9
5	30 th Percentile Value	42.5	18.7	6.5	20.5
6	40 th Percentile Value	42.7	19.1	6.6	21.4
7	50 th Percentile Value	43.1	19.5	6.8	21.6
8	60 th Percentile Value	43.3	19.7	6.9	22.0
9	70 th Percentile Value	43.5	20.1	7.2	22.7
10	80 th Percentile Value	43.8	20.6	7.5	23.4
11	90 th Percentile Value	44.5	21.4	7.8	23.8
12	95 th Percentile Value	44.9	21.7	8.2	25.1
13	98 th Percentile Value	45.6	22.1	8.5	26.6
14	Arithmetic Mean	43.4	20.0	7.1	22.4
15	Geometric Mean	43.4	19.9	7.1	22.3
16	Standard Deviation	1.2	1.4	0.8	2.2
17	Minimum	41.6	18.2	6.1	19.4
18	Maximum	45.6	22.1	8.5	26.6
19	NAAQ Norms*	100.0	60.0	80.0	80.0
	% Values exceeding Norms*	0.0	0.0	0.0	0.0

FIGURE 3.17: BAR DIAGRAM OF SUMMARY OF AAQ 1 – AAQ 7

Source: Table 3.26

FIGURE 3.18: BAR DIAGRAM OF PARTICULATE MATTER PM_{2.5}

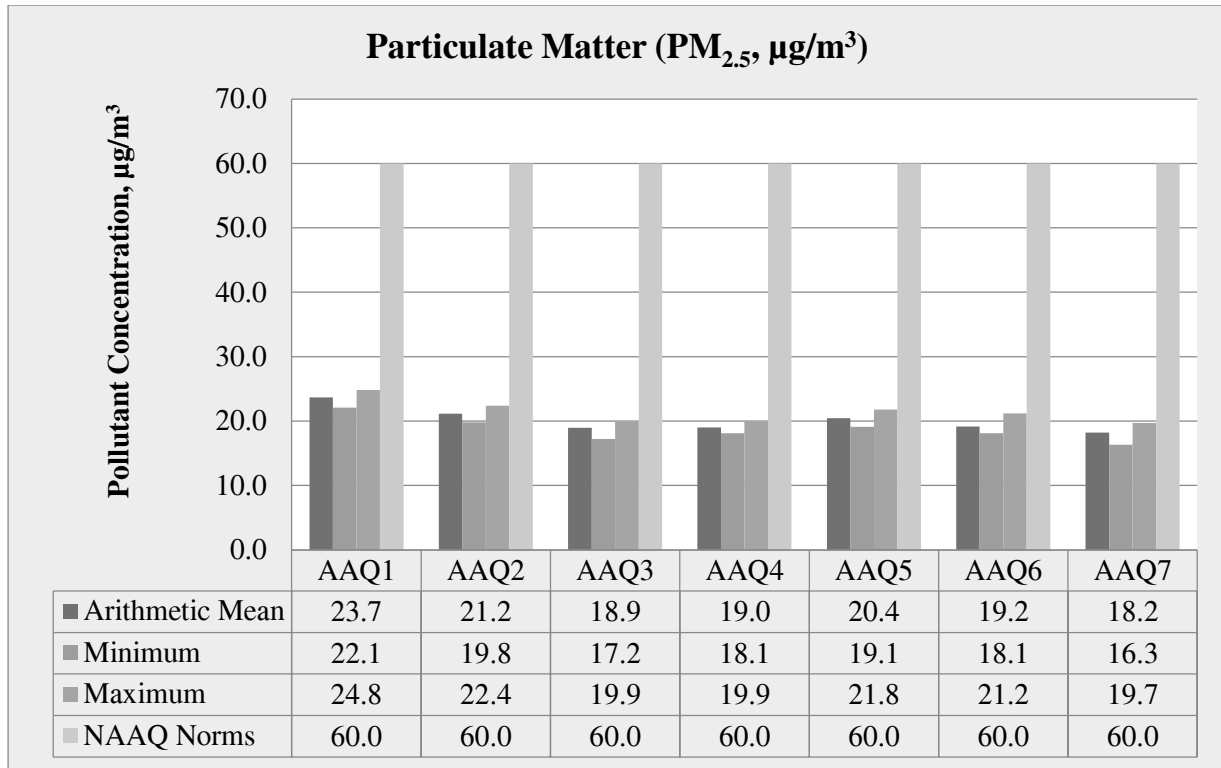


FIGURE 3.19: BAR DIAGRAM OF PARTICULATE MATTER PM₁₀

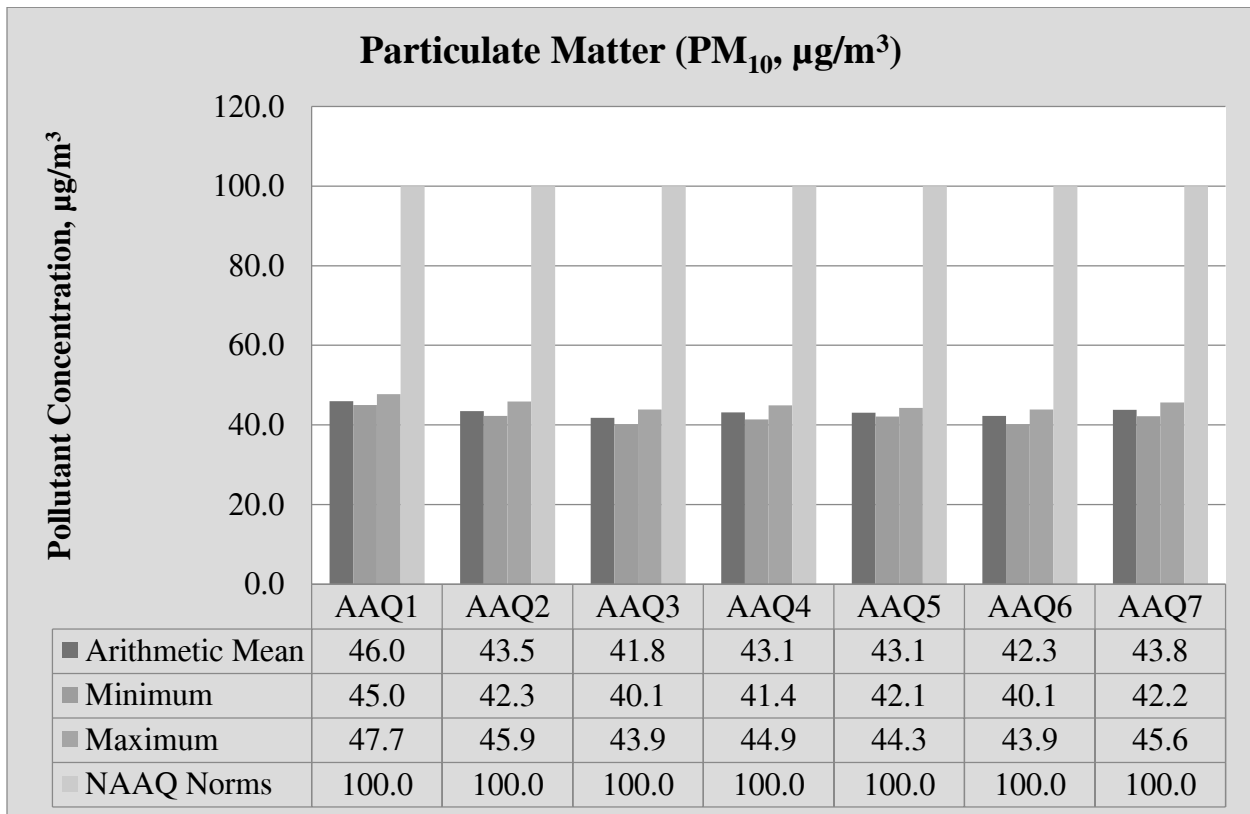


FIGURE 3.20: BAR DIAGRAM OF GASEOUS POLLUTANT SO₂

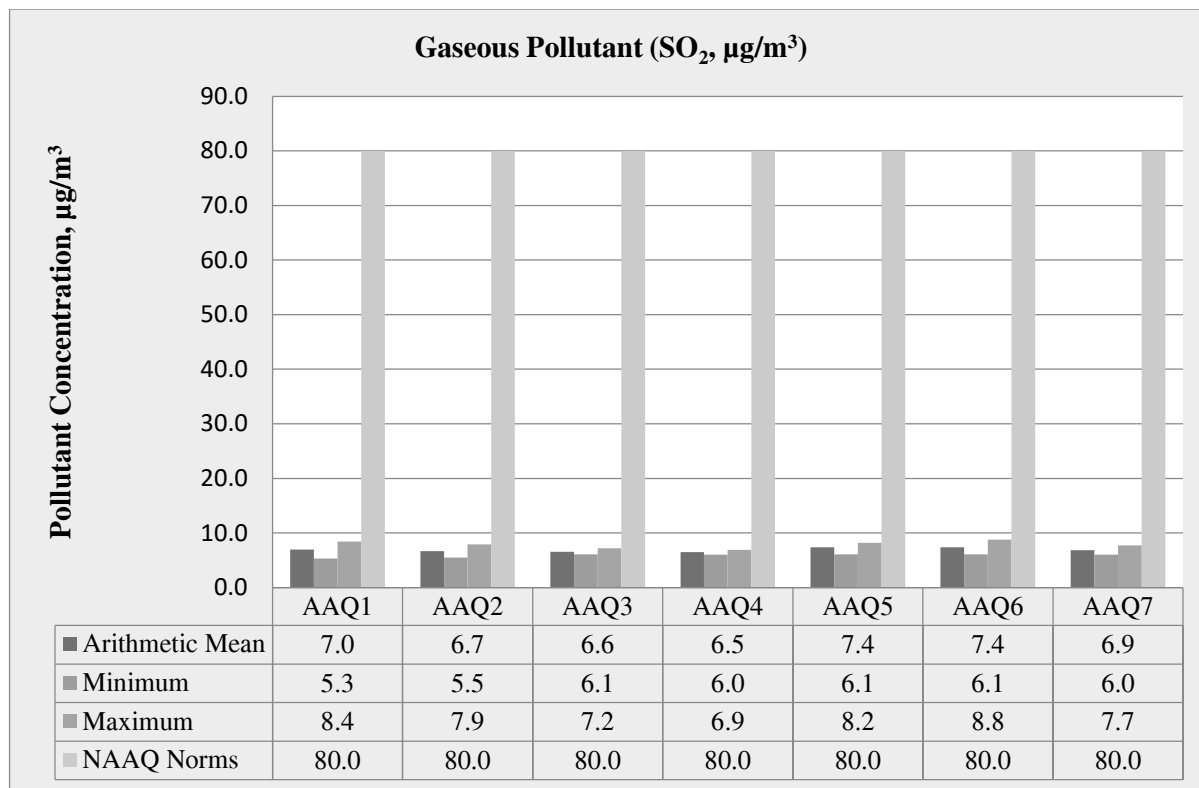
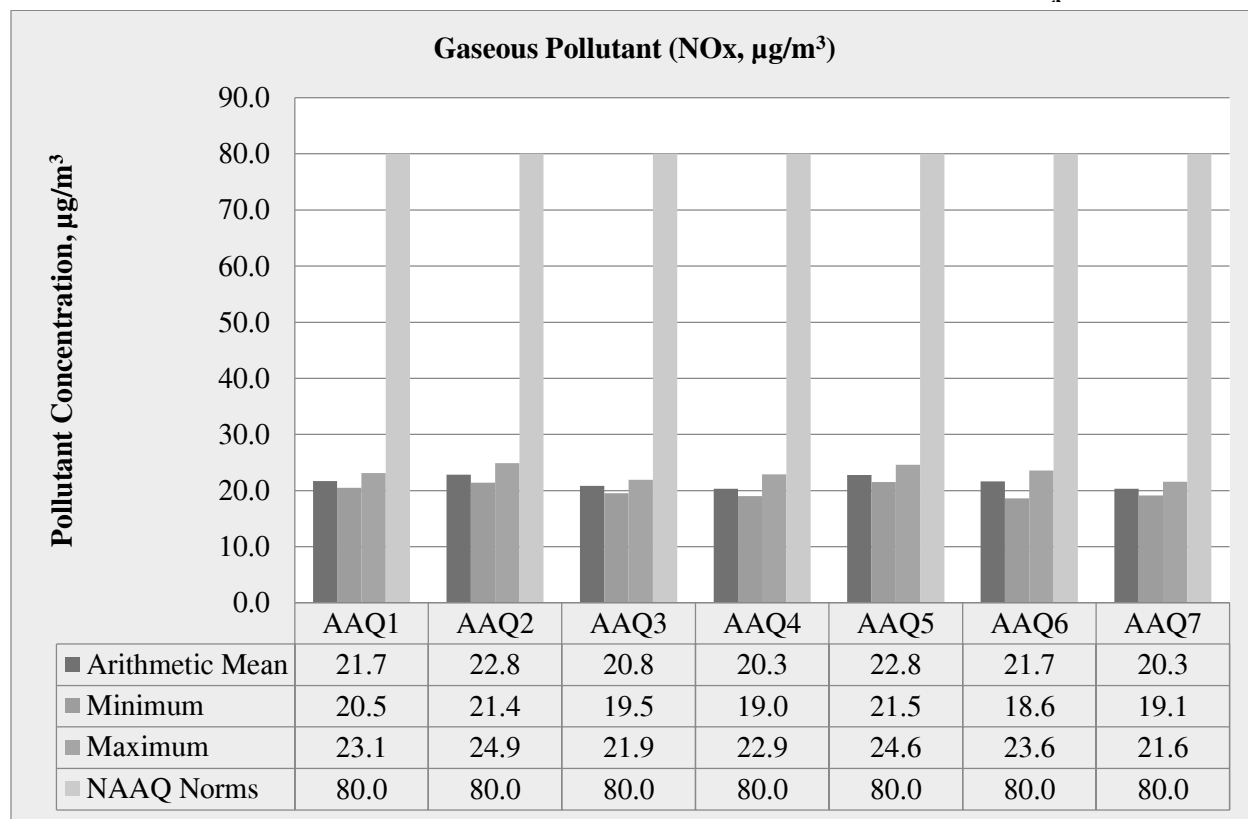


FIGURE 3.21: BAR DIAGRAM OF GASEOUS POLLUTANT NO_x



3.3.6 Interpretations & Conclusion

As per monitoring data, PM₁₀ ranges from 40.1µg/m³ to 47.7 µg/m³, PM_{2.5} data ranges from 16.3 µg/m³ to 24.8 µg/m³, SO₂ ranges from 5.3µg/m³ to 8.8 µg/m³ and NO_x data ranges from 18.6 µg/m³ to 24.9 µg/m³. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.3.7 FUGITIVE DUST EMISSION –

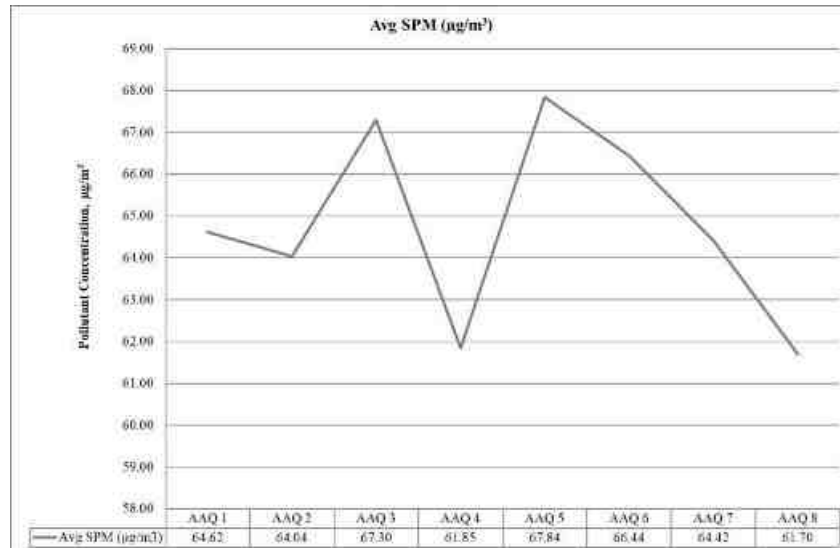
Fugitive dust was recorded at 7AAQ monitoring stations for 30 days average during the study period.

TABLE 3.20 AVERAGE FUGITIVE DUST SAMPLE VALUES

AAQ Locations	Avg SPM (µg/m ³)
AAQ 1	64.62
AAQ 2	64.04
AAQ 3	67.30
AAQ 4	61.85
AAQ 5	67.84
AAQ 6	66.44
AAQ7	64.42

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE 3.22: LINE DIAGRAM OF AVERAGE SPM VALUES



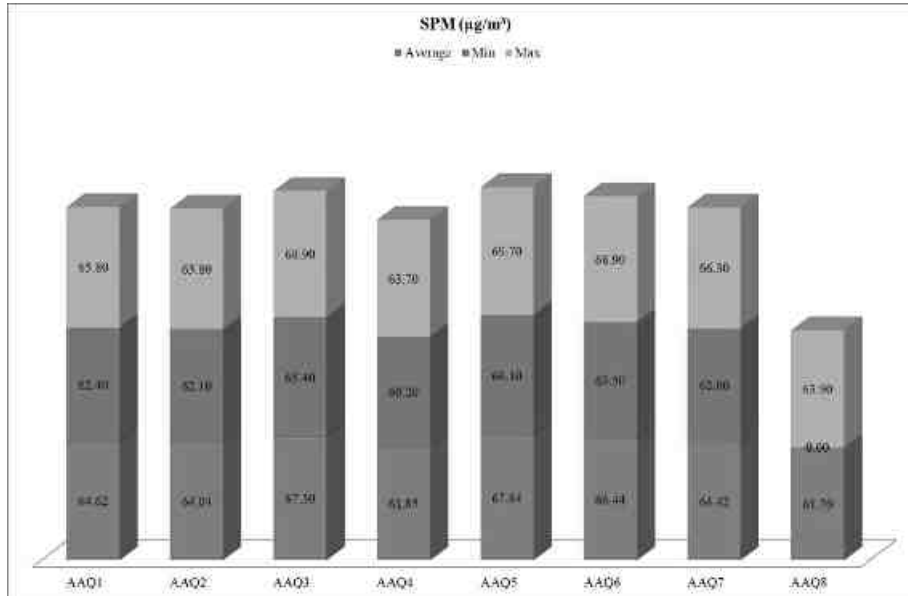
Source: Table 3.20

TABLE 3.21: FUGITIVE DUST SAMPLE VALUES IN $\mu\text{g}/\text{m}^3$

SPM ($\mu\text{g}/\text{m}^3$)	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7
Average	64.62	64.04	67.30	61.85	67.84	66.44	64.42
Min	62.40	62.10	65.40	60.20	66.10	63.50	62.00
Max	65.80	65.80	68.90	63.70	69.70	68.90	66.30

Source: Calculations from Lab Analysis Reports

FIGURE 3.23: BAR DIAGRAM OF SPM VALUES



Source: Table 3.20

3.4 NOISE ENVIRONMENT

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

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

3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Seven (7) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

TABLE 3.22: DETAILS OF SURFACE NOISE MONITORING LOCATIONS

S. No	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Project Area	Core Zone	9°42'35.07"N 78° 2'43.39"E
2	N-2	Near Project Area	370m SE	9°42'20.29"N 78° 2'59.38"E
3	N-3	Tirumal	1km NE	9°43'6.95"N 78° 3'7.97"E
4	N-4	Chennampatti	4.5km SW	9°40'53.66"N 78° 0'47.56"E
5	N-5	Arasapatti	6km NW	9°45'9.89"N 78° 0'36.20"E
6	N-6	Pullur	4.2km NE	9°42'42.22"N 78° 5'5.37"E
7	N-7	Pampatti	6km SE	9°39'17.70"N 78° 3'52.40"E

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

3.4.2 Method of Monitoring

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

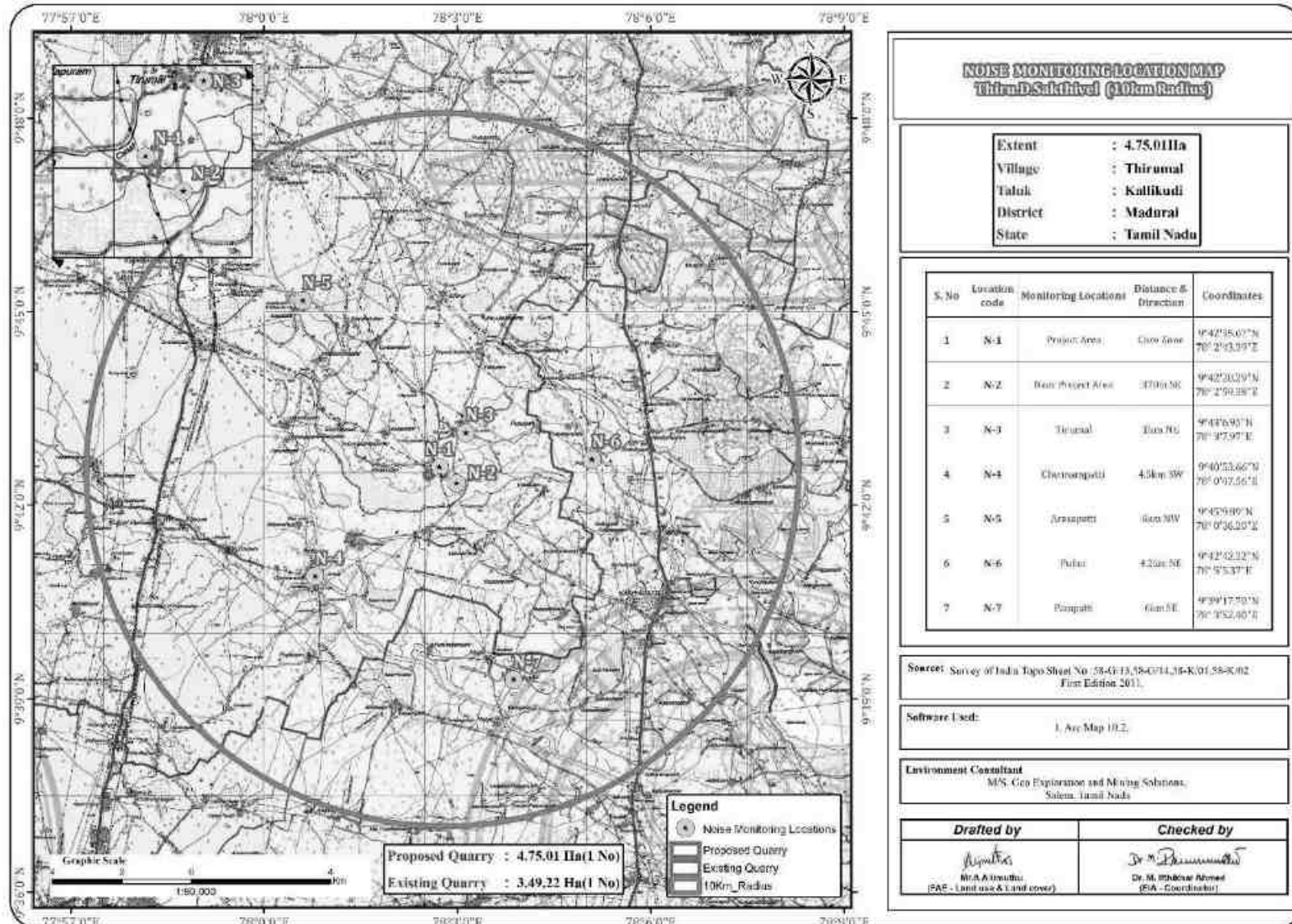
Measured noise levels, displayed as a function of time, is useful for describing the acoustical climate of the community. Noise levels recorded at each station with a time interval of about 60 minutes are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing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

$$Leq = 10 \log L / T \sum (10L_n/10)$$

Where L = Sound pressure level at function of time dB (A)

T = Time interval of observation

FIGURE 3.24: NOISE MONITORING STATIONS AROUND 10 KM RADIUS



3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352). An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.31

Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

TABLE 3.23: AMBIENT NOISE QUALITY RESULTS

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Project Area	43.1	39.3	Industrial Day Time- 75 dB (A) Night Time- 70 dB (A)
2	Near Project Area	42.4	38.0	Residential Day Time- 55 dB (A) Night Time- 45 dB (A)
3	Tirumal	39.9	37.8	
4	Chennampatti	40.3	38.3	
5	Arasapatti	39.8	37.6	
6	Pullur	40.2	38.8	
7	Pampatti	40.2	38.4	

Source: On-site monitoring/sampling by EHS360 Labs Private Limited in association with GEMS

FIGURE.3.25 PHOTO SHOWING NOISE MONITORING LOCATION



FIGURE 3.26: DAY TIME NOISE LEVELS IN CORE AND BUFFER ZONE

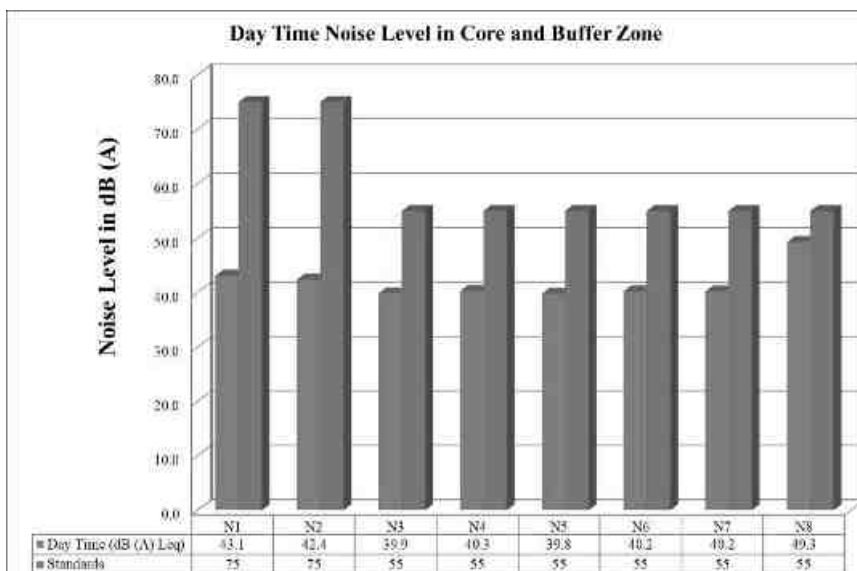
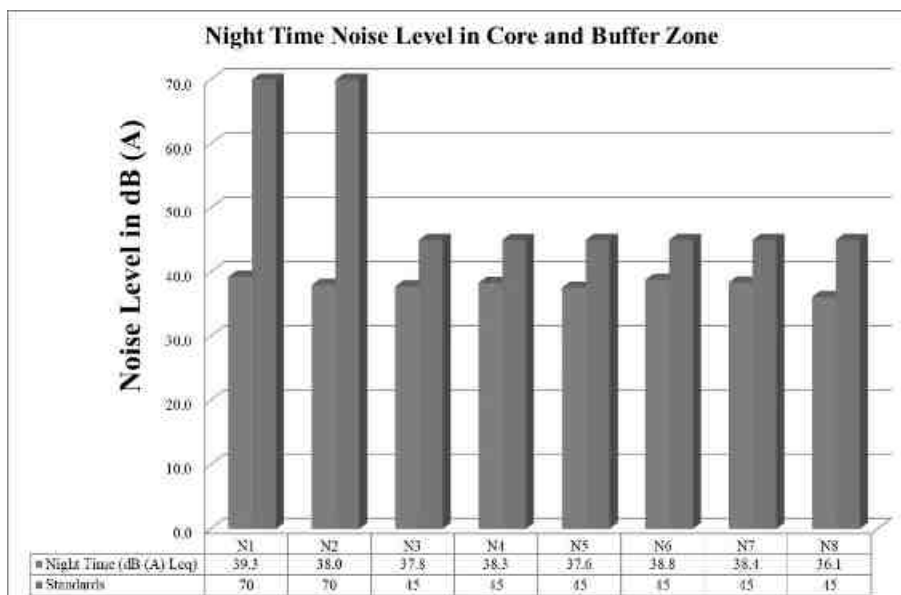


FIGURE 3.27: NIGHT TIME NOISE LEVELS IN CORE AND BUFFER ZONE



3.4.4 Interpretation & Conclusion:

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 43.1 (A) Leq and during night time were from 39.3 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 39.8 to 42.4 dB (A) Leq and during night time were from 37.6 to 38.8 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.5 ECOLOGICAL ENVIRONMENT

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

3.5.1 Scope of Work

The core area extent of 4.75.01 Ha of has an impact on the diversity of flora and fauna of the surrounding area. But present work was carried out on the detailed study of the impacts of the Rough stone and gravel quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The proposed mine lease area is situated on a plain terrain. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

The present study was carried out in two separate headings for floral and faunal community. The aspects to be covered in the study for the project are given in Table No 3.53.

Table No: 3.24: Aspect to be covered in the study area

Aspect of Environment	Impacts
A. Terrestrial Ecology	Impacts on terrestrial flora and fauna
	Impacts on Rare-Endangered-Threatened (RET) wildlife
B. Aquatic Ecology	Impacts on aquatic fauna/flora

3.5.2. Objectives of Biological Studies

- a) Undertake an intensive field survey to assess the status of floral & faunal component in different habitats in the core and buffer areas of the project site.
- b) Identification and listing of flora and fauna which are important as per the Wildlife (Protection) Act 1972.
- c) Suggest Wildlife conservation (species specific/habitat specific) and management plan for the threatened (critically endangered & endangered species - schedule I) faunal species if any reported within the study area.
- d) To identify the impacts of mining on agricultural lands and how it affects.
- e) Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of the project area.
- f) Devise management & conservation measures for biodiversity.

3.5.2.1. Field surveys

The field visit was carried out to understand and assess the impacts of mining activities on flora & and fauna and natural habitats and prediction after the enhancement of the production capacity of the mine. We evaluated the distribution and abundance of flora and fauna in the study area through primary and secondary data sources.

3.5.2.2. Floral Study

- The floral survey of the project area is based on field survey of the area.
- The local flora was identified by their morphological observation, such as the size, age and shape of the leaf, flowers, fruits, and their bark features of the stem, and also documented their habitat viz. Trees, Shrubs, Herbs, Grasses, Climbers etc.

- After surveying the core and the buffer areas, a detailed floral inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded.
- Selection of sampling locations was made with reference to topography, land use, vegetation pattern, wind pattern, etc. The observations were taken on natural vegetation, roadside plantations, and non-forest areas (agricultural fields, in plain areas, village wasteland, etc.) for quantitative representation of different species.

3.5.3. Methodology of Sampling

Primary survey was conducted with established and accepted ecological methods in different habitats of study area. The field data collection mainly included biodiversity status assessment of different life forms habit of flora elements such as Trees, Shrubs, Climbers Herbs and Grass. Faunal diversity was assessed by inventorying the taxonomical groups like Mammals, Herpetofauna, birds and butterflies.

Nocturnal faunal species were searched by locating their calls during night time and by searching along the forest shrubs areas, dense dry bushes, below the stones, water bodies. During the study, to know more about the seasonal presence of flora and faunal species, information was obtained from local people and forest department.

Identification of vegetation in relation to the natural flora and crops was conducted through reconnaissance field surveys and onsite observations in core and buffer zone. The plant species identification was done based on the reference materials and also by examining the morphological characteristics and reproductive materials i.e. flowers, fruits and seeds. Land use pattern in relation to agriculture crop varieties were identified through physical verification of land and interaction with local villagers.

Plot method is used in the floral documentation in the core and buffer zone. For trees (10x10-m), shrubs (5x5-m) and herbs (1x1-m) plots were taken. Birds and butterflies were mainly focused during faunal assessment, transect method was employed for birds and butterflies. Transect is a path along which one counts and records the occurrence of an individual for study. A straight-line walk covering desired distance, within a time span of one hour to 30 minutes was carried out in the proposed region. Bird species were recorded during the hours of peak activity. 0700 to 1100 Hrs and 1430 to 1730 Hrs (Bibby et al. 2000).

Direct observations and bird calls were used for bird documentation. Same transects were used for counting butterflies. Opportunistic observations were made for Amphibians, reptiles and ordinates. Presence of mammals was recorded by direct and indirect signs. All possible transects were taken for birds and butterflies. Birds and butterflies were classified into species level. Recorded bird species were identified to species level using standard books (Ali & Ripley 1987, Grimmett et al., 2016).

The secondary baseline data of flora and fauna has been compiled through the following data sources:

1. Forest working plan
2. Schedule I to V: Indian Wildlife (Protection) Act, 1972
3. Vivek Menon, Indian Mammals: A Field Guide. Hachette Book publishing India Pvt.Ltd., India.
4. Daniel J.C. The Book of Indian Reptiles and Amphibians, Bombay Natural History Society., India.
5. Ali, S and Ripley. handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim and Bhutan, Oxford University Press, Bombay.
6. ENVIS Centre on Wildlife and Protected Area.
7. Birds Life Data Zone
8. Ebird.org
9. Global Biodiversity Information Facility

3.5.3.1. Sampling

A stratified simple random sampling procedure was employed to obtain a sample from study area. The study area was further stratified in different land use/ecosystems.

3.5.3.2. Sampling Size

Keeping in mind both random sampling technique and covering all land use patterns for the study following sampling locations were chosen depending up on the area of the proposed site.

3.5.3.3. Timing of Study

The study was carried out during morning and evening hours, to cover the different activity phases for important species such as time resting, feeding, hunting, and daily movements.

3.5.3.4. Observations from Sampling

The various observations relating to flora and fauna species are discussed in detail below, in separate sections.

3.5.3.5. Field Equipment's/ References

Following tools/equipment were used for conducting phytosociological study.

- Ballpoint pen, Field bags, Field notebooks, field shoes, gloves, GPS, Measuring tapes and scales, Plant cutters, packet lens, ropes etc.
- Canon Mark III Camera with 50-500mm lens– Snap shots taken
- Leica Binoculars (8x 20) to spot/identify species
- IUCN Red Data Book – <https://www.iucnredlist.org/species>

Ornithological/Entomological/Herpetological/Mammalian catalogues and pictorial descriptions from various authors and websites are followed for species identification.

3.5.4. Part I Field Sampling Techniques (Fauna Sampling)

3.5.4.1. Transect walk – Birds

Eight no transect lines with varying length (100m-300m) and fixed width (2m) were laid which cuts through the core and buffer areas of proposed site. The transect surveys were conducted from 0700 to 1100Hrs and 1430 to 1730Hrs (Bibby et al. 2000). All avifauna found along these transects were recorded for analysing the data. Counts were conducted while there is no heavy rain, mist or strong wind.

3.5.4.2. Modified Pollard Walk – for Butterflies

The Modified Pollard Walk (Pollard 1977, 1993, Walpole 1999) using fixed width transect walk method were employed to investigate butterfly spatial distribution, diversity and abundance at the different survey sites.

3.5.4.3. Visual Encounter Survey (VES) - reptiles and Amphibians

VES is a time-constrained sampling technique (Campbell and Christman, 1982; Corn and Bury, 1990). It needs a systematic search through an area or habitat for a prescribed time period (Campbell and Christman, 1982). The result of VES is measured against the time spent on search. VES technique is one of the simplest methods, and an appropriate technique for both inventory and monitoring Herpetofauna (Heyer et al. 1994).

3.5.4.4. Observational methods- Mammals

For the purpose of recording mammals, we used two different observational techniques: (1) direct observations, and (2) recording of occurrences like holes, markings, scats, hairs, and spines (Menon 2003). For identification confirmations, photographs with a scale reference were used, and locations were recorded using a portable GPS device. Indigenous knowledge particularly that of the locals, was occasionally employed to compile a preliminary list of species and/or aid in the recognition of indicators.

3.5. Flora

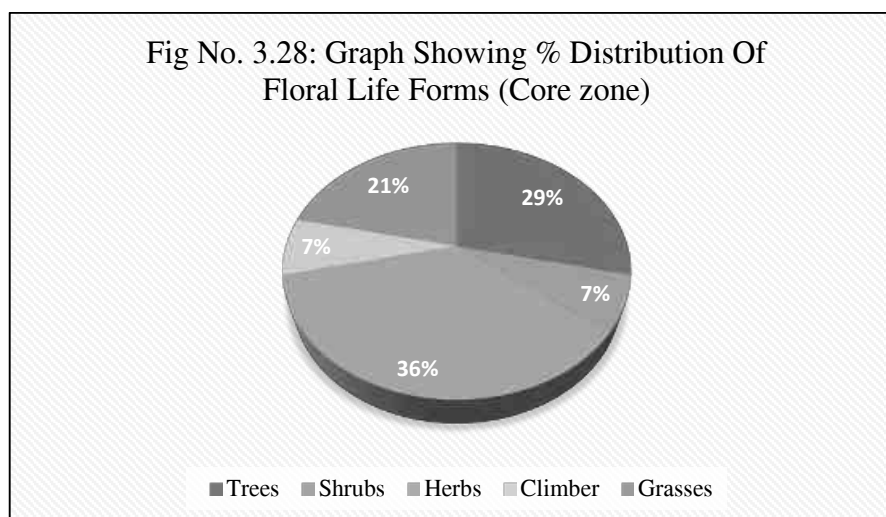
The quadrat sampling technique was used for sampling vegetation. Sampling quadrats of regular shape of dimensions 10 × 10 m, 5 × 5 m and 1 × 1 m, were nested within each other and were defined as the units for sampling the area and measuring the diversity of trees, Shrubs and herbs respectively.

Table No: 3.25. Flora in the Core zone of lease area (Primary Survey)

Sl.No	English Name	Vernacular Name	Scientific Name	Family Name
Trees				
1.	Neem or Indian lilac	Vembu maram	<i>Azadirachta indica</i>	Meliaceae
2.	Velvet mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae
3.	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Areceaceae
4.	Gum arabic tree	Karuvelam	<i>Vachellia nilotica</i>	Fabaceae
Shrubs				
5.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae
Herbs				
6.	Indian nettle	Nayuruvi	<i>Achyranthes aspera</i>	Amaranthaceae
7.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae
8.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
9.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae
10.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae
Climber				
11.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae
Grasses				
12.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
13.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae
14.	Great brome	Thodappam	<i>Bromus diandrus</i>	Poaceae

3.5.1. Flora Composition in the Core Zone (Primary Survey)

Core zone flora sampling was conducted between 8.00 am to 10.00 am in three locations. The lease area is having moderately sloping hillocks. we used with quadrat sampling methods. Taxonomically a total of 14 species belonging to 8 families have been recorded from the core mining lease area. Based on the habitat classification of the enumerated plants the majority of species were Herbs 5 followed by Trees 4, Grasses 3, Climbers 2 and Shrubs 1. Details of flora with the scientific name were mentioned in Table No. 3.54. The result of the core zone of flora studies shows that Fabaceae and Poaceae are the main dominating species in the study area mentioned in Table No.3.54. No species found as threatened category.



The trees surveys were conducted around 300m radius from the proposed project site. This is the standard scientific method followed by various workers in respect of phytosociological studies (Cotton and Curtis 1956; Ralhan et al. 1982; Saxena and Sing 1982; Nayak et al. 2000; Lu et al. 2004; Nautiyal 2008). While sampling, circumference at breast Height (CBH) of tree species was measured at 1.37m from ground level, along with the name of the species, phenology (flowering, fruiting, and flushes), and uses. After surveying areas, a detailed trees inventory has been compiled. A list of all plants from the study area was prepared and their habitats were recorded.

The species of trees were documented during this base line survey. The dominant plant species growing in this area were Azadirachta indica Prosopis juliflora, etc. Please refer the Table No.3.55.

Table No: 3.26. Tree survey around 300m radius from the proposed project site.

S.No	English Name	Vernacular Name	Scientific Name	No of trees
Trees				
1.	Acacia Nilotica	Karuvelammaram	Vachellianilotica	7
2.	Mesquite	Mullumaram	Prosopis juliflora	33
3.	Neem	Vembu	Azadirachta indica	27
4.	Asian Palmyra palm	Panai maram	Borassus flabellifer	6
5.	Bitter Albizia	Arappu Tree	Albizia amara	4

(Sources: Species observation in the field study)

Table No: 3.27. Flora in Buffer Zone of Thirumal Village, Rough stone and gravel quarry (Primary data & Secondary data)

SI.No	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type *(E,M,EM)
Trees					
1.	Neem or Indian lilac	Vembu	Azadirachta indica	Meliaceae	M
2.	Common fig	Athi Maram	Ficus Carica	Anacardiaceae	EM
3.	Frywood	Vaagai	Albizia lebbek	Mimosaceae	M
4.	Indian plum	Elanthai maram	Ziziphus mauritiana	Rhamnaceae	EM
5.	Mango	Manga	Mangifera indica	Anacardiaceae	E
6.	Oil cake tree	Wunja	Albizia amara	Fabaceae	M
7.	Chinaberry	Malai vembu	Melia azedarach L	Meliaceae	M
8.	Velvet mesquite	Mullu maram	Prosopis juliflora	Fabaceae	M
9.	Indian rosewood	Shisham	Dalbergia sissoo	Fabales	M
10.	Madras thorn	Kudukapuli	Pithecellobium dulce	Fabaceae	EM
11.	Portia tree	Poovarasam	Thespesia Populnea	Malvaceae	E
12.	Royal poinciana	Cemmayir Konra	Delonix regia	Fabaceae	M
13.	Lemon	Ezhumuchaipalam	Citrus lemon	Rutaceae	EM
14.	Jamun Fruit Plant	Naval maram	Syzygium cumini	Myrtaceae	EM
15.	Gum arabic tree	Karuvelam	Vachellia nilotica	Fabaceae	E
16.	Kassod Tree	ManjalKonrai	Cassia siamea	Fabaceae	M
17.	Asian Palmyra palm	Panai maram	Borassus flabellifer	Arecaceae	E
18.	Bamboo	Moongil	Bambusoideae	Poaceae	E
19.	Teak	Thekku	Tectona grandis	Verbenaceae	E
20.	Indian mulberry	Nuna maram	Morinda tinctoria	Rubiaceae	E
21.	Banyan	Alai	Ficus benghalensis	Moraceae	E
22.	Cashew	Munthiri	Anacardium occidentale	Anacardiaceae	EM
23.	Coconut	Thennai maram	Cocos nucifera	Arecaceae	EM
24.	Horsetail She-oak	Savukku maram	Casuarina equisetifolia	Casuarinaceae	E
25.	Eucalyptus	Thailam maram	Eucalyptus tereticornis	Myrtaceae	M
26.	Creamy peacock flower	Perungondrai	Delonix elata	Fabaceae	M
27.	Pongamia pinnata	Pongam	Millettia pinnata	Fabaceae	M
28.	Indian bael	Vilvam	Aegle marmelos	Rutaceae	E
29.	Indian gooseberry	Nelli	Phyllanthus emblica	Phyllanthaceae	EM
30.	Guava	Koyya	Psidium guajava	Myrtaceae	EM
31.	Tamarind	Puliyamaram	Tamarindus indica	Legumes	EM
32.	Drumstick tree	Murunga maram	Moringa oleifera	Moringaceae	EM
33.	Sugar apple	Sitapalam	Annona squamosal	Annonaceae	EM

34.	Papaya	Pappali maram	<i>Carica papaya</i> L	Caricaceae	EM
35.	Banana tree	Vazhaimaram	<i>Musa acuminata</i>	Musaceae	EM
36.	Jack fruit	Palamaram	<i>Artocarpus heterophyllus</i>	Moraceae	E
Shrubs					
1.	<i>Solanum pubescens</i>	Malaisundai	<i>Solanum pubescens</i> Willd	Solanaceae	M
2.	Bellyache bush	Kaatamanaku	<i>Jatropagossypifolia</i>	Euphorbiaceae	M
3.	<i>Stachytarpheta urticifolia</i>	Rat tai	<i>Stachytarphetaurcticifolia</i>	Verbenaceae	M
4.	Devil's trumpet	Umathai	<i>Datura metel</i>	Solanaceae	EM
5.	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	M
6.	Castor bean	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	M
7.	Shoe flower	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	EM
8.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	M
9.	Touch-me-not	Thottalchinungi	<i>Mimosa pudica</i>	Mimosaceae	M
10.	Indian mallow	Maanikham	<i>Abutilon indicum</i>	Meliaceae	M
11.	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	EM
12.	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	M
13.	West Indian Lantana	Unni chedi	<i>Lantana camara</i>	Verbenaceae	E
Herbs					
1.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	M
2.	Eggplant	Kathrikkai	<i>Solanum melongena</i>	Solanaceae	EM
3.	<i>Aloe barbadensis</i>	Katrazhai	<i>Aloe vera</i>	Asphodelaceae	M
4.	Mountain knotgrass	Thengaipoo kirai	<i>Aerva lanata</i>	Amaranthaceae	M
5.	Prickly chaff flower	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	M
6.	Bindii	Nerunchi	<i>Tribulus terrestris</i>	Zygophyllaceae	M
7.	Fish poison	Kolinchi	<i>Tephrosia purpurea</i>	Fabaceae	M
8.	Ban Tulsi	Melakai poondu	<i>Croton bonplandianus</i>	Euphorbiaceae	
9.	<i>Commelina benghalensis</i>	Kanavazha	<i>Commelina benghalensis</i>	Commelinaceae	M
10.	Asthma-plant	Amman pacharisi	<i>Euphorbia hirta</i>	Euphorbiaceae	EM
11.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	EM
12.	Spiny amaranth	Mullu keerai	<i>Amaranthus spinosus</i>	Amaranthaceae	M
13.	Chilli	Milakai	<i>Capsicum annum</i>	Solanaceae	M
14.	Flannel Weed	Sida mutti	<i>Sida cordifolia</i>	Malvaceae	M
15.	Indian Copperleaf	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	EM
16.	Marsh barbel	Neermulli	<i>Hygrophila auriculata</i>	Acanthaceae	M
17.	Asian spiderflower	Naaikaduku	<i>Cleome viscosa</i> L	Cleomaceae	M
18.	Tomato	Thakkali	<i>Solanum lycopersicum</i>	Solanaceae	EM
19.	White dammar	Mookutipoondu	<i>Vicoa indica</i>	Asteraceae	M
20.	<i>Cleome viscosa</i>	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	EM

21.	Bindii	Nerunji mullu	Tribulus terrestris	Zygophyllaceae	M
22.	Bara Gokhru	Yanainerunjil	Pedaliium murex	Pedaliaceae	M
23.	Digeria muricata	Thoiya keera	Digeria muricata	Amaranthaceae	EM
24.	False daisy	Karisalankanni	Eclipta alba	Asteraceae	EM
25.	Sessile Joyweed	Ponnakanni	Alternanthera sessilis	Amaranthaceae	EM
26.	Pignut	Nattapoochedi	Hyptis suaveolens	Lamiaceae	EM
27.	Field beans	Avarai	Hyacinth Beans	Fabaceae	EM
28.	Common leucas	Thumbai	Leucas aspera	Lamiaceae	EM
29.	Holy basil	Thulasi	Ocimum tenuiflorum	Lamiaceae	EM
30.	Malabar catmint	Pei veratti	Anisomeles malabarica	Lamiaceae	M
31.	Coat buttons	Thatha poo	Tridax procumbens	Asteraceae	M
32.	Indian mint	Karpura valli	Coleus amboinicus	Lamiaceae	M
33.	Aloe barbadensis	Katrazhai	Aloe vera	Asphodelaceae	EM
34.	Europeanblack nightshade	Manathakkali	Solanumnigrum	Solanaceae	EM
35.	Bright eyes	Nithiyakalyani	Catharanthus roseus	Apocynaceae	M
36.	Carrot grass	Partiniyam	Parthenium hysterophorus	Asteraceae	-
Climber/Creepers					
1.	Stemmed vine	Perandai	Cissus quadrangularis	Vitaceae	EM
2.	Rosary Pea	Gundumani	Abrus precatorius	Fabaceae	EM
3.	Ivy gourd	Kovai	Coccinia grandis	Cucurbitaceae	EM
4.	Balloon plant	Mudakathan	Cardiospermum halicacabum	Sapindaceae	EM
5.	Bitter apple	Peikkumatti	Citrullus colocynthis	Cucurbitaceae	M
6.	Butterfly pea	Sangu poo	Clitoria ternatea	Fabaceae	M
7.	Betel	Vettilai	Piper betle	Piperaceae	EM
8.	Pointed gourd	Kovakkai	Trichosanthes dioica	Cucurbitaceae	M
9.	Wild bitter	Pavarkai	Momordica charantia	Cucurbitaceae	M
10.	Bottle Guard	Sorakkai	Lagenaria siceraria	Cucurbitaceae	EM
11.	White pumpkin	Poosanaikkaai	Cucurbitaceae	Cucurbitaceae	M
12.	Wild jasmine	Malli	Jasminum augustifolium	Oleaceae	EM
13.	Nut grass	Korai	Cyperus rotandus	Poaceae	EM
14.	Cucumis maderaspatanus	Musumusukkai	Mukia maderaspatana	Cucurbitaceae	M
Grasses					
1.	Eragrostis	Pullu	Eragrostis ferruginea	Poaceae	E
2.	Windmill grass	Chevvarakupul	Chloris barbata	Amaranthaceae	NE
3.	Great brome	Thodappam	Bromus diandrus	Poaceae	E

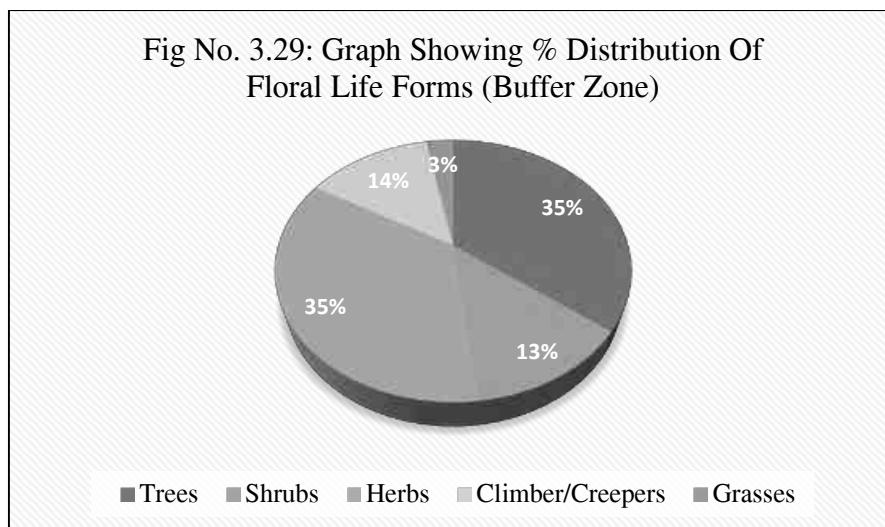
*E- Economical, M- Medicinal, EM- Both Economical and Medicinal, NE- Not evaluated.

3.5.2. Flora Composition in the Buffer Zone (Primary data & Secondary data)

Buffer zone flora sampling was conducted between 10.30 am to 1.00 pm in eight different locations in 10 km radius as per the ToR. The most important and widely used methods for a general assessment is belt transect/quadrade methods. The study area was divided according to habitat types followed the random sampling methods in the selected area. For plant biodiversity study in the ecosystems, the quadrade methods were followed. The proposed project site there are 102 species in the buffer zone study area in total, based on records. The floral (102) varieties among them Trees 36, Herbs 36, Shrubs 13, Climbers/ Creepers 14 and Grasses 3 were identified. The result of the buffer zone of flora studies shows that Fabaceae and Cucurbitaceous, Euphorbiaceae is the main dominating species in the study area mentioned in Table No.3.56. There are no impacts due to this mining activity. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Apart from the proposed project area, there is agricultural land. Horticulture and agricultural land are untouched. There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. A list of floral species has been prepared based on primary survey (site observations) and discussion with local people. The total number of different plant life forms under trees, shrubs, herbs, and climbers is shown in Table No 3.57 and their % distribution is shown in Figure No 3.35.

Table No: 3.28: Number of floral life forms in the Study Area

S. No	Plant Life Form	Number of Species
1	Trees	36
2	Shrubs	13
3	Herbs	36
4	Climber/ Creeper	14
6	Grasses	3
Total No. of Species		102



3.5.3. Species Diversity

Shannon Diversity Index has been used for estimating the diversity among the eight sampling sites to highlight the most diverse site, and calculate the Shannon Wiener diversity index of each site using the formula:

$$H = - \sum P_i \ln P_i$$

Where, H' = Shannon index of diversity

S= Number of individuals of one species

Pi = -----

N = Total number of all individuals in the sample

\ln : is the logarithm to the base e -[

To estimate floral diversity, quadrat samplings were carried out at 8 locations where 10 quadrates were laid down each of 10×10 m, 5×5 m, and 1×1 m in size at each location. Sampling locations were randomly selected on plots of land where agriculture was not practiced or orchard or plantation was not present. Biodiversity value following Shannon Diversity Index was found to be:

Table No: 3.29 Floral Diversity

Sample Location	Shannon diversity index	Evenness	Richness (number of species)	Total number of individuals	Average population size
Location-1	3.03	0.95	56	113	2.22
Location-2	3.53	0.95	43	61	1.52
Location-3	3.53	0.95	40	71	1.77
Location-4	3.22	0.94	30	52	1.23
Location-5	3.34	0.96	32	45	1.41
Location-6	3.34	0.95	33	54	1.63
Location-7	3.60	0.97	40	53	1.32
Location-8	3.18	0.97	26	35	1.35

3.5.3.1. Interpretation

The Shannon Diversity Index (H) of the vegetation that exists in the project profile area (an assemblage of trees/shrubs and herbs) ranges from 3.04 to 3.61. The values were found highest around the location -7. Three locations were selected in and around the floral diversity shows more than average values because of the presence of ground cover. Tree diversity was found to be dominated by a few tree and herbs species such as *Acacia nilotica*, and *Prosopis juliflora*, *Calotropis gigantea*, No RET (Rare, Endangered, and Threatened) floral species were recorded from the vegetational survey.



a. *Ziziphus Mauritiana*



b. *Azadirachta indica*



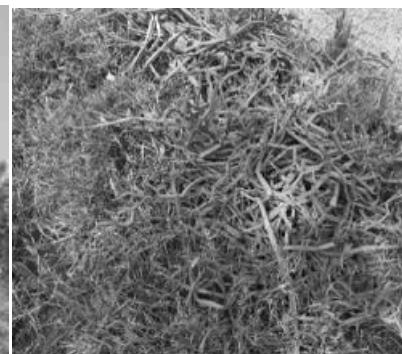
c. *Morinda tinctoria*



d. *Ricinus communis*



e. *Tectona grandis*



f. *Cissus quadrangularis*



g. *Eucalyptus tereticornis*



h. *Euphorbia antiquorum*



i. *Parthenium hysterophorus*



J. *Cocos nucifera*



k. *Thespesia Populnea*



l. *Prosopis juliflora*



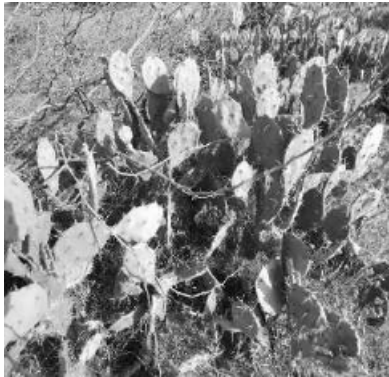
m. *Tridax procumbens*



n. *Tecoma stans*



o. *Vitex negundo*



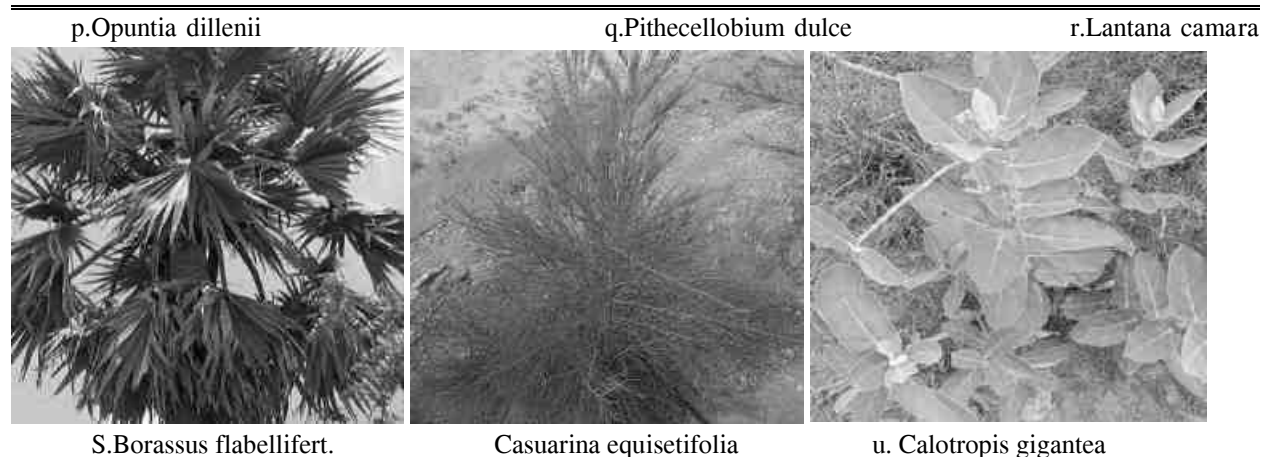


Fig No: 3.36. Flora species observation in the Buffer zone area

3.5.4. Economically important Flora of the study area

Agricultural crops: The main agricultural crops are maize and paddy. The locals also cultivate a variety of vegetables and fruits, including brinjal, drumsticks, onion, and coriander, as well as fruits like banana, papaya, mangoes, and guava.

Medicinal species: Several more medicinal plants commonly found in wastelands are also present in the near area. *Azadirachta indica* (Neem), *Ocimum tenuiflorum* (Holy basil), etc., and others are common medicinal plants in the area.

Rare and endangered floral species: There are no rare or endangered or threatened (RET) species in the study area. During the vegetation survey, there are no species that are endangered or threatened under IUCN (International Union for Conservation of Nature and Natural resources) guidelines.

3.5.5. The vegetation in the RF / PF areas, ecologically sensitive areas

There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar sites, Tiger/Elephant Reserves/(existing as well as proposed) within 10 km of the mine lease area. There are no protected forests within the project area. Hence submission of clearance from the National Board of Wildlife does not arise. No Wildlife Sanctuary in the study area. In addition, No Biosphere Reserves, Wildlife corridors, or, Tiger / Elephant reserves within 10 km of the project area. No protected (PF) forests either in the mine lease area or in the buffer zone. Thus, no forest land is involved in any manner.

There are no protected or ecologically sensitive areas such as National parks or Important Bird Areas (IBAs), or Wetlands or migratory routes of fauna or water bodies or human settlements within the proposed mine lease area. There are no Biosphere reserves or wildlife sanctuaries or National parks or Important Bird Areas (IBAs), or migratory routes of fauna. Thus, the area under study (Mine lease area and the 10 Km buffer zone) is not ecologically sensitive. It is away from the proposed project site.

Thus, no forest land is involved in any manner. There are no impacts due to this mining activity. There are neither forests nor forest dwellers nor forest-dependent communities in the mine lease area. There shall be no forest-impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project.

3.6. Fauna

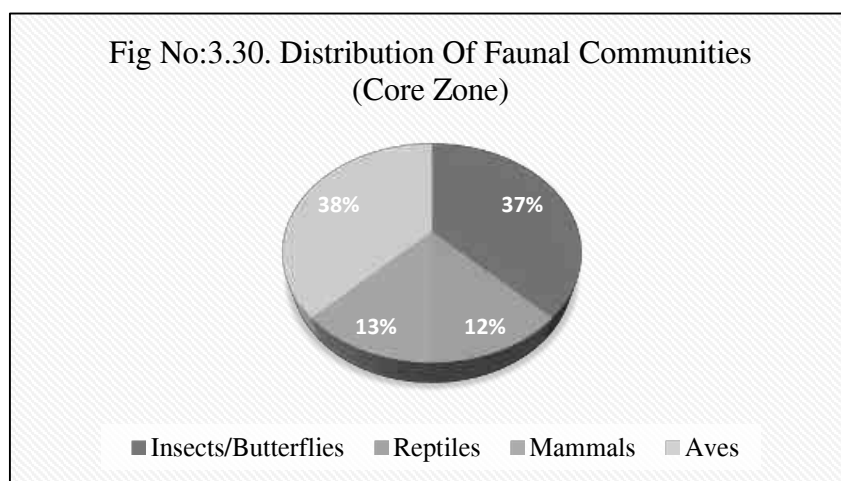
3.6.1. Fauna Composition in the Core Zone (Primary data)

Core zone fauna samplings were conducted between 6.00 am to 8.00 am in three locations. A total of 10 varieties of species were observed in the Core zone of Thirumal village, Rough stone and gravel quarry (Table No.3.59) among them numbers of Insects/ Butterflies 6, Reptiles 2, Mammals 2, and Avian 6. A total of 16 species have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species and 14 species are under Schedule IV according to the Indian Wildlife Act 1972. A total of 6 species of bird were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. Details of fauna in the core zone with the scientific name were mentioned in Table No. 3.59.

Table No: 3.30. Fauna in the Core zone of lase area, Rough stone and gravel quarry (Primary data)

SI.No	Scientific Name	Common Name	IUCN Red List data
Insects/Butterflies			
1.	Agriansp	Dragonfly	-
2.	Musca domestica	House fly	-
3.	Danaus genutia	Common Tiger	NL
4.	Danaus genutia	Striped Tiger	LC
5.	Apisindica	Honey Bee	-
6.	Hamitermes silvestri	Termite	LC
Reptiles			
1.	Calotes versicolor	Garden lizard	LC
2.	Mabuya carinatus	Common skink	LC
Mammals			
1.	Mus booduga	Indian Field Mouse	NL
2.	Herpestes javanicus	Asian Small Mongoose	LC
Aves			
1.	Acridotheres tristis	Common myna	LC
2.	Laniusexcubitor	Shikra	LC
3.	Corvussplendens	House crow	LC
4.	Eudynamys	Koel	LC
5.	Dicurus macrocercus	Black drongo	LC
6.	Saxicoloides fulicata	Indian Robin	LC

*NL- Not listed, LC- Least Concern



3.6.2. Fauna Composition in the Buffer Zone

As the animals, especially vertebrates move from place to place in search of food, shelter, mate or other biological needs, separate lists for core and buffer areas are not feasible however, a separate list of fauna pertaining to core and buffer zone are listed separately. Though there are no reserved forest in the buffer zone. As such there are no chances of occurrence of any rare or endangered or endemic or threatened (REET) species within the core or buffer area.

There are no Sanctuaries, National Parks, Tiger Reserve or Biosphere Reserve or Elephant Corridor or other protected areas within 10 km radius from core area. It is evident from the available records, reports, and circumstantial evidence that the entire study area including the core and buffer areas were free from any endangered animals. There were no resident birds other than common bird species such as, green bee eaters, Indian blue robin, Common Mynas, Black drangos, Crows, Woodpecker bird etc.

The list of Mammals (*directly sighted animals & Secondary data) is given in table No.3.60. The list of bird species recorded during field survey and literature from the study area is given in Table 3.61. The list of reptilian species recorded during field survey and literature from the study area are given in Table 3.62. The list of insect species recorded during field survey and literature from the study area are given in Table 3.63. The list of Amphibian species recorded during the field survey and literature from the study area are given in Table 3.68 and List of Butterflies identified from the project site and their conservation status is given in Table No.3.65. It is apparent from the list that none of the species either spotted or reported is included in Schedule I of the Wildlife Protection Act. Similarly, none of them comes under the REET category.

Taxonomically a total of 66 species were identified from the project site. Based on habitat classification the majority of species were Insects 5, followed by birds 24, Reptiles 8, Mammals 6, amphibians 3, and Butterflies 20. A total of 24 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed. There are no impacts on nearby fauna species.

Dominant species are mostly birds and insects, and three was observed during the extensive field visit *Sphaerotheca breviceps*, *Euphlyctis hexadactylus*, *Bufo melanostictus*, There is no schedule I Species in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

Table No: 3.31. List of Fauna & Their Conservation Status, Mammals: (*directly sighted animals & Secondary data)

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Funambulus palmarum</i>	Indian palm squirrel	LC
2.	<i>Mus booduga</i>	Indian Field Mouse	LC
3.	<i>Herpestes javanicus</i>	Asian Small Mongoose	LC
4.	<i>Lepus nigricollis</i>	Indian hare	LC
5.	<i>Rattus norvegicus</i>	Brown rat	LC
6.	<i>Lepus nigricollis</i>	Rabbit	LC

Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table No: 3.32. Listed birds

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	<i>Bubulcus ibis</i>	Cattle Egret	LC
2.	<i>Saxicoloidesfulvicata</i>	Indian Robin	LC
3.	<i>Streptopeliachinensis</i>	Spotted Dove	LC
4.	<i>Accipiter badius</i>	Shikra	LC

5.	Coracias benghalensis	Indian Roller	LC
6.	Anthus rufus	Paddyfield Pipit	LC
7.	Nectarinia minima	Small Sunbird	LC
8.	Acridotheres tristis	Common Myna	LC
9.	Vanellus indicus	Red-wattled Lapwing	-
10.	Dicrurus macrocercus	Black Drongo	LC
11.	Lonchura punctulata	Spotted Munia	LC
12.	Dendrocitta vagabunda	Indian Treepie	LC
13.	Corvus splendens	House Crow	LC
14.	Eudynamis	Koel	LC
15.	Psittacula krameri	Rose ringed parakeet	LC
16.	Dicrurus macrocercus	Black drongo	LC
17.	Corvus splendens	House crow	LC
18.	Alcedo atthis	Small blue kingfisher	LC
19.	Columba livia	Rock pigeon	LC
20.	Cuculus canorus	Common Cuckoo	LC
21.	Pycnonotus cafer	Red vented Bulbul	LC
22.	Milvus migrans	Black kite	LC
23.	Merops orientalis	Small Bee-eater	LC
24.	Halcyon smyrnensis	White-breasted Kingfisher	LC

Not Evaluated (NE) Least Concern (LC) Near Threatened (NT) Endangered (E)

Table No: 3.33. List of Reptiles either spotted or reported from the study area.

SI. No	Scientific Name	Common Name	IUCN Red List data
1.	Calotes versicolor	Oriental garden lizard	LC
2.	Hemidactylus flaviviridis	House lizards	NL
3.	Naja naja	Indian cobra	LC
4.	Vipera russelli	Russell's viper	NL
5.	Ahaetulla nasuta	Green vine snake	LC
6.	Ptyas mucosa	Rat snake	NL
7.	Bungarus caeruleus	Common krait	LC
8.	Basiliscus vittatus	Brown basilisk	LC

Table No: 3.34. List of insects either spotted or reported from the study area

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	Apis cerana	Indian honey bee	-
2.	Hamitermes silvestri	Termite	LC
3.	Hieroglyphus sp	Grasshopper	LC
4.	Camponotus Vicinus	Ant	NL
5.	Ceratogomphus pictus	Dragonfly	-

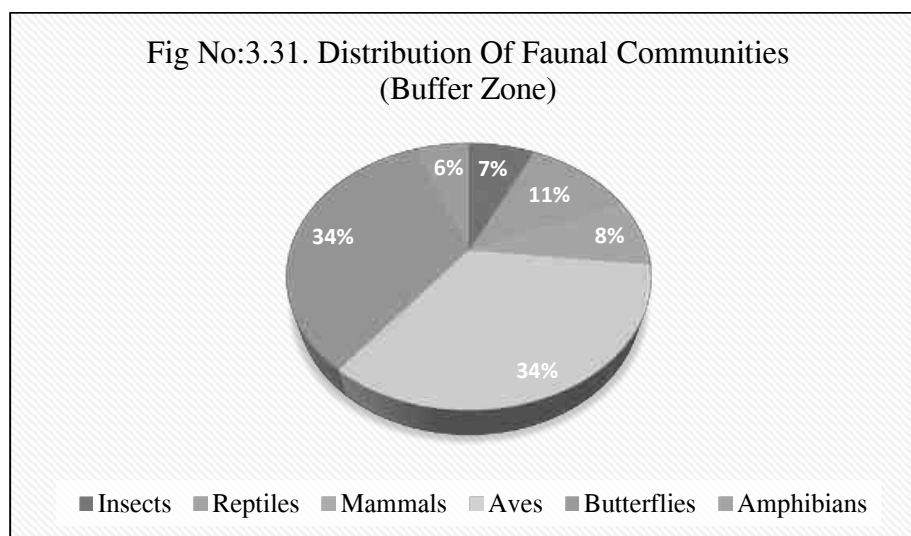
Table No: 3.35. List of Amphibians either spotted or reported from the study area

SI. No	Scientific Name	Common Name	IUCN Red List data
1.	Sphaerotheca breviceps	Indian Burrowing frog	LC
2.	Euphlyctis hexadactylus	Green pond frog	LC
3.	Bufomelanostictus	Indian Toad	LC

NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Table No: 3.36. List of Butterflies identified from the project site and their conservation status

SI. No	Scientific Name	Common Name	IUCN Conservation Status
1.	Danaus genutia	Striped Tiger	LC
2.	Danaus chrysippuschrysippus	Plain Tiger	LC
3.	Acraea terpsicore	Tawny Coster	LC
4.	Papiliopolytespolytes	Common Mormon	LC
5.	Papiliopolytesromulus	Common Mormon	LC
6.	Papiliodemoleusdemoleus	Lime Butterfly	LC
7.	Hypolimnasmisippus	DanaidEggfly	LC
8.	Junoniahiarta	Yellow Pansy	LC
9.	Junonialemonias	Lemon Pansy	LC
10.	Hypolimnasmisippus	DanaidEggfly	LC
11.	Phalantaphalantha	Common Leopard	LC
12.	Zizulahylax	Tiny Grass Blue	LC
13.	Catochrysopsstrabo	Forget-Me-Not	LC
14.	Euchrysopsnejus	Gram Blue	LC
15.	Lampidesboeticus	Pea Blue	LC
16.	Euploea core	Common Crow	LC
17.	Melanitisedaleda	Common Evening Brown	LC
18.	Jamidescelenoceleno	Common Cerulean	LC
19.	Evereslacturnus	Indian Cupid	LC
20.	Pachlioptaaristolochiae	Common Rose	LC



Livestock like cattle, buffalo, goat, poultry, duck and pig are reared for dairy products, meat, and egg and for agriculture purpose. Majority of cattle and buffalo are of local variety. Backyard poultry farms are mostly common in this area; however, some commercial poultry farms are also recorded in the study area.

Table No. 3.37: Description of Flora & Fauna

S. No	Type of Species	Name	Local Name
Flora			
1.	Endangered species	None	None
2.	Threatened species	None	None

3.	Near Threatened species	None	None
4.	Vulnerable species	None	None
Fauna			
5.	Endangered species	None	None
6.	Threatened species	None	None
7.	Near Threatened species	None	None
8.	Vulnerable species	None	None
9.	Migratory Corridors & Flight Paths	No corridors & flight paths	-
10.	Breeding & Spawning grounds	None	-
11.	Invasive Alien species	None	None



a. Phalanta phalantha



b. Junonia lemonias



c. Danaus chrysippus



d. Junonia iphita



e. Euploea core



f. Hypolimnasmisippus



g. Calotes versicolor



h. Acridotheres tristis



i. Alcedo atthis



j. Basiliscus vittatus

(Sources: Species observation in the field study)

Fig No: 3.39. Fauna species observation in the buffer zone area

3.6.3. Aquatic Ecology

The study area has seasonal water bodies is located away from the proposed project site. Mining activities will not have an impact on aquatic ecosystems because no effluent discharge from the Rough stone and gravel quarry

is planned. There are no natural perennial surface water bodies, such as marshes, rivers, streams, lakes, or agricultural sites, inside the mining lease area. There is no aquatic flora and, aquatic fauna. Hence, it does not harbour any significant aquatic life. Therefore, the project is not likely to affect the aquatic ecology. Aquatic weeds are found to be growing everywhere in 10 km radius area, in every water bog, pond, etc. *Typha angustata* can be found growing all along the drains of villages, small water-logged depressions, and agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, *Eichhornia crassipes* has taken its roots and covers the entire water surface by its sprawl and invasion.

3.6.3.1. Objectives of Aquatic Studies

- Generating data through actual field collection in these locations over the study period.
- Impacts on aquatic fauna/flora
- Consulted with locals to obtain knowledge about aquatic flora and animals.

3.6.3.2. Macrophytes

The macrophytes observed within the study area are tabulated in Table 3.67

Table No.3.38 Description of Macrophytes (Primary data & Secondary data)

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

Sources: Species observation in the field study

3.6.3.3. Aquatic Faunal Diversity

Amphibian species like the common Indian Burrowing frog, and Green pond frog, and etc. were sighted near the water bodies located in the study area.

Table No. 3.39. Amphibians Observed/Recorded from the Study Area & Secondary data

SI. No	Common Name/English Name	Scientific Name	Schedule list wildlife Protection act 1972
1.	Indian Burrowing frog	<i>Sphaerotheca breviceps</i>	Schedule IV
2.	Green pond frog	<i>Euphlyctis hexadactylus</i>	Schedule IV
3.	Indian Toad	<i>Bufo melanostictus</i>	Schedule IV

3.6.3.4. Other Aquatic Fauna

3.6.3.5. Fishes

The study area has low aquatic diversity, with few types of fish living. The species of fish reported during the primary visit are Rohu, Catla, Catfish, etc. Species of fish reported in the study area are given in Table No 3.69.

Table No 3.40. Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S.No	Common name	Scientific name	Family
1.	Ponithia	<i>Puntius sophore</i>	Cyprinidae
2.	Catla	<i>Catla Catla</i>	Cyprinidae
3.	Catfish	<i>Siluriformes</i>	-
4.	Rohu	<i>Labeo rohita</i>	Cyprinidae

3.10. Findings/Results

The assessment was carried out during the summer season. The inspection day was quite all right with respectable weather. The details of the flora and fauna observed are given below.

S.No	Ecological sensitive habitat	Direction and Distance from the project site
1.	National Parks/ Wildlife Sanctuary/ Biosphere reserves/ Elephant Reserve/ Any Other Reserve	Nil
2.	Reserved Forests	Nil
3.	Wildlife Corridors & Routes	No notified wildlife corridors are present in 10 km vicinity.
4.	Wetlands / Water bodies	-
5.	Ramsar Site	Nil
6.	Important Bird Habitats	Nil
7.	Breeding/nesting areas of endangered species	Not present
8.	Mangroves	None

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

3.8. Conclusion

The observations and assessment of the overall ecological scenario involve details such as classification of Biogeographic zone, eco-region, habitat types, and land cover, distances from natural habitats, vegetation/forest types, and sensitive ecological habitats such as Wetlands sites, Important Bird areas, migration corridors of important wildlife etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, and wildlife species etc., and consulted and discussed with local people, from the villages, herders and farmers who inhabit close to the proposed project area

3.6 SOCIO ECONOMIC ENVIRONMENT

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

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

3.6.1 Objectives of the Study

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

- To study the socio-economic status of the people living in the study area of the proposed mining project.
- To assess the impact of the project on Quality of life of the people in the study area.

- To recommend Community Development measures needs to be taken up in the study Area.

3.6.2 Scope of Work

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

3.6.3 District Profile

Madurai is a city in the Indian state of Tamil Nadu. Madurai is the administrative headquarters of Madurai district is a major city in the Indian state of Tamil Nadu. It is the cultural capital of Tamil Nadu and the administrative headquarters of Madurai District. As of the 2011 census, it was the third largest Urban agglomeration in Tamil Nadu after Chennai and Madurai and the 44th most populated city in India. The district is bounded by Theni in the west, Sivaganga in the east, Dindigul in the north, Virudhunagar in the south and small parts of Tiruchirappalli in the northeast.

3.6.4 Study area:

THIRUMAL VILLAGE

Tirumal village is situated in Teshil Thirumangalam, District Madurai and in State of Tamil Nadu India. Village has population of 2910 as per census data of 2011, in which male population is 1458 and female population is 1452. Total geographical area of Tirumal village is 934.25 Hectares. Population density of Tirumal is 3 persons per Hectares. Total number of house hold in village is 764. Gram Panchayat name of the Tirumal village is Thirumal. CD Block name is Kallikudi and Teshil/Taluk or sub-district is Thirumangalam. Data Reference year is 2009 of Census 2011. Sub District HQ Name is THIRUMANGALAM and Sub District HQ Distance is 17 Km from the village. District Head Quarter name is MADURAI and it's distance from the village is 32KM. Nearest Town of the Tirumal village is KARIAPATTI and nearest town distance is 7 km. Pincode of Tirumal village is 625022. As per census 2011 village code of village Tirumal is 640986

The sex-ratio of Thirumal village is As per the Census Data 2011 there are 996 Femals per 1000 males out of 2910 total population of village. There are 846 girls per 1000 boys under 6 years of age in the village.

TABLE 3.41: RAJAKKALPATTI VILLAGE POPULATION FACTS

Number of Households	764
Population	2910
Male Population	1458
Female Population	1452
Children Population	371
Sex-ratio	996
Literacy	68.33%

Male Literacy	81.94%
Female Literacy	54.99%
Scheduled Tribes (ST)	0
Scheduled Caste (SC)	219

Source: <https://etrace.in/census/village/tirumal-thirumangalam-district-madurai-tamil-nadu-640986/>

TABLE 3.42: DEMOGRAPHICS POPULATION OF VILLAGE RAJAKKALPATTI

Total Population	Male Population	Female Population
2910	1458	1452

Source: <https://etrace.in/census/village/tirumal-thirumangalam-district-madurai-tamil-nadu-640986/>

Sex Ratio of Thirumal Village -Census 2011

As per the Census Data 2011 there are 996 Femals per 1000 males out of 2910 total population of village. There are 846 girls per 1000 boys under 6 years of age in the village.

Literacy of Rajakkalpatti Village

Out of total poplation total 1735 people in Tirumal Village are literate, among them 1030 are male and 705 are female in the village. Total literacy rate of of Tirumal is 68.33%, for male literacy is 81.94% and for female literacy rate is 54.99%.

Worker's profile of Rajakkalpatti Village

Total working population of Tirumal is 1669 which are either main or marginal workers. Total workers in the village are 1669 out of which 849 are male and 820 are female. Total main workers are 1551 out of which female main workers are 809 and male main workers are 742. Total marginal workers of village are 118.

TABLE 3.43: THIRUMAL VILLAGE CENSUS 2011 DATA

Description	Census 2011 Data
Village Name	Tirumal
Teshil Name	Thirumangalam
District Name	Madurai
State Name	Tamil Nadu
Total Population	2910
Total Area	934 (Hectares)
Total No of House Holds	764
Total Male Population	1458
Total Female Population	1452
0-6 Age group Total Population	371
0-6 Age group Male Population	201
0-6 Age group Female Population	170

Total Person Literates	1735
Total Male Literates	1030
Total Female Literates	705
Total Person Illiterates	1175
Total Male Illiterates	428
Total Female Illiterates	747
Scheduled Cast Persons	219
Scheduled Cast Males	112
Scheduled Cast Females	107
Scheduled Tribe Persons	0
Scheduled Tribe Males	0
Scheduled Tribe Females	0

Source: <https://etrace.in/census/village/tirumal-thirumangalam-district-madurai-tamil-nadu-640986/>

TABLE 3.44: THIRUMAL WORKING POPULATION ---CENSUS 2011

	Total	Male	Female
Total Workers	1669	849	820
Main Workers	1551	809	742
Main Workers Cultivators	328	173	155
Agriculture Labourer	963	442	521
Household Industries	36	26	10
Other Workers	224	168	56
Marginal Workers	118	40	78
Non Working Persons	1241	609	632

Source: <https://etrace.in/census/village/tirumal-thirumangalam-district-madurai-tamil-nadu-640986/>

FIGURE 3.33: SOCIO-ECONOMIC VILLAGE MAP OF 10KM RADIUS

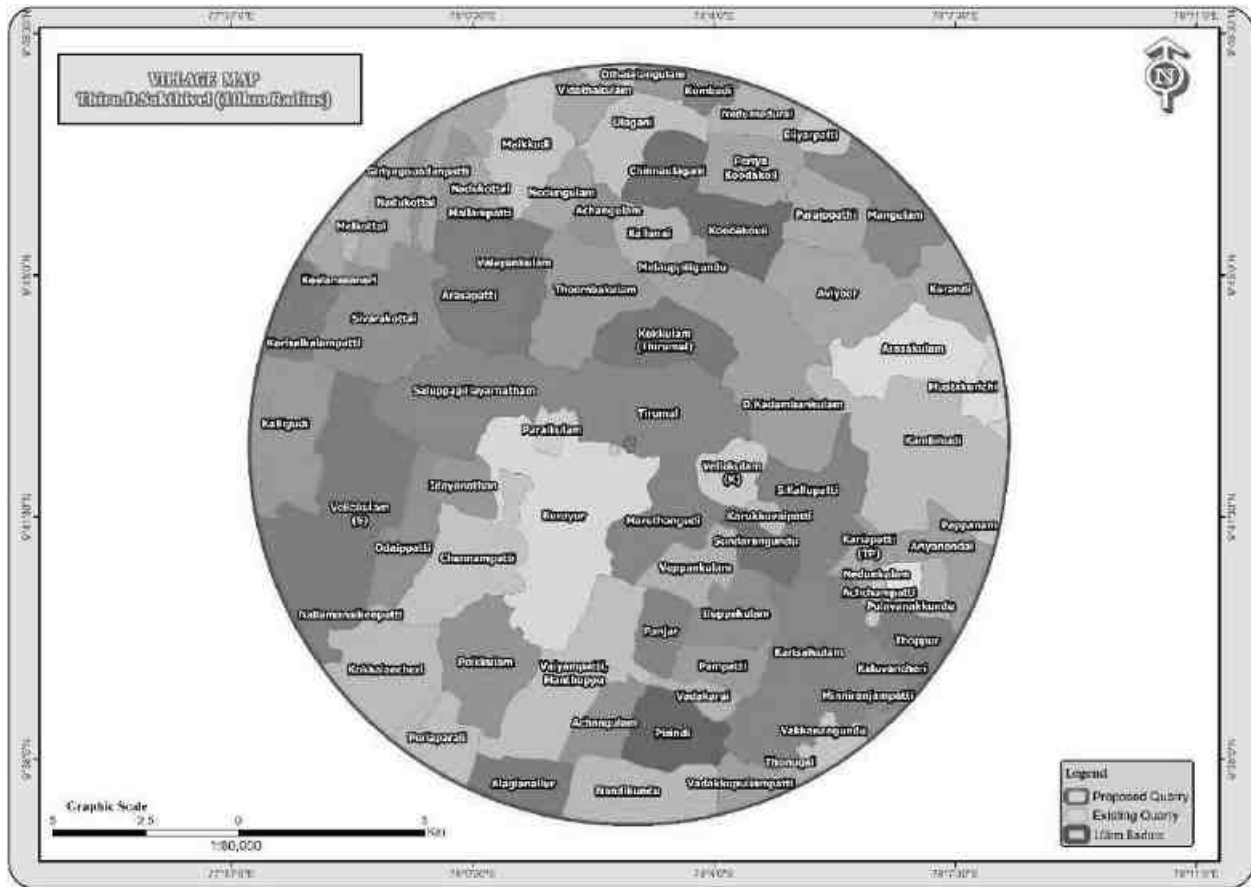


TABLE 3.45: POPULATION DATA OF STUDY AREA

Sl.No.	Village Name	No of House Holds	Total Population	Male	Female	Total Literate Population	Male Literate	Female Literate	Total Illiterate Population	Male Illiterate	Female Illiterate
1	Achampattu	444	1712	865	847	1213	661	552	499	204	295
2	Achangulam	218	736	358	378	409	240	169	327	118	209
3	Alagianallur	1195	4252	2116	2136	2888	1597	1291	1364	519	845
4	Arasakulam	580	2336	1198	1138	1500	898	602	836	300	536
5	Arasapatti	615	2210	1130	1080	1297	797	500	913	333	580
6	Ariyanendal	149	567	297	270	367	209	158	200	88	112
7	Aviyoor	1455	5629	2902	2727	3481	2059	1422	2148	843	1305
8	Chennampatti	360	1440	733	707	924	515	409	516	218	298
9	Chinnaulagani	457	1854	936	918	984	629	355	870	307	563
10	Chittumoonradaippu	277	961	476	485	784	407	377	177	69	108
11	D.Kadambankulam	821	3588	1833	1755	2327	1350	977	1261	483	778
12	Eliyarpatti	368	2156	1471	685	1509	1208	301	647	263	384
13	Giriyagoundanpatti	203	743	368	375	551	301	250	192	67	125
14	Idayanathan	96	374	187	187	259	152	107	115	35	80
15	Iluppakulam	177	646	331	315	465	260	205	181	71	110
16	Kallanai	564	2112	1080	1032	1033	665	368	1079	415	664
17	Kalligudi	1618	5427	2682	2745	4083	2169	1914	1344	513	831
18	Kaluvancheri	407	1516	779	737	789	491	298	727	288	439
19	Kambikudi	945	3640	1888	1752	2394	1395	999	1246	493	753
20	Karisalkalampatti	326	1158	589	569	722	424	298	436	165	271
21	Karukkuvaipatti	64	273	144	129	197	118	79	76	26	50
22	Keelanesaneri	130	498	251	247	307	175	132	191	76	115
23	Kokkalancheri	860	2880	1437	1443	2145	1176	969	735	261	474
24	Kokkulam (Thirumal)	358	1466	751	715	871	549	322	595	202	393
25	Kombadi	348	1344	663	681	794	466	328	550	197	353
26	Koodakovil	555	2232	1138	1094	1541	877	664	691	261	430
27	Kurandi	504	1974	998	976	1145	680	465	829	318	511

28	Kurayur	1415	5362	2731	2631	3406	2031	1375	1956	700	1256
29	Maikkudi	345	1382	701	681	839	494	345	543	207	336
30	Mallampatti	166	664	332	332	466	253	213	198	79	119
31	Mangulam	158	631	306	325	403	242	161	228	64	164
32	Maruthangudi	329	1277	641	636	692	404	288	585	237	348
33	Melauppiligundu	314	1183	618	565	687	466	221	496	152	344
34	Mustakurichi	378	1478	741	737	886	528	358	592	213	379
35	Nadukottai	453	1749	905	844	1304	723	581	445	182	263
36	Nallamanaikenpatti	302	1115	558	557	767	438	329	348	120	228
37	Nandikundu	654	2279	1117	1162	1555	870	685	724	247	477
38	Nedumadurai	599	2272	1118	1154	1273	744	529	999	374	625
39	Nedungulam	259	1022	522	500	650	392	258	372	130	242
40	Nedungulam	266	897	445	452	558	337	221	339	108	231
41	Odaippatti	158	531	249	282	425	221	204	106	28	78
42	Othaialangulam	339	1282	656	626	716	458	258	566	198	368
43	Pampatti	158	406	197	209	321	166	155	85	31	54
44	Panjar	146	520	243	277	282	165	117	238	78	160
45	Paraikulam	125	452	231	221	273	164	109	179	67	112
46	Paraipathi	721	2760	1395	1365	1375	828	547	1385	567	818
47	Peikkulam	427	1493	765	728	825	456	369	668	309	359
48	Periya Koodakoil	51	173	95	78	72	52	20	101	43	58
49	Pisindi	170	583	290	293	397	224	173	186	66	120
50	S.Kallupatti	586	1962	990	972	1214	720	494	748	270	478
51	Saluppapillayarnatham	603	2129	1043	1086	1305	736	569	824	307	517
52	Sivarakottai	905	3331	1646	1685	2386	1294	1092	945	352	593
53	Sundarangundu	166	612	306	306	361	215	146	251	91	160
54	Thonugal	498	1787	865	922	1208	640	568	579	225	354
55	Thoombakulam	325	1149	564	585	610	386	224	539	178	361
56	Thoppur	400	1502	771	731	1052	603	449	450	168	282
57	Tirumal	764	2910	1458	1452	1735	1030	705	1175	428	747
58	Ulagani	386	1466	743	723	815	522	293	651	221	430

59	Vadakarai	44	151	73	78	90	48	42	61	25	36
60	Vadakkupuliampatti	607	2051	999	1052	1202	688	514	849	311	538
61	Vaiyampatti	129	499	251	248	256	158	98	243	93	150
62	Vakkanangundu	342	1250	613	637	867	491	376	383	122	261
63	Valayankulam	274	1050	517	533	527	336	191	523	181	342
64	Vellakulam (K)	1431	4867	2380	2487	3594	1857	1737	1273	523	750
65	Vellakulam (S)	352	1259	627	632	777	446	331	482	181	301
66	Veppankulam	237	878	440	438	291	164	127	587	276	311
67	Vidathakulam	520	1934	987	947	1295	758	537	639	229	410
68	Virusankulam	227	860	423	437	563	328	235	297	95	202

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

TABLE 3.46: WORKERS PROFILE OF STUDY AREA

Sl.No.	Village Name	Total Workers Population	Male Workers	Female Workers	Total Main Workers	Main Workers Male	Main Workers Female	Main Cultivation Workers	Main Agriculture Workers	Main Other Workers	Non-Worker Population
1	Achampattu	816	521	295	566	392	174	23	175	356	896
2	Achangulam	431	218	213	422	217	205	4	350	68	305
3	Alagianallur	2226	1234	992	2120	1186	934	173	1396	538	2026
4	Arasakulam	1300	718	582	1292	716	576	774	222	291	1036
5	Arasapatti	1288	673	615	1264	667	597	423	567	260	922
6	Ariyanendal	277	169	108	253	163	90	2	134	116	290
7	Aviyoor	2351	1541	810	2242	1503	739	406	570	1238	3278
8	Chennampatti	784	444	340	150	106	44	2	9	137	656
9	Chinnaulagani	1083	580	503	1068	575	493	344	528	196	771
10	Chittumoonradaippu	528	307	221	521	303	218	63	177	272	433
11	D.Kadambankulam	1662	893	769	1572	866	706	155	994	414	1926
12	Eliyarpatti	847	459	388	511	301	210	86	172	243	1309
13	Giriyagoundanpatti	502	253	249	477	242	235	35	302	123	241
14	Idayanathan	228	119	109	226	118	108	1	165	52	146
15	Iluppakulam	306	170	136	238	161	77	29	47	160	340
16	Kallanai	1242	586	656	1227	582	645	64	1027	127	870
17	Kalligudi	2772	1612	1160	2380	1437	943	115	979	1216	2655
18	Kaluvancheri	947	514	433	911	495	416	123	588	198	569
19	Kambikudi	1873	1097	776	1778	1074	704	167	867	738	1767
20	Karisalkalampatti	683	365	318	615	348	267	88	379	146	475
21	Karukkuvaipatti	158	84	74	156	84	72	36	82	38	115
22	Keelanesaneri	252	139	113	249	139	110	17	142	89	246
23	Kokkalancheri	1563	868	695	1295	763	532	167	670	447	1317
24	Kokkulam (Thirumal)	791	424	367	723	409	314	69	500	151	675
25	Kombadi	763	400	363	207	157	50	44	53	107	581
26	Koodakovil	1143	627	516	1052	581	471	34	747	250	1089
27	Kurandi	1163	606	557	732	465	267	119	315	281	811

28	Kurayur	2886	1617	1269	2586	1482	1104	300	1489	787	2476
29	Maikkudi	774	422	352	598	389	209	136	185	263	608
30	Mallampatti	421	221	200	103	74	29	0	35	68	243
31	Mangulam	303	169	134	154	133	21	27	12	104	328
32	Maruthangudi	634	357	277	626	352	274	31	416	179	643
33	Melauppiligundu	676	361	315	670	359	311	73	436	158	507
34	Mustakurichi	776	424	352	708	410	298	237	284	184	702
35	Nadukottai	850	532	318	449	338	111	25	159	264	899
36	Nallamanaikenpatti	543	305	238	493	288	205	66	130	281	572
37	Nandikundu	1424	703	721	1407	694	713	254	835	313	855
38	Nedumadurai	1321	696	625	985	648	337	179	395	409	951
39	Nedungulam	434	306	128	354	261	93	39	75	230	588
40	Nedungulam	518	277	241	494	270	224	123	316	51	379
41	Odaippatti	301	157	144	301	157	144	3	210	87	230
42	Othaiangulam	698	358	340	665	350	315	116	274	271	584
43	Pampatti	281	136	145	281	136	145	130	125	25	125
44	Panjar	304	139	165	212	110	102	53	114	45	216
45	Paraikulam	246	136	110	236	134	102	39	115	82	206
46	Paraipathi	1489	806	683	1359	788	571	227	525	595	1271
47	Peikkulam	852	479	373	835	472	363	32	326	470	641
48	Periya Koodakoil	102	54	48	94	54	40	45	18	31	71
49	Pisindi	357	182	175	346	174	172	74	139	133	226
50	S.Kallupatti	1158	635	523	823	466	357	137	405	278	804
51	Saluppapillayarnatham	1390	713	677	1380	708	672	470	557	351	739
52	Sivarakottai	1694	976	718	1170	721	449	227	430	445	1637
53	Sundarangundu	412	203	209	411	203	208	68	224	119	200
54	Thonugal	864	517	347	548	372	176	12	42	475	923
55	Thoombakulam	655	349	306	636	343	293	111	335	182	494
56	Thoppur	738	462	276	545	382	163	82	12	427	764
57	Tirumal	1669	849	820	1551	809	742	328	963	224	1241
58	Ulagani	740	382	358	716	370	346	149	383	183	726

59	Vadakarai	88	44	44	88	44	44	0	51	34	63
60	Vadakkupuliampatti	1224	618	606	702	449	253	44	267	391	827
61	Vaiyampatti	295	160	135	295	160	135	89	89	117	204
62	Vakkanangundu	423	307	116	369	282	87	0	14	354	827
63	Valayankulam	603	291	312	600	290	310	16	561	23	447
64	Vellakulam (K)	2651	1447	1204	2328	1295	1033	233	1308	724	2216
65	Vellakulam (S)	814	407	407	521	265	256	38	429	47	445
66	Veppankulam	489	274	215	481	269	212	319	59	102	389
67	Vidathakulam	1174	603	571	1151	597	554	56	869	222	760
68	Virusankulam	499	252	247	259	194	65	17	19	222	361

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

TABLE 3.47: COMMUNICATION & TRANSPORT FACILITIES IN THE STUDY AREA

Sl	Village Name	PO	SPO	PTO	T	PCO	MP	IC / CSC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	NWR	FP
1	Achampattu	2	1	2	1	1	1	2	2	2	2	2	2	2	2	1	1	2	1
2	Achangulam	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
3	Alagianallur	2	1	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
4	Arasakulam	2	2	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
5	Arasapatti	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	1	2	1
6	Ariyanendal	2	2	2	2	2	1	2	2	1	1	2	2	2	1	1	1	2	1
7	Aviyoor	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
8	Chennampatti	2	1	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
9	Chinnaulagani	2	2	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
10	Chittumoonradaippu	2	1	2	1	2	1	2	2	2	1	2	2	2	1	2	1	2	1
11	D.Kadambankulam	2	2	2	1	2	1	2	2	1	1	2	1	1	1	1	1	2	1
12	Eliyarpatti	2	2	2	1	1	1	2	2	1	1	2	1	2	1	1	1	2	1
13	Giriyagoundanpatti	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
14	Idayanathan	2	2	2	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1
15	Iluppakulam	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
16	Kallanai	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
17	Kalligudi	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2	1
18	Kaluvancheri	2	2	2	2	2	1	2	2	1	1	2	2	2	1	1	1	2	1
19	Kambikudi	2	1	2	1	2	1	2	2	1	1	2	1	1	1	1	1	2	1
20	Karisalkalampatti	2	2	2	1	1	1	2	2	1	2	2	2	1	2	1	1	2	1
21	Karukkuvaipatti	2	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	2	1
22	Keelanesaneri	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
23	Kokkalancheri	2	1	2	1	1	1	2	1	1	1	2	1	1	2	1	1	2	1
24	Kokkulam (Thirumal)	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
25	Kombadi	2	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
26	Koodakovil	2	1	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
27	Kurandi	2	1	2	1	2	1	2	2	1	1	2	2	2	2	1	1	2	1
28	Kurayur	2	1	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
29	Maikkudi	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1	1	2	1
30	Mallampatti	2	2	2	2	2	1	2	2	1	1	2	2	2	2	1	1	2	1
31	Mangulam	2	2	2	1	2	1	2	2	1	2	2	1	1	1	1	1	2	1
32	Maruthangudi	2	1	2	1	2	1	2	2	1	2	2	2	1	1	1	1	2	1
33	Melauppiligundu	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
34	Mustakurichi	2	1	2	1	2	1	2	2	1	1	2	2	2	1	1	1	2	1
35	Nadukottai	2	2	2	1	1	1	2	2	1	1	2	2	2	1	1	1	2	1
36	Nallamanaikenpatti	2	2	2	1	1	1	2	2	1	2	2	1	2	2	1	1	2	1
37	Nandikundu	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
38	Nedumadurai	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1

39	Nedungulam	2	1	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
40	Nedungulam	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
41	Odaippatti	2	1	2	2	2	1	2	2	1	1	2	2	2	2	2	1	2	1
42	Othaiangulam	2	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	1
43	Pampatti	2	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
44	Panjar	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
45	Paraikulam	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1
46	Paraippathi	2	2	2	1	1	1	2	2	1	1	2	1	2	1	1	1	2	1
47	Peikkulam	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
48	Periya Koodakoil	2	1	2	2	2	1	2	2	1	2	2	2	2	1	1	1	2	1
49	Pisindi	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
50	S.Kallupatti	2	1	2	1	2	1	2	2	1	1	2	1	1	1	1	1	2	1
51	Saluppapillayarnatham	2	1	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
52	Sivarakottai	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
53	Sundarangundu	2	2	2	2	2	1	2	2	2	1	2	2	1	1	1	1	2	1
54	Thonugal	2	2	2	1	2	1	2	2	1	1	2	1	1	1	1	1	2	1
55	Thoombakulam	2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1
56	Thoppur	2	2	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
57	Tirumal	2	1	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
58	Ulagani	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	2	1
59	Vadakarai	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
60	Vadakkupuliampatti	2	2	2	1	2	1	2	2	1	2	2	2	2	2	1	1	2	1
61	Vaiyampatti	2	2	2	1	2	1	2	2	1	2	2	2	2	1	1	1	2	1
62	Vakkanangundu	2	1	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	1
63	Valayankulam	2	2	2	1	2	1	2	2	1	2	2	2	1	2	1	1	2	1
64	Vellakulam (K)	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
65	Vellakulam (S)	2	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	2	1
66	Veppankulam	2	2	2	2	2	1	2	2	1	2	2	2	2	1	1	1	2	1
67	Vidathakulam	2	1	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1
68	Virusankulam	2	2	2	2	2	1	2	2	2	2	2	1	2	2	1	1	2	1

Abbreviations: PO - Post Office; MP - Mobile Phone Coverage; RS - Railway Station; GR - Gravel Roads; SPO - Sub Post Office; IC / CSC - Internet Cafe/Common Service Centre; NH - National Highways; NWR - Navigate waterways River; PTO - Post & Telegraph office; PCF - Private Courier Facility; SH - State Highways; FP - Foot path; T- Telephone (Landline); BS - Public Bus Service; MDR - Major District Road; PCO - Public call office / Mobile; PBS - Private Bus Service; BTR - Black Topped (Pucca Roads). Note: 1 - Available within the village 2 - Not available

TABLE 3.48: WATER & DRAINAGE FACILITIES IN THE STUDY AREA

Sl	Village Name	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
1	Achampattu	1	1	2	1	1	1	2	2	1	1	2
2	Achangulam	1	2	2	2	1	2	2	2	2	2	2
3	Alagianallur	1	1	2	1	2	2	1	2	1	1	2
4	Arasakulam	2	2	1	1	1	2	2	2	1	1	2
5	Arasapatti	1	2	2	2	2	2	2	2	2	1	1
6	Ariyanendal	2	2	2	2	2	2	2	2	2	1	2
7	Aviyoor	1	1	1	1	1	2	2	2	1	1	1
8	Chennampatti	1	2	2	2	1	2	2	2	1	1	2
9	Chinnaulagani	1	2	2	2	1	2	2	2	1	1	2
10	Chittumoonradaippu	2	2	2	2	2	2	2	2	1	1	1
11	D.Kadambankulam	1	2	1	2	1	2	2	2	1	1	1
12	Eliyarpatti	1	2	2	2	2	2	2	2	1	1	1
13	Giriyagoundanpatti	1	2	2	2	1	2	2	2	2	1	1
14	Idayanathan	2	2	2	2	2	2	2	2	1	1	2
15	Iluppakulam	1	1	2	1	1	1	2	1	1	1	2
16	Kallanai	1	2	2	1	1	2	1	2	1	1	1
17	Kalligudi	1	2	2	1	1	2	2	2	1	1	2
18	Kaluvancheri	1	1	1	2	1	1	2	2	2	2	2
19	Kambikudi	1	1	1	1	1	2	2	2	1	1	2
20	Karisalkalpatti	1	2	2	2	2	2	2	2	2	1	2
21	Karukkuvaipatti	1	2	1	2	1	2	2	2	1	1	2
22	Keelanesaneri	1	2	2	1	1	2	2	2	2	1	2
23	Kokkalancheri	1	2	2	1	1	2	2	2	1	1	1
24	Kokkulam (Thirumal)	1	2	1	2	1	2	2	2	1	1	2
25	Kombadi	2	2	2	2	1	2	2	2	1	1	2
26	Koodakovil	1	1	2	2	2	1	2	2	1	1	1
27	Kurandi	1	1	1	1	1	2	2	2	2	1	2
28	Kurayur	1	1	2	1	1	2	2	2	1	1	2
29	Maikkudi	1	2	1	1	1	2	2	2	1	1	1
30	Mallampatti	1	2	2	2	2	2	2	2	1	2	1
31	Mangulam	1	2	1	1	1	2	2	2	2	1	1
32	Maruthangudi	1	1	1	2	2	2	2	2	1	1	2
33	Melauppiligundu	1	2	2	1	1	2	1	2	1	2	2
34	Mustakurichi	1	1	1	1	1	2	2	2	2	1	2
35	Nadukottai	1	2	2	2	2	2	2	2	1	1	1
36	Nallamanaikenpatti	1	2	2	2	1	2	2	2	1	1	1
37	Nandikundu	1	2	1	1	1	2	2	2	1	1	2

38	Nedumadurai	1	2	1	2	1	2	2	2	1	1	1
39	Nedungulam	2	2	2	2	1	2	2	2	1	1	2
40	Nedungulam	1	2	1	2	1	2	2	2	1	1	1
41	Odaippatti	2	2	2	2	2	2	2	2	1	1	1
42	Othaiangulam	1	2	2	2	1	2	2	2	1	1	1
43	Pampatti	1	2	2	2	2	2	2	2	2	1	2
44	Panjar	2	2	2	2	2	2	2	2	1	2	2
45	Paraikulam	1	2	1	1	1	2	2	2	1	2	2
46	Paraippathi	1	2	2	1	2	2	2	2	1	1	1
47	Peikkulam	1	1	2	2	2	1	2	2	1	1	2
48	Periya Koodakoil	2	2	1	2	2	2	2	2	2	1	1
49	Pisindi	2	2	2	2	2	2	2	2	1	1	2
50	S.Kallupatti	1	2	2	2	2	2	2	2	1	1	2
51	Saluppapillayarnatham	1	1	1	1	1	2	2	2	1	1	2
52	Sivarakottai	1	2	2	1	1	2	2	2	1	1	2
53	Sundarangundu	1	2	2	2	2	2	2	2	2	2	2
54	Thonugal	1	2	1	1	1	2	2	2	1	1	1
55	Thoombakulam	1	1	2	1	1	2	2	2	2	1	1
56	Thoppur	1	2	2	2	2	2	2	2	1	1	2
57	Tirumal	1	1	1	2	1	2	2	2	1	1	2
58	Ulagani	1	2	2	2	1	1	2	2	1	1	2
59	Vadakarai	2	2	2	2	1	2	2	2	2	1	2
60	Vadakkupuliampatti	1	2	2	2	1	2	2	1	1	1	2
61	Vaiyampatti	1	2	2	2	2	2	2	1	1	1	2
62	Vakkanangundu	1	2	1	1	2	2	2	2	1	1	1
63	Valayankulam	1	2	2	1	1	2	2	2	1	1	2
64	Vellakulam (K)	1	1	2	1	1	1	2	2	1	1	2
65	Vellakulam (S)	2	2	1	1	1	2	2	2	2	1	2
66	Veppankulam	1	2	2	2	2	2	2	2	1	1	2
67	Vidathakulam	1	2	2	2	2	2	2	2	1	1	1
68	Virusankulam	1	2	2	2	2	2	2	2	1	1	1

Abbreviations: T - Tap Water; R / C - River / Canal; CW - Covered Well; T/P/L - Tank / Pond / Lake; UCW - Uncovered Well; CD - Covered Drainage; HP - Hand Pump; OD - Open Drainage; TW/BH - Tube / Bore Well; CT - Community Toilet Complex for General public; S - Spring
Note – 1 - Available within the village; 2 - Not available

TABLE 3.49: OTHER FACILITIES IN THE STUDY AREA

Sl	Village Name	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NPS	APS	BDRO	PS
1	Achampattu	2	2	2	1	1	1	2	2	1	1	2	2	1	1	1	1	1
2	Achangulam	2	2	2	2	1	1	2	2	1	1	2	2	2	1	2	2	1
3	Alagianallur	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1
4	Arasakulam	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
5	Arasapatti	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1
6	Ariyanendal	2	2	2	2	1	1	2	2	2	2	2	2	1	1	2	1	1
7	Aviyoor	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
8	Chennampatti	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1
9	Chinnaulagani	2	2	2	2	1	1	2	2	1	1	2	1	2	1	1	2	1
10	Chittumoonradaippu	2	2	2	2	1	1	2	2	1	1	2	2	1	1	1	2	1
11	D.Kadambankulam	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1	1
12	Eliyarpatti	2	2	2	2	1	1	2	2	1	1	1	2	1	1	1	1	1
13	Giriyagoundanpatti	2	2	2	2	1	1	2	2	1	1	2	1	2	1	2	2	1
14	Idayanathan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
15	Iluppakulam	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1
16	Kallanai	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	2	1
17	Kalligudi	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1
18	Kaluvancheri	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	2	1
19	Kambikudi	2	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1	1
20	Karisalkalampatti	2	2	2	2	1	1	2	2	1	1	2	1	2	1	1	1	1
21	Karukkuvaipatti	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1
22	Keelanesaneri	2	2	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1
23	Kokkalancheri	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1
24	Kokkulam (Thirumal)	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1
25	Kombadi	2	2	2	2	1	1	2	2	1	1	1	2	1	1	1	1	1
26	Koodakovil	2	1	1	2	1	1	2	2	1	1	1	1	2	1	1	1	1
27	Kurandi	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
28	Kurayur	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
29	Maikkudi	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
30	Mallampatti	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1
31	Mangulam	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
32	Maruthangudi	2	2	2	1	1	1	2	2	1	1	2	1	1	1	1	1	1
33	Melauppiligundu	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
34	Mustakurichi	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
35	Nadukottai	2	2	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1
36	Nallamanaikenpatti	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
37	Nandikundu	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1	1
38	Nedumadurai	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1

39	Nedungulam	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
40	Nedungulam	2	2	2	2	1	1	1	2	1	1	1	1	2	1	1	2	1
41	Odaippatti	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
42	Othaiyangulam	2	2	2	2	1	1	2	2	1	1	2	2	1	1	2	1	1
43	Pampatti	2	2	2	2	1	2	2	2	1	1	2	1	1	1	2	1	1
44	Panjar	2	2	2	2	1	1	2	2	1	1	1	2	2	1	1	1	1
45	Paraikulam	2	2	2	2	1	1	2	2	1	1	1	1	2	2	2	2	1
46	Paraipathi	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
47	Peikkulam	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	2	1
48	Periya Koodakoil	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
49	Pisindi	2	2	2	2	1	1	2	2	1	1	1	1	2	1	1	1	1
50	S.Kallupatti	2	2	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1
51	Saluppapillayarnatham	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
52	Sivarakottai	2	2	1	2	1	1	2	2	1	1	2	1	1	1	1	1	1
53	Sundarangundu	2	2	2	2	1	1	2	2	1	1	2	2	2	2	2	2	1
54	Thonugal	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
55	Thoombakulam	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
56	Thoppur	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
57	Tirumal	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1
58	Ulagani	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
59	Vadakarai	2	2	2	2	1	1	2	2	1	1	2	2	2	1	1	1	1
60	Vadakkupuliampatti	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
61	Vaiyampatti	2	2	2	2	1	1	2	2	1	1	2	2	2	2	2	2	1
62	Vakkanangundu	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1
63	Valayankulam	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	2	1
64	Vellakulam (K)	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
65	Vellakulam (S)	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	1	1
66	Veppankulam	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	2	1
67	Vidathakulam	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1
68	Virusankulam	2	2	2	2	1	1	2	2	1	1	2	1	1	1	2	1	1

Abbreviations: ATM - Automatic Teller Machine; PDS - Public Distribution System (Shop); CB - Commerical Bank; RM - Regular Market; COB - Co-operative Bank; AMS - Agricultural Market Society; ACS - Agricultural Credit Societies; NC - Nutritional Centres; SHG - Self Help Group; NC-AC - Nutritional Centres - Anganwadi Centre; DBRO - Birth & Death Registration Office; PS - Power Supply
 Note - 1 - Available within the village; 2 - Not available

TABLE 3.50: EDUCATIONAL FACILITIES IN THE STUDY AREA

Sl	Village Name	PPS		PS		MS		SS		SSS		DC		EC		MC		MI		PT		VTS		SSD	
		G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
1	Achampattu	1	2	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	Achangulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	Alagianallur	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	Arasakulam	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	Arasapatti	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	Ariyanendal	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	Aviyoor	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	Chennampatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	Chinnaulagani	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	Chittumoonradaippu	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	D.Kadambankulam	1	2	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
12	Eliyarpatti	1	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	2
13	Giriyagoundanpatti	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14	Idayanathan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	Iluppakulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	Kallanai	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
17	Kalligudi	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
18	Kaluvancheri	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	Kambikudi	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2
20	Karisalkalampatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21	Karukkuvaipatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	Keelanesaneri	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
23	Kokkalancheri	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
24	Kokkulam (Thirumal)	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
25	Kombadi	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
26	Koodakovil	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
27	Kurandi	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
28	Kurayur	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
29	Maikkudi	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	Mallampatti	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
31	Mangulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
32	Maruthangudi	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
33	Melauppiligundu	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
34	Mustakurichi	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
35	Nadukottai	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
36	Nallamanaikenpatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37	Nandikundu	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

38	Nedumadurai	1	2	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
39	Nedungulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
40	Nedungulam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
41	Odaippatti	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
42	Othaiangulam	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
43	Pampatti	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
44	Panjar	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
45	Paraikulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
46	Paraippathi	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
47	Peikkulam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
48	Periya Koodakoil	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
49	Pisindi	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
50	S.Kallupatti	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
51	Saluppapillayarnatham	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
52	Sivarakottai	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
53	Sundarangundu	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
54	Thonugal	1	2	1	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
55	Thoombakulam	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
56	Thoppur	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
57	Tirumal	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
58	Ulagani	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
59	Vadakarai	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
60	Vadakkupuliampatti	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
61	Vaiyampatti	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
62	Vakkanangundu	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
63	Valayankulam	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
64	Vellakulam (K)	1	1	1	1	1	2	1	2	1	2	2	2	1	2	2	2	2	2	2	1	2	2
65	Vellakulam (S)	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
66	Veppankulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
67	Vidathakulam	1	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
68	Virusankulam	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Abbreviations: PPS-Pre Primary School; SSS-Senior Secondary School; DC-Degree School; PT-Polytechnic; PS-Primary School; G-Government; EC-Engineering College; VTS-Vocational School /ITI; MS-Middle School; P-Private; MC-Medical College; SSD-Special School For Disabled; SS-Secondary School; MI-Management College/Institute;
 Note – 1 - Available within the village; 2 - Not available

TABLE 3.51: MEDICAL FACILITIES IN THE STUDY AREA

Sl. No.	Village Name	CHC	PHC	PHSC	MCW	TBC	HA	HAM	D	VH	MHC	FWC	NGM-I/O
1	Achampattu	0	0	1	0	0	0	0	0	1	0	0	b
2	Achangulam	0	0	0	0	0	0	0	0	0	0	0	b
3	Alagianallur	0	0	1	0	0	0	0	0	0	0	0	b
4	Arasakulam	0	0	1	0	0	0	0	0	0	0	0	a
5	Arasapatti	0	0	1	0	0	0	0	0	0	0	0	
6	Ariyanendal	0	0	0	0	0	0	0	0	0	0	0	b
7	Aviyoor	0	0	1	0	0	0	0	0	0	0	0	b
8	Chennampatti	0	0	0	0	0	0	0	0	0	0	0	b
9	Chinnaulagani	0	0	0	0	0	0	0	0	0	0	0	b
10	Chittumoonradaippu	0	0	1	0	0	0	0	0	0	0	0	c
11	D.Kadambankulam	0	0	1	0	0	0	0	0	0	0	0	b
12	Eliyarpatti	0	0	0	0	0	0	0	0	0	0	0	b
13	Giriyagoundanpatti	0	0	0	0	0	0	0	0	0	0	0	a
14	Idayanathan	0	0	0	0	0	0	0	0	0	0	0	b
15	Iluppakulam	0	0	0	0	0	0	0	0	0	0	0	a
16	Kallanai	0	0	0	0	0	0	0	0	0	0	0	
17	Kalligudi	1	1	1	1	1	0	0	1	0	0	1	b
18	Kaluvancheri	0	0	0	0	0	0	0	0	0	0	0	c
19	Kambikudi	0	0	1	0	0	0	0	0	0	0	0	b
20	Karisalkalampatti	0	0	0	0	0	0	0	0	0	0	0	b
21	Karukkuvaiyapatti	0	0	0	0	0	0	0	0	0	0	0	a
22	Keelanesaneri	0	0	0	0	0	0	0	0	0	0	0	b
23	Kokkalancheri	0	0	1	1	0	0	0	0	1	0	0	b
24	Kokkulam (Thirumal)	0	0	0	0	0	0	0	0	0	0	0	a
25	Kombadi	0	0	0	0	0	0	0	0	0	0	0	b
26	Koodakovil	0	1	1	1	1	0	0	1	1	0	1	b
27	Kurandi	0	0	0	0	0	0	0	0	0	0	0	b
28	Kurayur	0	0	1	0	0	0	0	0	0	0	0	a
29	Maikkudi	0	0	0	0	0	0	0	0	0	0	0	a
30	Mallampatti	0	0	0	0	0	0	0	0	0	0	0	a
31	Mangulam	0	0	0	0	0	0	0	0	0	0	0	b
32	Maruthangudi	0	0	1	0	0	0	0	0	0	0	0	b
33	Melauppiligundu	0	0	0	0	0	0	0	0	0	0	0	
34	Mustakurichi	0	1	1	1	1	0	0	1	0	0	1	
35	Nadukottai	0	0	0	0	0	0	0	0	0	0	0	b
36	Nallamanaikenpatti	0	0	0	0	0	0	0	0	0	0	0	b
37	Nandikundu	0	0	0	0	0	0	0	0	0	0	0	a
38	Nedumadurai	0	0	1	0	0	0	0	0	0	0	0	c

39	Nedungulam	0	0	0	0	0	0	0	0	0	0	0	b
40	Nedungulam	0	0	0	0	0	0	0	0	0	0	0	
41	Odaippatti	0	0	1	0	0	0	0	0	0	0	0	b
42	Othaialangulam	0	0	0	0	0	0	0	0	0	0	0	b
43	Pampatti	0	0	0	0	0	0	0	0	0	0	0	b
44	Panjar	0	0	0	0	0	0	0	0	0	0	0	c
45	Paraikulam	0	0	0	0	0	0	0	0	0	0	0	b
46	Paraippathi	0	0	0	0	0	0	0	0	0	0	0	b
47	Peikkulam	0	0	0	0	0	0	0	0	0	0	0	b
48	Periya Koodakoil	0	0	0	0	0	0	0	0	0	0	0	b
49	Pisindi	0	0	1	0	0	0	0	0	0	0	0	b
50	S.Kallupatti	0	0	0	0	0	0	0	0	0	0	0	b
51	Saluppapillayarnatham	0	0	1	0	0	0	0	0	0	0	0	
52	Sivarakottai	0	0	1	0	0	0	0	0	1	0	0	b
53	Sundarangundu	0	0	0	0	0	0	0	0	0	0	0	b
54	Thonugal	0	0	0	0	0	0	0	0	0	0	0	a
55	Thoombakulam	0	0	0	0	0	0	0	0	0	0	0	a
56	Thoppur	0	0	0	0	0	0	0	0	0	0	0	c
57	Tirumal	0	0	1	0	0	0	0	0	0	0	0	b
58	Ulagani	0	0	0	0	0	0	0	0	0	0	0	a
59	Vadakarai	0	0	0	0	0	0	0	0	0	0	0	b
60	Vadakkupuliampatti	0	0	1	0	0	0	0	0	0	0	0	b
61	Vaiyampatti	0	0	0	0	0	0	0	0	0	0	0	b
62	Vakkanangundu	0	0	0	0	0	0	0	0	0	0	0	a
63	Valayankulam	0	0	0	0	0	0	0	0	0	0	0	
64	Vellakulam (K)	0	0	1	0	0	0	0	0	0	0	0	a
65	Vellakulam (S)	0	0	0	0	0	0	0	0	0	0	0	a
66	Veppankulam	0	0	0	0	0	0	0	0	0	0	0	b
67	Vidathakulam	0	0	0	0	0	0	0	0	1	0	0	b
68	Virusankulam	0	0	0	0	0	0	0	0	0	0	0	b

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

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

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

3.6.6 Recommendation and Suggestion

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

3.6.7 Summary & Conclusion

The socio-economic study of surveyed villages 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 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.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 GENERAL

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

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

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

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail

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

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

4.1 LAND ENVIRONMENT:

4.1.2 Anticipated Impact

Permanent or temporary change on land use and land cover.

- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

4.1.2 Common Mitigation Measures

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

4.1.3 Soil Environment

The proposed project area is covered by thin layer of gravel formation and the average thickness is about 2 m – 3 m, the excavated gravel will be dumped sold to needy customers in open market.

4.1.4 Impact on Soil Environment

Erosion and Sedimentation (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

4.1.5 Common Mitigation Measures

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

4.1.6 Waste Dump Management

There is no waste anticipated in this Rough Stone quarrying operation. The entire quarried out materials will be utilized (100%).

4.2 WATER ENVIRONMENT

4.2.1 Anticipated Impact

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

Detail of water requirements in KLD as given below:

TABLE 4.1: WATER REQUIREMENTS

*Purpose	Quantity	Source
Dust Suppression	0.9 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Green Belt development	0.8 KLD	Rainwater accumulated in Mine Pit/ Water Tanker
Domestic purpose	0.4 KLD	Water Tankers
Total		2.1 KLD

* Water for drinking purpose will be brought from approved water vendors
Source: Approved Mining Plan Pre-Feasibility Report

4.2.2 Common Mitigation Measures

- Garland drain, settling tank will be constructed along the proposed mining lease area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.

- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
 - Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages.
 - Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits.
 - Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
- De-silting will be carried out before and immediately after the monsoon season.
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

4.3.1. Anticipated Impact

- During mining, at various stages activities such as excavation, drilling, blasting, 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.

4.3.1.1. Modelling of Incremental Concentration

Wind erosion of the exposed areas and the air borne particulate matter generated by quarrying operation, and transportation are mainly PM₁₀ & PM_{2.5} and emissions of Sulphur dioxide (SO₂) & Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are the cause of air pollution in the project area.

Similarly, loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles causes of pollution. This leads to an impact on the ambient air environment around the project area.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using AERMOD Software.

The impact on Air Environment is due to the mining and allied activities during Land Development phase, Mining process and Transportation. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) due to excavation/loading equipment and vehicles plying on haul roads are marginal. Loading - unloading and transportation of Rough Stone, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air of the area. Prediction of impacts on air environment has been carried out taking into consideration cumulative production three proposed quarries. Air environment and net increase in emissions by Open pit source modelling in AERMOD Software.

4.3.2.1 Emission Estimation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER =overall emission reduction efficiency, %

The proposed mining activity includes various activities like ground preparation, excavation, handling and transport of Rough Stone. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 4-2.

TABLE 4.2: ESTIMATED EMISSION RATE FOR PM₁₀

Activity	Source type	Value	Unit
		P1	
Drilling	Point Source	0.108745709	g/s
Blasting	Point Source	0.003678537	g/s
Mineral Loading	Point Source	0.046191091	g/s
Haul Road	Line Source	0.002505285	g/s/m
Overall Mine	Area Source	0.077277090	g/s

TABLE 4.3: ESTIMATED EMISSION RATE FOR SO₂

Activity	Source type	Value	Unit
		P1	
Overall Mine	Area Source	0.001633718	g/s

TABLE 4.4: ESTIMATED EMISSION RATE FOR NO_x

Activity	Source type	Value	Unit
		P1	
Overall Mine	Area Source	0.000167118	g/s

4.3.2 Frame work of Computation & Model details

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

Impact was predicted over the distance of 10 km around the source to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM₁₀ was observed close to the source due to low to moderate wind speeds. Incremental value of PM₁₀ was superimposed on the base line data monitored at the proposed site to predict total GLC of PM₁₀ due to combined impacts.

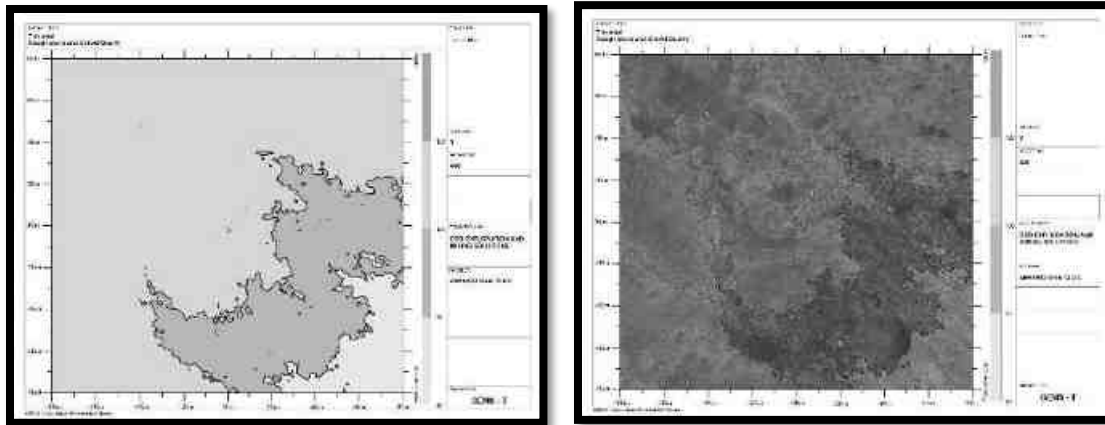
FIGURE 4.1: AERMOD TERRAIN MAP

FIGURE 4.2: PREDICTED INCREMENTAL CONCENTRATION OF PM₁₀

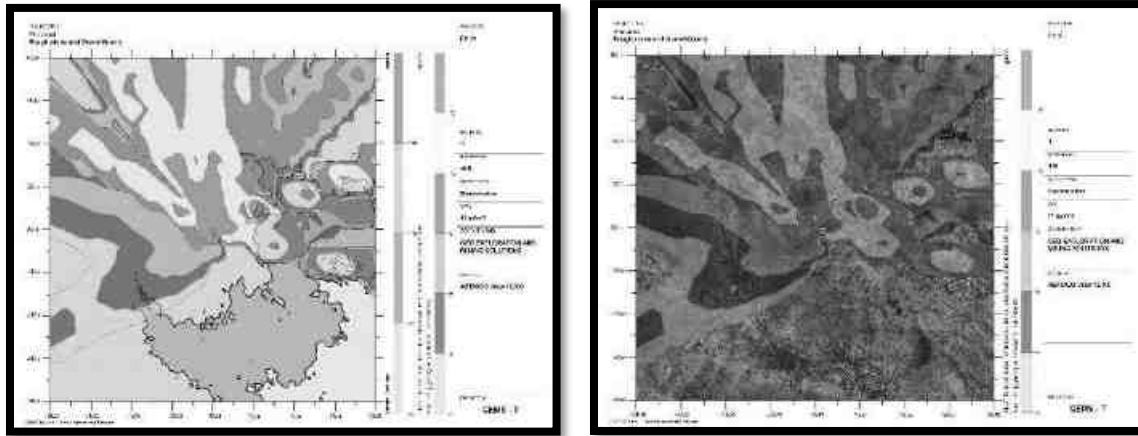


FIGURE 4.3: PREDICTED INCREMENTAL CONCENTRATION OF SO₂

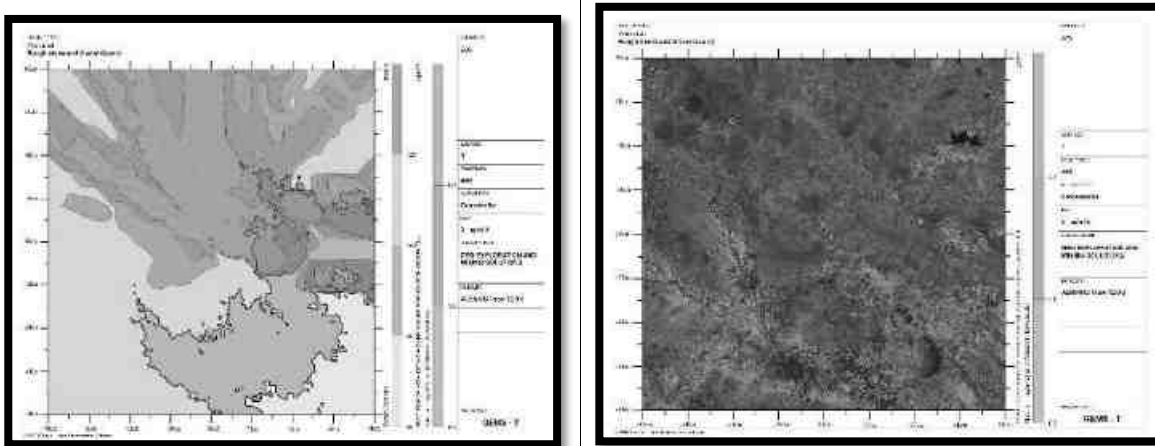


FIGURE 4.4: PREDICTED INCREMENTAL CONCENTRATION OF NO_x

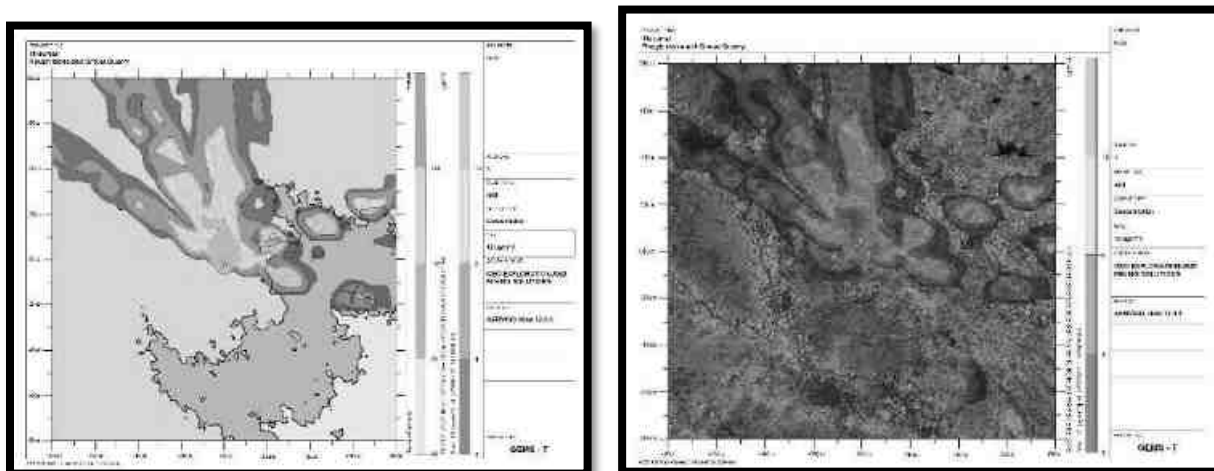
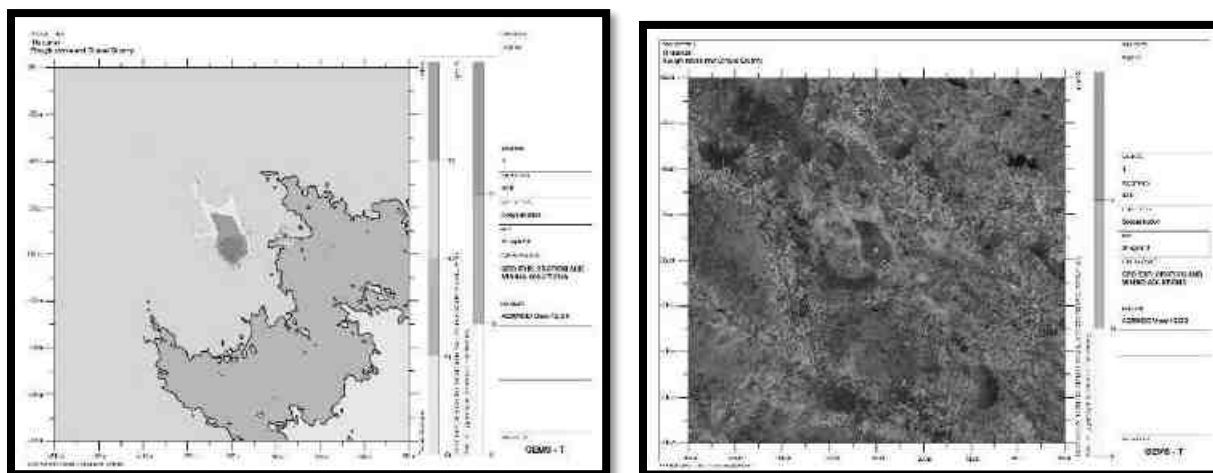


FIGURE 4.5: PREDICTED INCREMENTAL CONCENTRATION OF FUGITIVE DUST

4.3.2.1 Model Results

The post project Resultant Concentrations of PM₁₀, PM_{2.5}, SO₂& NO_x (GLC) is given in Table below:

TABLE 4.5: INCREMENTAL & RESULTANT GLC OF PM₁₀

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM ₁₀ (µg/m ³)	Incremental value of PM ₁₀ duev to mining (µg/m ³)	Total PM ₁₀ (µg/m ³)
AAQ1	9°42'38.19"N 78° 2'46.12"E	-13	107	46	17.70	63.7
AAQ2	9°42'19.27"N 78° 2'57.59"E	341	-478	43.5	0	43.5
AAQ3	9°43'5.41"N 78° 3'12.32"E	789	954	41.8	16.00	57.8
AAQ4	9°40'53.84"N 78° 0'47.55"E	-3655	-3134	43.1	5.19	48.29
AAQ5	9°45'9.39"N 78° 0'35.32"E	-4030	4799	43.1	11.00	54.1
AAQ6	9°42'42.52"N 78° 5'5.45"E	4268	248	42.3	13.42	55.72
AAQ7	9°39'16.42"N 78° 3'52.37"E	2027	-6151	43.8	0	43.8

TABLE 4.6: INCREMENTAL & RESULTANT GLC OF PM_{2.5}

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline PM _{2.5} (µg/m ³)	Incrementalvalue of PM _{2.5} due to mining (µg/m ³)	Total PM _{2.5} (µg/m ³)
AAQ1	9°42'38.19"N 78° 2'46.12"E	-13	107	23.7	9.84	33.54
AAQ2	9°42'19.27"N 78° 2'57.59"E	341	-478	21.2	2.50	23.70

AAQ3	9°43'5.41"N 78° 3'12.32"E	789	954	18.9	9.38	28.28
AAQ4	9°40'53.84"N 78° 0'47.55"E	-3655	-3134	19.0	3.90	22.90
AAQ5	9°45'9.39"N 78° 0'35.32"E	-4030	4799	20.4	6.81	27.21
AAQ6	9°42'42.52"N 78° 5'5.45"E	4268	248	19.2	8.00	27.20
AAQ7	9°39'16.42"N 78° 3'52.37"E	2027	-6151	18.2	0	18.2

TABLE 4.7: INCREMENTAL & RESULTANT GLC OF SO₂

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline SO ₂ (µg/m ³)	Incremental value due to mining (µg/m ³)	Total SO ₂ (µg/m ³)
AAQ1	9°42'38.19"N 78° 2'46.12"E	-13	107	7	3.46	10.46
AAQ2	9°42'19.27"N 78° 2'57.59"E	341	-478	6.7	0	6.7
AAQ3	9°43'5.41"N 78° 3'12.32"E	789	954	6.6	3.21	9.81
AAQ4	9°40'53.84"N 78° 0'47.55"E	-3655	-3134	6.5	0	6.5
AAQ5	9°45'9.39"N 78° 0'35.32"E	-4030	4799	7.4	1.92	9.32
AAQ6	9°42'42.52"N 78° 5'5.45"E	4268	248	7.4	3.06	10.46
AAQ7	9°39'16.42"N 78° 3'52.37"E	2027	-6151	6.9	0	6.9

TABLE 4.8: INCREMENTAL & RESULTANT GLC OF NO_x

Station Code	Location	X Coordinate (m)	Y Coordinate (m)	Average Baseline NO _x (µg/m ³)	Incremental value due to mining (µg/m ³)	Total NO _x (µg/m ³)
AAQ1	9°42'38.19"N 78° 2'46.12"E	-13	107	21.7	12.00	33.7
AAQ2	9°42'19.27"N 78° 2'57.59"E	341	-478	22.8	0	22.8
AAQ3	9°43'5.41"N 78° 3'12.32"E	789	954	20.8	7.89	28.69
AAQ4	9°40'53.84"N 78° 0'47.55"E	-3655	-3134	20.3	0	20.3
AAQ5	9°45'9.39"N 78° 0'35.32"E	-4030	4799	22.8	0	22.8
AAQ6	9°42'42.52"N 78° 5'5.45"E	4268	248	21.7	4.67	26.37
AAQ7	9°39'16.42"N 78° 3'52.37"E	2027	-6151	20.3	0	20.3

TABLE 4.9: INCREMENTAL & RESULTANT GLC OF FUGITIVE DUST

Station Code	Location	X Coordinate	Y Coordinate	Average Baseline	Incremental	Total Fugitive
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		(m)	(m)	Fugitive ($\mu\text{g}/\text{m}^3$)	value due to mining ($\mu\text{g}/\text{m}^3$)	Dust ($\mu\text{g}/\text{m}^3$)
AAQ1	9°42'38.19"N 78° 2'46.12"E	-13	107	64.62	31	95.62
AAQ2	9°42'19.27"N 78° 2'57.59"E	341	-478	64.04	0	64.04
AAQ3	9°43'5.41"N 78° 3'12.32"E	789	954	67.30	0	67.30
AAQ4	9°40'53.84"N 78° 0'47.55"E	-3655	-3134	61.85	0	61.85
AAQ5	9°45'9.39"N 78° 0'35.32"E	-4030	4799	67.84	0	67.84
AAQ6	9°42'42.52"N 78° 5'5.45"E	4268	248	66.44	0	66.44
AAQ7	9°39'16.42"N 78° 3'52.37"E	2027	-6151	64.42	0	64.42

4.3.4. Common Mitigation Measures

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

Advantages of Wet Drilling: -

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

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation –

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

- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

Green Belt –

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

Occupational Health –

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

4.4 NOISE ENVIRONMENT

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

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

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves, which are propagated outwards from the source through the air at a speed of 1,100 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 model based on first principle.

$$L_{p2} = L_{p1} - 20 \log (r_2/r_1) - A_{e1,2}$$

Where:

L_{p1} & L_{p2} are sound levels at points located at distances r_1 & r_2 from the source.

$A_{e1,2}$ is the excess attenuation due to environmental conditions. Combined effect of all sources can be determined at various locations by logarithmic addition.

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

4.4.1 Anticipated Impact

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

- Source data
- Receptor data
- Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4-8.

TABLE 4.10: ACTIVITY AND NOISE LEVEL PRODUCED BY MACHINERY

Sl.No.	Machinery / Activity	Impact on Environment?	Noise Produced in dB(A) at 50 ft from source*
1	Blasting	Yes	94
2	Jack Hammer	Yes	88
3	Compressor	No	81
4	Excavator	No	85
5	Tipper	No	84
Total Noise Produced			95.8

*50 feet from source = 15.24 meters

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

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

TABLE 4.11: PREDICTED NOISE INCREMENTAL VALUES

Location ID	N1	N2	N3	N4	N5	N6	N7
Maximum Monitored Value (Day) dB(A)	43.1	42.4	39.9	40.3	39.8	40.2	40.2
Incremental Value dB(A)	41.0	43.5	40.7	39.5	40.8	41.3	41.9
Total Predicted Noise level dB(A)	47.8	45.5	43.9	42.7	43.1	42.4	43.5

The incremental noise level is found within the range of 47.8 dB (A) in Core Zone and 42.4 – 45.5 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations are within permissible limits of Industrial area (core zone) & Residential area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette

of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.).

4.4.2 Common Mitigation Measures

The following noise mitigation measures are proposed for control of Noise

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects

4.4.3 Ground Vibrations

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

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

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

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

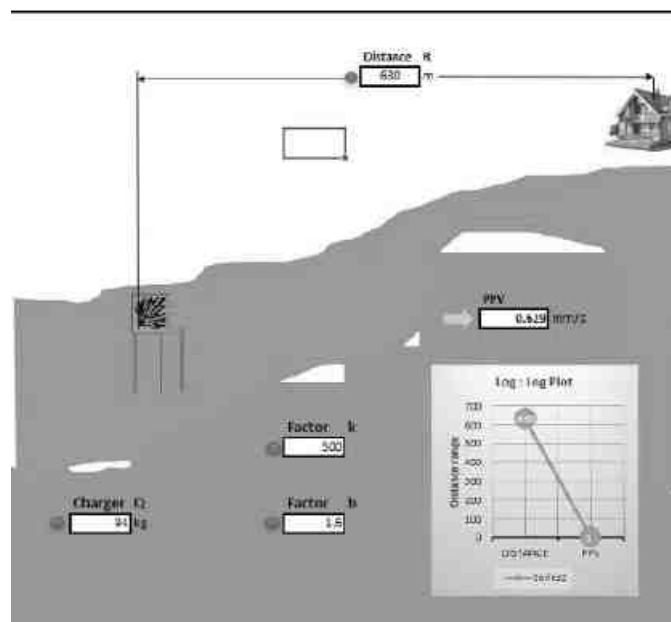
Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 4.12: PREDICTED PPV VALUES DUE TO BLASTING

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	94 (4 rounds)	630	0.629

FIGURE 4.6: GROUND VIBRATION PREDICTION

From the above graph, the charge per blast of 25 kg is well below the Peak Particle Velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the project proponent ensure that the charge per blast shall be less than 100 kg and carry out blasting twice or thrice a day based on the onsite conditions under the supervision of competent person employed. However, as per statutory requirement control measures will be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.4.3.1 Common Mitigation Measures

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

-
- Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire.
 - The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used.
 - The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects.
 - Appropriate blasting techniques shall be adopted such that the predicted peak particle velocity shall not exceed 8 Hz.
 - Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

4.5 ECOLOGY AND BIODIVERSITY

4.5.1 Impact on Ecology and Biodiversity

The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics, mining activities generally result in the deforestation, land degradation, water, air and noise pollution which directly or indirectly affect the faunal and floral status of the project area. However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved. Impact prediction is the main footstep in impact evaluation and identifies project actions that are likely to bring significant changes in the project environment. The present study was carried out to predict the likely impacts of the proposed project at Thirumal village and the surrounding environment with special reference to biological attributes covering habitats/ecosystems and associated biodiversity.

The proposed mining activities include removal of some scattered bushes and other thorny species. Although impacts on key habitat elements will occur on a local scale, but on a regional scale they would not be critical for the life cycle needs of the species observed or expected. Moreover, during conceptual stage, the mined-out areas on 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. Wild life is not commonly found in the project area and its immediate environs because of lack of vegetal cover and surface water. Except few domestic animals, reptiles, hares and some common birds are observed in the study area.

- I. None of the plants will be cut during operational phase of the mine.
- II. 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.
- III. 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

4.5.2 Common Mitigation Measures

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species. The details of year wise proposed plantation program are given in Table 4.13.

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 in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

The objectives of the green belt cover will cover the following:

- Noise abatement
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

4.5.2.2.1. Species Recommendation for Plantation granted in the District

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

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

TABLE 4.13: RECOMMENDED SPECIES FOR GREENBELT DEVELOPMENT PLAN

S. No	Scientific name	Tamil Name
1	Aegle marmelos	Vilva maram
2	Albizia lebbeck	Vaagai maram
3	Cassia fistula	Konrai tree
4	Lanea coromandelica	Othiyam
5	Limonia acidissima	Vila maram
6	Syzygium cumini	Naval maram
7	Toona ciliata	Santhana Vembu
8	Ficus hispida	Aththi maram
9	Borassus flabellifer	Panai-maram
10	Madhuca longifolia	Illupai maram

The 7.5m Safety distance along the boundary has been identified to be utilized for subsequent Afforestation. However, the afforestation should always be carried out in a systematic and scientific manner. Regional trees like Neem, Pongamia, Pinnata, and Vilvam will be planted along the Lease boundary and avenue plantation will be carried out in respective proposed projects. The rate of survival expected to be 80% in this area. Afforestation Plan is given in Table No.4.13 and budget of green belt development plan are given in Table No.4.14.

TABLE 4.14: GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Survial %	Name of the species
I	2400	80%	Neem, Pongamia,Pinnata, Vilvam etc.,,

TABLE 4.15: BUDGET FOR GREENBELT DEVELOPMENT PLAN

Activity	Year					Cost	Total Cost
	I	II	III	IV	V		
Plantation in Nos	2400					@ 200 Rs/ Saplings including maintenance	Rs 4,80,000
Plantation cost	4,80,000						
Renovation of Wire Fencing (1200 meters)	3,60,000					@ 300Rs per meter	Rs 3,60,000
Renovation of Garland Drain (1100 meters)	3,30,000					@ 300Rs per meter	Rs 3,30,000
TOTAL							Rs 11,70,000

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

4.5.3. Anticipated Impact on Fauna

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

4.5.3.1. Measures for protection and conservation of wildlife species

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

4.5.3.2. Mitigation Measures

- All the preventive measures will be taken for growth & development of fauna.
- Creating and development awareness for nature and wildlife in the adjoin villages.

- The workers shall be trained to not harm any wildlife, should it come near the project site. No work shall be carried out after 6.00 pm.

4.5.4. Impact on Aquatic Biodiversity

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

4.5.5. Impact Assessment on Biological Environment

A detail of impact and assessments was mentioned in Table No 4.15.

TABLE 4.16: ECOLOGICAL IMPACT ASSESSMENTS

SI.No	Attributes	Assessment
1	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	NO Reserve Forest within 10 km Radius.
2	Proposed mining project impact surface water quality that also provide water to wildlife	'NO' 'scheduled or threatened wildlife animal sighted regularly core in core area.
3	Located near an area populated by rare or endangered species	NO endangered, critically endangered, vulnerable species sighted in core mining lease area.
4	Proposed project restricts access to waterholes for wildlife	'NO'
5	Project likely to affect migration routes	'NO' 'migration route observed during monitoring period.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management such as garland drains is proposed to be constructed, so there will be no siltation nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	'NO'
8	Activities of the project affects the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in mining lease site. The fauna sighted mostly migrated from buffer area.
9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	'NO'
10	The project release effluents into a water body that also supplies water to a wildlife	No water body near to core zone so chances of water become polluted is low.
11	The project likely to affect wetlands, Fish breeding grounds, marine ecology	'NO'. Wetland was not present in near core Mining lease area. No breeding and nesting ground present in core mining area.
12	Project likely to affect flora of an area, which have medicinal value	'NO'

13	Forestland is to be diverted, has carbon high sequestration	'NO 'There was no forest land diverted.
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TABLE 4.17: ANTICIPATED IMPACT OF ECOLOGY AND BIODIVERSITY

Sl. No	Aspect Description	Likely Impacts on Ecology and Biodiversity (EB)	Impact Consequence - Probability Description / Justification	Significance	Mitigation Measures
Pre-Mining Phase					
1	Uprooting of vegetation of lease area	Site specific loss of common floral diversity (Direct impact)	Site possesses common floral (not trees) species. Clearance of these species will not result in loss of flora	Less severe	No immediate action required. However, Greenbelt /plantation will be developed in project site and in periphery of the project boundary, which will improve flora and fauna diversity of the project area.
		Site specific loss of associated faunal diversity (Partial impact)	Site supports only common species, which use wide variety of habitats of the buffer zone reserve forest area. So, there is no threat of faunal diversity.		
		-Loss of Habitat (Direct impact)	Site does not form Unique / critical habitat structure for unique flora or fauna.		
Mining phase					
2	Excavation of mineral using machine and labours, Transportation activities will generate noise.	Site-specific disturbance to normal faunal movements at the site due to noise. (Partial impact)	Site does not form unique / critical habitat structure for unique flora or fauna.	Less severe	Mining activity should not be operated after 5PM. Excavation of dump and transportation work should stop before 7PM.
3	Vehicular Movement for transportation of materials will result in generation of dust (SPM) due to haul roads and emission	Impact on surrounding agriculture and associated fauna due to deposition of dust and	Impact is less as the agricultural land far from core area.	Less severe	All vehicles will be certified for appropriate Emission levels. More plantation has been suggested

	of SO ₂ , NO ₂ , CO etc.	Emission of CO. (Indirect impact)			Upgrade the vehicles with alternative fuel such as biodiesel, methanol and biofuel around the mining area.
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4.6 SOCIO ECONOMIC

4.6.1 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

4.6.2 Common Mitigation Measures

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

4.7 OCCUPATIONAL HEALTH AND SAFETY

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

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

4.7.1 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

4.7.2 Noise

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

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

4.7.3 Physical Hazards

The following measures are proposed for control of physical hazards

- Specific personnel training on work-site safety management will be taken up;
- Work site assessment will be done by rock scaling of each surface exposed to workers to prevent accidental rock falling and / or landslide, especially after blasting activities;
- 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

4.7.4 Occupational Health Survey

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

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

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment.

First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.8 MINE WASTE MANAGEMENT

No waste is anticipated from any of the proposed quarry.

4.9 MINE CLOSURE

Mine closure plan is the most important environmental requirement in 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. Therefore, progressive mine closure plan should be specifically dealt with in the mining plan and is to be reviewed along with mining plan. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of

scientific mining have included most of the activities to be included in the closure plan. While formulating the closure objectives for the site, it is important to consider the existing or the pre-mining land use of the site; and how the operation will affect this activity.

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

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

4.9.1 Mine Closure Criteria

The criteria involved in mine closure are discussed below:

4.9.1.1 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.,

4.9.1.2 Chemical Stability

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

4.9.1.3 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 mine plan and activities of closure shall be carried out as per the process described in mine closure plan.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 INTRODUCTION

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

5.2 FACTORS BEHIND THE SELECTION OF PROJECT SITE

Thiru D. Sakthivel Rough Stone and gravel quarry Project at Thirumal Village is a mining project for excavation of Rough Stone, which is site specific. All the proposed mining lease areas have following advantages: -

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

5.3 ANALYSIS OF ALTERNATIVE SITE

No alternatives are suggested as all the mine sites are mineral specific

5.4 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY

Mechanized open cast mining operation with drilling and blasting method will be used to extract Rough Stone in the area. All the applied mining lease areas have following advantages –

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

5.5 ANALYSIS OF ALTERNATIVE TECHNOLOGY

Open cast mechanized method has been selected for these projects. 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.

6. 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 as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting 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 projects; 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 all the proposed quarries.

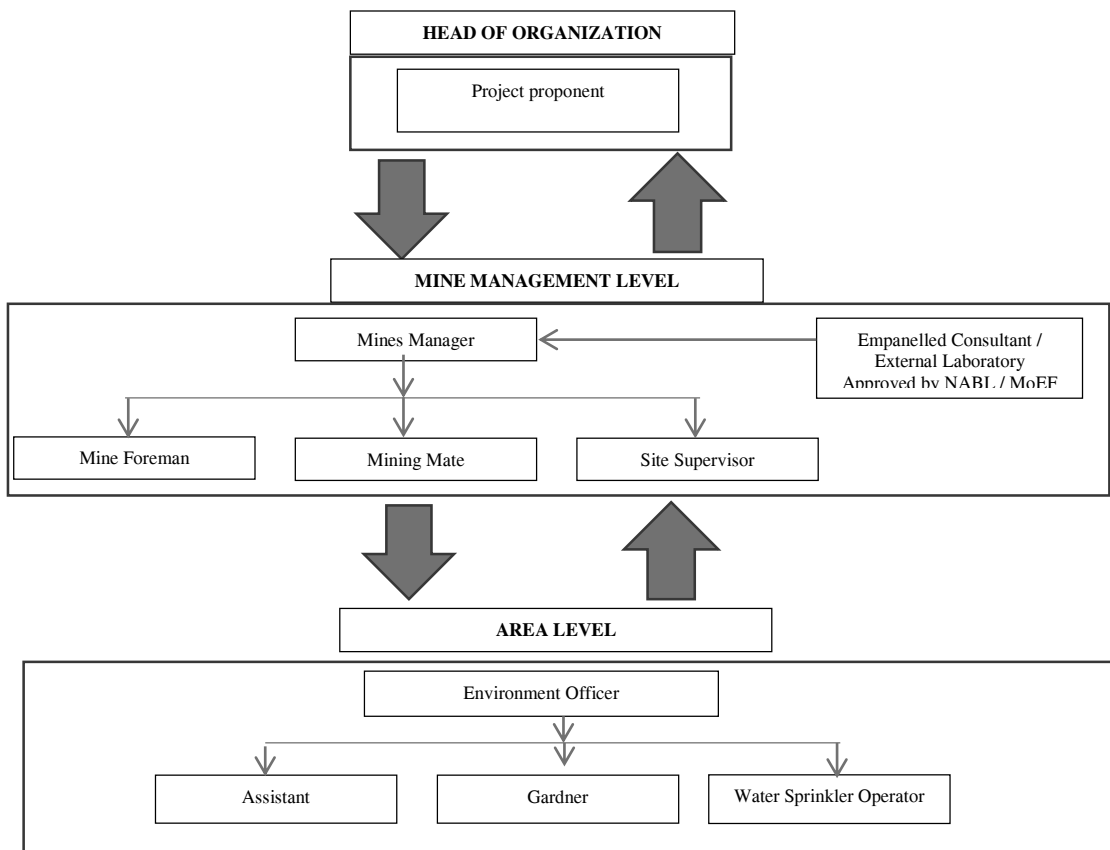
The responsibilities of this cell will be:

- 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 each proposed project proponent. The half-yearly reports are submitted to Ministry of Environment and Forest, Regional Office and SEIAA 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).

FIGURE 6.1: PROPOSED ENVIRONMENTAL MONITORING CELL



* The Environmental Monitoring Cell will be formed in all the proposed projects

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures proposed in Chapter-4 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

Sl 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 monitoring is detailed in Table 6.2

TABLE 6.2: PROPOSED MONITORING SCHEDULE POST EC

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 bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

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

6.4 BUDGETARY PROVISION FOR EMP

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

The proposed capital cost for Environmental Monitoring Programme is Rs 76,000/- and the recurring cost is Rs 76,000/- per annum for each Proposed Project.

TABLE 6.3 ENVIRONMENT MONITORING BUDGET

Sl.No.	Parameter	Capital Cost	Recurring Cost per annum
1	Air Quality	Rs. 76,000/-	Rs. 76,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
Total		Rs 76,000/-	Rs 76,000/-

Source: Approved Mining Plan

6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to: -

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

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

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

7. 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
- Cumulative Impact Study
- Plastic Waste Management

7.1. PUBLIC CONSULTATION

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

7.2 RISK ASSESSMENT

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

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for all proposed projects. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

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

TABLE 7.1 RISK ASSESSMENT& CONTROL MEASURES

S. No	Risk factors	Causes of risk	Control measures
1	Accidents due to explosives and heavy mining machineries	Improper handling and unsafe working practice	All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations; Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited;

			<p>Fire-fighting and first-aid provisions in the mine office complex and mining area;</p> <p>Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use</p> <p>Working of quarry, as per approved plans and regularly updating the mine plans;</p> <p>Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut;</p> <p>Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager;</p> <p>Maintenance and testing of all mining equipment as per manufacturer 's guidelines.</p>
2	Drilling	<p>Improper and unsafe practices</p> <p>Due to high pressure of compressed air, hoses may burst</p> <p>Drill Rod may break</p>	<p>Safe operating procedure established for drilling (SOP) will be strictly followed.</p> <p>Only trained operators will be deployed.</p> <p>No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places,</p> <p>Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</p> <p>Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual.</p> <p>All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</p> <p>Operator shall regularly use all the personal protective equipment.</p>
4	Blasting	<p>Fly rock, ground vibration, Noise and dust.</p> <p>Improper charging, stemming & Blasting/ fining of blast holes</p> <p>Vibration due to movement of vehicles</p>	<p>Restrict maximum charge per delay as per regulations and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blasting can be conducted safely.</p> <p>SOP for Charging, Stemming & Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation</p> <p>Shots are fired during daytime only.</p> <p>All holes charged on any one day shall be fired on the same day.</p> <p>The danger zone will be distinctly demarcated (by means of red flags)</p>

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

Source: Analysed and Proposed by FAE & EC

7.3 DISASTER MANAGEMENT PLAN

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

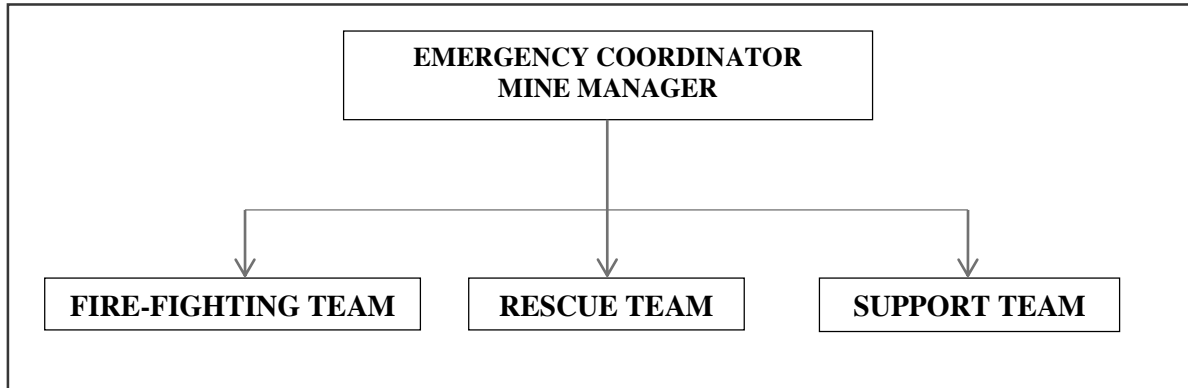
The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

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

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

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

FIGURE 7.1: DISASTER MANAGEMENT TEAM LAYOUT



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

TABLE 7.2: PROPOSED TEAMS TO DEAL WITH EMERGENCY SITUATION

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

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

Roles and responsibilities of emergency team –

(a) Emergency coordinator (EC)

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

(b) Incident controller (IC)

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

(c) Communication and advisory team

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

(d) Roll call coordinator

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

(e) Search and rescue team

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

(f) Emergency security controller

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

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

Proposed fire extinguishers at different locations –

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

TABLE 7.3: PROPOSED FIRE EXTINGUISHERS AT DIFFERENT LOCATIONS

LOCATION	TYPE OF FIRE EXTINGUISHERS
Electrical Equipment's	CO ₂ type, foam type, dry chemical powder type
Fuel Storage Area	CO ₂ type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

Alarm system to be followed during disaster –

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

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

- All safety precautions and provisions of Metalliferous Mines Regulations (MMR), 1961 is strictly followed during all mining operations.
- Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- Entry of unauthorized persons into mine & allied areas is completely prohibited.

- Fire-fighting and first-aid provisions in the mines office complex and mining area are provided.
- Provisions of all the safety appliances such as safety boot, helmets, goggles, dust masks, ear plugs and ear muffs etc. are made available to the employees and the use of same is strictly adhered to through regular monitoring.
- Training and refresher courses for all the employees working in hazardous premises.
- Working of mine, as per approved plans and regularly updating the mine plans.
- Cleaning of mine faces is regularly done.
- Handling of explosives, charging and blasting are carried out only by qualified persons following SOP.
- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Provision of high-capacity standby pumps with generator sets with enough quantity of diesel for emergency pumping especially during monsoon.
- A blasting SIREN is used at the time of blasting for audio signal.
- Before blasting and after blasting, red and green flags are displayed as visual signals.
- Warning notice boards indicating the time of blasting and NOT TO TRESPASS are displayed at prominent places.
- Regular maintenance and testing of all mining equipment were carried out as per manufacturer's guidelines.

7.4 CUMULATIVE IMPACT STUDY

For easy representation of Proposed and Existing Quarries in the Cluster are given unique codes and identifies and studied in this EIA/EMP Report.

TABLE 7.4: LIST OF QUARRIES WITHIN 500 METER RADIUS

PROPOSED QUARRY				
CODE	Name of the Owner	S.F. Nos	Extent	Status
P1	Thiru. D. Sakthivel, S/o. Durairaj, No.15, Melaratha Veethi, Thirupparankundram, Madurai District - 625 005.	217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B	4.75.01 ha	ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024.
TOTAL			4.75.01 ha	
EXISTING QUARRY				
CODE	Name of the Owner	S.F. No & Village	Extent	Status
E1	Thiru. D. Sakthivel,	14/2F,14/2G,14/4E,14/3B	3.49.22 ha	Lease Period –

	S/o. Durairaj, No.15, Melaratha Veethi, Thirupparankundram, Madurai District - 625 005.	etc.. & Kurayur (Bit-1)		09.10.2020 – 08.10.2025
TOTAL			3.49.22 ha	
TOTAL CLUSTER EXTENT			8.24.23ha	

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

TABLE 7.5: SALIENT FEATURES OF PROPOSAL -P1

Name of the Project	Thiru. D.Sakthivel Rough Stone & Gravel Quarry	
S.F. No.	217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B	
Extent	4.75.01 ha	
Village Taluk and District	Thirumal Village, Kallikudi Taluk, Madurai District.	
Land Type	patta land	
Land Ownership	It is a Patta lands. S.F.Nos 217/2A & 217/2B Registered in the name of Thiru.Duraigiopalasamy,S/o, Thalapathy vide Patta No.3418 & 3436 and other S.F.Nos are Registered in the name of Tmt.D.Dhanalakshmi,W/o, T.Duraigopalasamy vide Patta No.3051,3325 & 3063 . the applicant has obtained consent from the Pattadhar for the period of 10 years.	
Toposheet No	58-K/02	
Latitude between	09°42'26.88"N to 09°42'38.86"N	
Longitude between	78°02'42.36"E to 78°02'50.07"E	
Highest Elevation	127 m AMSL	
Lease Period	Ten years	
Mining Plan Period	Ten years	
Proposed Depth of Mining	47 m bgl (2m Gravel +45m Roughstone)	
Geological Resources	Rough Stone in m ³	Gravel m ³
	21,37,545	95,002
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	6,53,795	69,908
Proposed Quantity of Production for this Mining Plan Period First Five Years	5,21,325	69,908
Proposed Quantity of Production for this Mining Plan Period Second Five Years	1,32,470	-
Peak Production	1,18,575	30,436
Ultimate Pit Dimension	108 m (L) * 107 m (W) * 47 m (D) Below from the general ground level	

	100 m (L) * 146 m (W) * 47 m (D) Below from the general ground level	
	106 m (L) * 83 m (W) * 32 m (D) Below from the general ground level	
Water Level in the surrounds area	57m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease applied area is exhibits plain terrain. The area has gentle sloping towards south-eastern side. The altitude of the area is 127 m (max) above mean sea level. The area is covered by 2 m thickness of Gravel Formation. Massive Charnockite is found after 2 m (Gravel Formation) which is clearly inferred from the nearby existing quarrying pit.	
Machinery proposed	Jack Hammer	6Nos
	Compressor	2 Nos
	Excavator with Bucket and Rock Breaker	1 No
	Water Sprinkler	1 No
	Tippers	3 Nos
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	34 Nos	
Project Cost	Rs.3,08,19,000/-	
EMP cost	Rs. 7,60,000/-	
Total Project cost	Rs.3,15,79,000	
CER Cost	Rs 5,00,000	
Nearby Water Bodies	Odai	50m Safety SE
	Tank	370m S
	Tank	900m NW
	Gundar River	3.8Km SW
	Lake	6.4Km NE
Greenbelt Development Plan	Proposed to plant 2400 trees in the 7.5 m Safety Zone, panchayat road etc..	
Proposed Water Requirement	3.5 KLD	
Nearest Habitation	630m – North	
Nearest Reserve Forest	Kodimangalam B Block R.F – 25.17 Km – North	
Nearest Wild Life Sanctuary	Sirivilliputhur (Giant squirrel) Wildlife – 29.0km – North West	

Source: Approved Mining Plan

TABLE 7.6: SALIENT FEATURES OF PROPOSAL “E1”

Name of the Quarry	Thiru. D.Sakthivel Rough Stone Quarry Project	
Toposheet No	58-K/02	
Latitude between	09°42'24"N to 09°42'32"N	
Longitude between	78°02'29"E to 78°02'37"E	
Proposed Depth of Mining	46m bgl	
Geological Resources	Rough Stone in m ³	Gravel m ³
	13,96,480	69,824
Mineable Reserves	Rough Stone in m ³	Gravel m ³
	5,45,360	48,984
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	25 Nos	
Project Cost	Rs. 83,16,880/-	
CER Cost	Rs 5,00,000 /-	

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

Air Environment –

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.5& 7.9

TABLE 7.10: CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	PROPOSED PRODUCTION DETAILS			
	5 /10 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	6,53,795	65,379	218	18
Total	6,53,795	65,379	218	18
E1	5,45,360	1,09,072	364	30
Total	5,45,360	1,09,072	364	30
Grand Total	11,99,155	1,74,451	582	48

TABLE 7.11: CUMULATIVE PRODUCTION LOAD OF GRAVEL

PROPOSED PRODUCTION DETAILS				
Quarry	2 - 3 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
P1	69,908	23,302	78	6
Total	69,908	23,302	78	6
E1	48,984	16,328	54	5
Total	48,984	16,328	54	5
Grand Total	1,18,892	39,630	132	11

TABLE 7.11A: CUMULATIVE PRODUCTION LOAD OF WEATHERED ROCK

PROPOSED PRODUCTION DETAILS				
Quarry	2 - 3 Years in m ³	Per Year in m ³	Per Day in m ³	Number of Lorry Load Per Day
E1	90,960	30,320	101	8
Total	90,960	30,320	101	8

On a cumulative basis considering the 2 quarries it can be seen that the overall production of Rough Stone is 582 m³ per day and overall production of Gravel is 132 m³ per day with a capacity of 48 trips of Rough Stone per day and 11 Trips per day of Gravel from the cluster.

Note: Per day production of Rough Stone is calculated for 5/10 Years Lease Period and for Gravel production with 1, 2 or 3 or 5 years of production period. And the load of existing quarries is covered under existing environment of the cluster.

Based on the above production quantities the emissions due to various activities in all the 2 mines includes various activities like ground preparation, excavation, handling and transport of ore. These activities have been analysed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in Table 7.14.

TABLE 7.12: EMISSION ESTIMATION FROM QUARRIES WITHIN 500 METER RADIUS

EMISSION ESTIMATION FOR QUARRY "P1"				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.108745709	g/s
	Blasting	Point Source	0.003678537	g/s
	Mineral Loading	Point Source	0.046191091	g/s
	Haul Road	Line Source	0.002505285	g/s/m
	Overall Mine	Area Source	0.077277090	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001633718
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000167118	g/s

EMISSION ESTIMATION FOR QUARRY "E1"				
	Activity	Source type	Value	Unit
Estimated Emission Rate for PM ₁₀	Drilling	Point Source	0.111788517	g/s
	Blasting	Point Source	0.004222799	g/s
	Mineral Loading	Point Source	0.046159655	g/s
	Haul Road	Line Source	0.002505128	g/s/m
	Overall Mine	Area Source	0.068387540	g/s
	Estimated Emission Rate for SO ₂	Overall Mine	Area Source	0.001599685
Estimated Emission Rate for NO _x	Overall Mine	Area Source	0.000124132	g/s

Source: Emission Calculations

TABLE 7.13: INCREMENTAL & RESULTANT GLC WITHIN CLUSTER

PM₁₀ in µg/m³	
Location	P1
Background	46.0
Incremental	17.7
Resultant	63.70
NAAQ Norms	100 µg/m³
PM_{2.5} in µg/m³	
Location	P1
Background	23.7
Incremental	9.84
Resultant	33.54
NAAQ Norms	60 µg/m³
SO₂ in µg/m³	
Location	P1
Background	7
Incremental	3.46
Resultant	10.66
NAAQ Norms	80 µg/m³
NO_x in µg/m³	
Location	P1
Background	21.7

Incremental	12
Resultant	33.7
NAAQ Norms	80 µg/m³

Noise Environment –

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

For hemispherical sound wave propagation through homogeneous loss free medium, one can estimate noise levels at various locations at different sources using 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 & r_2 from the source.

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

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

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

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

TABLE 7.14: PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	43.1	41.0	45.7	55
Habitation Near E1	46.2	44.5	48.5	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 41.0 – 44.5 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to Green Belt as 4.9 dB (A) the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 (The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986.).

Ground Vibrations

Ground vibrations due to mining activities in the all the 2 Mines within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from the all the 2 mines is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

Another impact due to blasting activities is fly rocks. These may fall on the houses or agricultural fields nearby the mining areas and may cause injury to persons or damage to the structures.

Nearest Habitations from 2 mines respectively are as in below Table 7.17

TABLE 7.15: NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	630
Habitation Near E1	980

The ground vibrations due to the blasting in all the mines are calculated using the empirical equation for assessment of peak particle velocity (PPV) is:

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

Where –

V = peak particle velocity (mm/s)

K = site and rock factor constant

Q = maximum instantaneous charge (kg)

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

R = distance from charge (m)

TABLE 7.16: GROUND VIBRATIONS AT 2 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	94	630	0.629
E1	157	980	0.467

Source: Blasting Calculations

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

Socio Economic Environment –

The 2mines shall contribute towards CER and the community shall develop.

TABLE 7.16: SOCIO ECONOMIC BENEFITS FROM 2 MINES

Code	Project Cost	CER Cost
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P1	Rs.3,15,79,000/-	Rs 5,00,000/-
Total	Rs.3,15,79,000/-	Rs 5,00,000/-
E1	Rs. 83,16,880/-	Rs 5,00,000/-
Total	Rs. 83,16,880/-	Rs 5,00,000/-
Grand Total	Rs. 3,98,95,880/-	Rs.10,00,000/-

As per para 6 (II) of the office memorandum, all the mines being a green field project & Capital Investment is \leq 100 crores, they shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC.

- Proposed project shall fund towards CER – **Rs 5,00,000/-**
- Existing project shall fund towards CER – **Rs 5,00,000/-**
- 2 Projects in Cluster shall fund towards CER – **Rs 10,00,000/-**

TABLE 7.18: EMPLOYMENT BENEFITS FROM 2 MINES

Code	Employment
P1	34
Total	34
E1	25
Total	25
Grand Total	59

A total of 34 people will get employment due to 1 proposed mine in cluster and 25 people are already employed at existing mines.

TABLE 7.19: GREENBELT DEVELOPMENT BENEFITS FROM 2 MINES

CODE	No of Trees proposed to be planted	Survival %	Name of the Species
P1	2400	80%	Neem, Pongam,Vilvam
Total	2400		
E1	1750	80%	Neem, Pongam,Vilvam
Total	1750		

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Pinnata et., in the Cluster at a rate of 2400 Trees Planted over a period of 10 Years with Survival Rate of 80% by proposed quarry.

7.5 PLASTIC WASTE MANAGEMENT PLAN

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

Objective –

- To investigate the actual supply chain network of plastic waste.

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

TABLE 7.20: ACTION PLAN TO MANAGE PLASTIC WASTE

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

Source: Proposed by FAE's and EC

8. PROJECT BENEFITS

8.0 GENERAL

The Proposed Project for Quarrying Rough Stone and gravel quarry at Thirumal Village aims to produce 6,53,795m³ Rough Stone & 69,908 m³ of Gravel over a period of 10 Years for Rough Stone. This will enhance the socio-economic activities in the adjoining areas and will result in these 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 34 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be opportunity for indirect employment to many people in the form of contractual jobs, business opportunities, service facilities etc. the economic status of the local people will be enhanced due to mining project.

8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED

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

8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

The proposed quarries are located in Thirumal Village, Kallikudi Taluk and Madurai District of Tamil Nadu and the area have communications, roads and other facilities already well established. The following physical infrastructure facilities will further improve due to proposed mine.

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

8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE

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

8.5 OTHER TANGIBLE BENEFITS

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

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

CORPORATE SOCIAL RESPONSIBILITY

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

- Health Services
- Social Development
- Infrastructure Development
- Education & Sports
- Self-Employment

CSR Cost Estimation

- CSR activities will be taken up in the Thirumal village mainly contributing to education, health, training of women self-help groups and contribution to infrastructure etc., CSR budget is allocated as 2.5% of the profit.

CORPORATE ENVIRONMENT RESPONSIBILITY

For the existing quarries 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, all the mines being a green field project & Capital Investment is \leq 100 crores, they shall contribute 2% of Capital Investment towards CER.

For the proposed projects it is recommended to spent Rs 5,00,000/- towards CER Activities in the nearby Government School for Renovation or reconstruction of Existing Toilet, Providing Note books to the school library, Plantation in the school ground & any other recommendations by the School Head masters.

TABLE 8.1 CER – ACTION PLAN

Code	CER
P1	Rs 5,00,000/-

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

9. ENVIRONMENTAL COST BENEFIT ANALYSIS

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

10. ENVIRONMENTAL MANAGEMENT PLAN- THIRU. D. SAKTHIVEL

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 of 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.Sakthivel 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 programmes to provide early warning of any deficiency or unanticipated performance in environmental safeguards
- Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

Description of the Administration and Technical Setup –

The Environment Monitoring Cell discussed under Chapter 6 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 programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10.2 LAND ENVIRONMENT MANAGEMENT

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (un utilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. Aesthetic of the Environment will not be affected. There is no major vegetation in the project area during the course of quarrying operation and after completion of the quarrying operation thick plantation will be developed under greenbelt development programme.

TABLE 10.1: PROPOSED CONTROLS FOR LAND ENVIRONMENT

CONTROL	RESPONSIBILITY
Design vehicle wash-down areas so that all runoff water is captured and passed through oil water separators and sediment catchment devices.	Mines Manager
Refueling to be undertaken in a safe location, away from vehicle movement pathways & 100 m away of any watercourse Refueling activity to be under visual observation at all times. Drainage of refueling areas to sumps with oil/water separation	Mine Foreman & Mining Mate
Soil and groundwater testing as required following up a particular incident of contamination.	Mines Manager
At conceptual stage, the mining pits will be converted into Rain Water Harvesting. Remaining area will be converted into greenbelt area	Mines Manager
No external dumping i.e., outside the project area	Mine Foreman
Garland drains with catch pits / settlement traps to be provided all around the project area to prevent run off affecting the surrounding lands.	Mines Manager
The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.3 SOIL MANAGEMENT

There is no overburden or waste anticipated from proposed project.

TABLE 10.2: PROPOSED CONTROLS FOR SOIL MANAGEMENT

CONTROL	RESPONSIBILITY
Surface run-off from the project boundary via garland drains will be diverted to the mine pits	Mine Foreman & Mining Mate
Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk	Mines Manager
Empty sediment from sediment traps Maintain, repair or upgrade garland drain system	Mines Manager
Test soils for pH, EC, chloride, size & water holding capacity	Manager Mines

Source: Proposed by FAE's & EIA Coordinator

10.4 WATER MANAGEMENT

In the proposed quarrying project, no process is involved for the effluent generation, only oil & grease from the machinery wash is anticipated and domestic sewage from mine office. The quarrying operation is proposed upto a depth of 47 m BGL, the water table in the area is 57 m below ground level, hence the proposed projects will not intersect the Ground water table during entire quarry period.

TABLE 10.3: PROPOSED CONTROLS FOR WATER ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.5 AIR QUALITY MANAGEMENT

The proposed quarrying activity would result in the increase of particulate matter concentrations due to fugitive dust. Daily water sprinkling on the haul roads, approach roads in the vicinity would be undertaken and will

be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements.

TABLE 10.4: PROPOSED CONTROLS FOR AIR ENVIRONMENT

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

Source: Proposed by FAE's & EIA Coordinator

10.6 NOISE POLLUTION CONTROL

There will be intermittent noise levels due to vehicular movement, trucks loading, drilling and blasting and cutting activities. No mining activities are planned during night time.

TABLE 10.5: PROPOSED CONTROLS FOR NOISE ENVIRONMENT

CONTROL	RESPONSIBILITY
Development of thick greenbelt all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained	Mines Manager
Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation	Mines Foreman
Deployment of mining equipment with an inbuilt mechanism to reduce noise	Mines Manager
Provision of earmuff / ear plugs to workers working in noise prone zones in the mines	Mining Mate
Provision of effective silencers for mining machinery and transport vehicles	Mines Manager
Provision of sound proof AC operator cabins to HEMM	Mines Manager
Sharp drill bits are used to minimize noise from drilling	Mines Foreman
Controlled blasting technologies are adopted by using delay detonators to minimize noise from blasting	Mines Manager
Annual ambient noise level monitoring shall be carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager

Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator

10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone quarry operation creates vibration due to the blasting and movement of Heavy Earth moving machineries, fly rocks due to the blasting.

TABLE 10.6: PROPOSED CONTROLS FOR GROUND VIBRATIONS & FLY ROCK

CONTROL	RESPONSIBILITY
Controlled blasting using delay detonators will be carried out to maintain the PPV value (below 8Hz) well within the prescribed standards of DGMS	Mines Manager
Drilling and blasting will be carried under the supervision of qualified persons	Mines Manager
Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting	Mines Manager
Suitable spacing and burden will be maintained to avoid misfire / fly rocks	Manager Mines
Number of blast holes will be restricted to control ground vibrations	Manager Mines
Blasting will be carried out only during noon time	Mining Mate
Undertake noise or vibration monitoring	Mines Manager
ensure blast holes are adequately stemmed for the depth of the hole and stemmed with suitable angular material	Mines Foreman

Source: Proposed by FAE's & EIA Co-ordinator

10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

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

Following control measures are proposed for its management and will be the responsibility of the Mines Manager.

- Greenbelt development all along the safety barrier of the project area
- It is also proposed to implement the greenbelt development programme and post plantation status will be regularly checked for every season.
- The main attributes that retard the survival of sapling is fugitive dust, this fugitive dust can be controlled by water sprinkling on the haul roads and installing a sprinkler unit near the newly planted area.
- Year wise greenbelt development will be recorded and monitored
 - Based on the area of plantation.
 - Period of plantation

- Type of plantation
 - Spacing between the plants
 - Type of manuring and fertilizers and its periods
 - Lopping period, interval of watering
 - Survival rate
 - Density of plantation
- The ultimate reclamation planned leaves a congenial environment for development of flora & immigration of small fauna through green belt and water reservoir. The green belt and water reservoir developed within the Project at the end of mine life will attract the birds and animals towards the project area in the post mining period.

10.8.1 Green Belt Development Plan

About 2400 nos. of saplings is proposed to be planted for the Mining plan period in safety barrier of applied mine lease area with survival rate 80%. The greenbelt development plan has been prepared keeping in view the land use changes that will occur due to mining operation in the area.

TABLE 10.7 PROPOSED GREENBELT ACTIVITIES FOR 10 YEAR PLAN PERIOD

Year	No. of trees proposed to be planted	Area to be covered in m ²	Name of the species
I	2400	The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development and along village roads.	Neem, Pongamia, vilvam etc.,

Source: proposed by FAE's & EIA Coordinator

The objectives of the greenbelt development plan are –

- Provide a green belt around the periphery of the quarry area to combat the dispersal of dust in the adjoining areas,
- Protect the erosion of the soil, Conserve moisture for increasing ground water recharging,
- Restore the ecology of the area, restore aesthetic beauty of the locality and meet the requirement of fodder, fuel and timber of the local community.

A well-planned Green Belt with multi rows (three tiers) preferably with long canopy leaves shall be developed with dense plantations around the boundary and haul roads to prevent air, dust noise propagation to undesired places and efforts will be taken for the enhancement of survival rate.

10.8.2 Species Recommended for Plantation

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

- Creating of bio-diversity.
- Fast growing, thick canopy cover, perennial and evergreen large leaf area,
- Efficient in absorbing pollutants without major effects on natural growth

TABLE 10.8: RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

S.No	Botanical Name	Local Name	Importance
1.	Azadirachta indica	Neem, Vembu	Neem oil & neem products

2.	Tamarindus indica	Tamarind	Edible & Medicinal and other Uses
3.	Polyalthia longifolia	Nettilinkam	Tall and evergreen tree
4.	Borassus Flabellifer	Palmyra Palm	Tall Wind breaker tree and its fruits are edible

Source: Proposed by FAE's & EIA Coordinator

10.9 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT

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

10.9.1 Medical Surveillance and Examinations

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

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

- General Physical Examination and Blood Pressure
- X-ray Chest and ECG
- Sputum test
- Detailed Routine Blood and Urine examination

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

TABLE 10.9: MEDICAL EXAMINATION SCHEDULE

S. No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Initial Medical Examination (Mine Workers)					
A	Physical Check-up					
B	Psychological Test					
C	Audiometric Test					
D	Respiratory Test					
2	Periodical Medical Examination (Mine Workers)					
A	Physical Check - up					

B	Audiometric Test					
C	Eye Check - up					
D	Respiratory Test					
3	Medical Camp (Mine Workers & Nearby Villagers)					
4	Training (Mine Workers)					

Medical Follow ups:- Work force will be divided into three targeted groups age wise as follows:-		
Age Group	PME as per Mines Rules 1955	Special Examination
Less than 25 years	Once in a Three Years	In case of emergencies
Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

10.9.2 Proposed Occupational Health and Safety Measures

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

FIGURE 10.1: PERSONAL PROTECTIVE EQUIPMENT TO THE MINE WORKERS

10.9.3 Health and Safety Training Programme

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

TABLE 10.10: LIST OF PERIODICAL TRAININGS PROPOSED FOR EMPLOYEES

Course	Personnel	Frequency	Duration	Instruction
New-Employee Training	All new employees exposed to mine hazards	Once	One week	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives
Task Training Like Drilling, Blasting, Stemming, safety, Slope stability, Dewatering, Haul road maintenance,	Employees assigned to new work tasks	Before new Assignments	Variable	Task-specific health & safety procedures and SOP for various mining activity. Supervised practice in assigned work tasks.
Refresher Training	All employees who received new-hire training	Yearly	One week	Required health and safety standards Transportation controls Communication systems Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance

				Emergency evacuation procedures Health standards Safety rules Respiratory devices
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Source: Proposed by FAE's & EIA Coordinator as per DGMS Norms

10.9.4.: Budgetary Provision for Environmental Management –

Adequate budgetary provision has been made by the Company for execution of Environmental Management Plan. The Table 10.11 gives overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

TABLE 10.11: EMP BUDGET FOR PROPOSED PROJECT

Activites	Mitigation Measure	Provision for Implementation	Capital	Recurring
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare; and yearly maintenance @ Rs. 10,000/- per hectare	47501	47501
	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
	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 -2 Units	150000	15000
	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	5000
	Stone carrying trucks will be covered by tarpaulin	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 - 1 Units	15000	750
	Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes by Manual Labour	0	5000
	Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area	Provision for 2 labours @ Rs.10,000/labour (Contractual) per Hectare	0	95002
	Installing wheel wash system near gate of quarry	Installation + Maintenance + Supervision	50000	20000
Noise Environment	Source of noise will be during operation of transportation vehicles, 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 implements 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 / Compentent Person	0	0
	Provision for Portable blaster shed	Installation of Portable blasting shelter	50000	2000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	Rs. 30/- per 6 Tonnes of Blasted Material	0	1699867
Waste Management	Waste management (Spent Oil, Grease etc.,)	Provision for domestic waste collection and disposal through authorized agency	5000	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
Mine Closure	1. Progressive Closure Activity - Surface Runoff managment	Provision for garland drain @ Rs. 10,000/- per Hectare with maintenance of Rs. 5,000/- per annum	47501	5000
	2. Progressive Closure Activity 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	950020	10000
	3. Progressive Closure Activity Green belt development - 500 trees per one hectare - Proposal for 500 Trees - (500 Inside Lease Area & 0 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)	268000	40200

		Avenue Plantation @ 300 per plant (capital) for plantation outside the lease area and @ 30 per plant maintenance (recurring)	318000	31800
	4. Implementation of Final Mine Closure Activity as per Approved Mining Plan on Last Year	Few activities already covered as progressive closure activities as greenbelt development, wire fencing, garland drain. *For Final Closure Activities 15% of the proposed closure cost will be spent during the final mine closure stage - Last Year	163500	0
	5. Contribution towards Green Fund. As per TNMMCR 1959, Rule 35 A	The Contribution towards Green Funds @ 10% of Seigniorage fee are indicated as part of EMP Budge and not necessarily implemented in the Project Site	5884155	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	Fixed Display Board at the Quarry Entrance as permanent structure mentioning Environmental Conditions	10000	1000
	Air, Water, Noise and Soil Quality Sampling every 6 Months for Compliance Report of EC Conditions	Submission of 2 Half Yearly Compliance - Lab Monitoring Report as per CPCB norms	0	50000
	Workers will be provided with Personal Protective Equipment's	Provision of PPE @ Rs. 4000/- per employee with recurring based on wear and tear (say, @ Rs. 1000/- per employee) - 15 Employees	136000	34000
	Health check up for workers will be provisioned	IME & PME Health check up @ Rs. 1000/- per employee	0	34000
	First aid facility will be provided	Provision of 2 Kits per Hectare @ Rs. 2000/-	0	9500.2
	Mine will have safety precaution signages, boards.	Provision for signages and boards made	10000	2000
	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	237505	10000

	Installation of CCTV cameras in the mines and mine entrance	Camera 4 Nos, DVR, Monitor with internet facility	30000	5000
	Implementation as per Mining Plan and ensure safe quarry working	Mines Manager (1 st Class / 2 nd Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate	0	780000
CER	As per MoEF &CC OM 22-65/2017-IA.III Dated 25.02.2021	Detailed Description in following slides and Budget allocation is included as per MoeEF & CC OM	500000	0
TOTAL			36,29,527	29,89,620

*Marked cost is already discussed in the mining plan hence that is not included in the total Environmental Management plan cost Total Cost for the Ten years

Year	Total Cost	Year	Total Cost
1 st	₹ 66,19,147	6 th	₹ 56,30,361
2 nd	₹ 31,39,101	7 th	₹ 40,97,115
3 rd	₹ 32,96,056	8 th	₹ 43,01,971
4 th	₹ 34,60,859	9 th	₹ 45,17,069
5 th	₹ 36,33,902	10 th	₹ 49,06,423
Total	436 lakhs		

Cost inflation 5% per annum

Note: This Environmental Management plan cost will vary according to the public consultation comments

10.10 CONCLUSION –

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

11. SUMMARY AND CONCLUSION

Thiru. D.Sakthivel Rough Stone and Gravel Quarry Extent:4.75.01 Ha consisting of 1 Proposed,1 Existing Quarries falls under “B” category as per MoEF & CC Notification S.O. 3977 (E).

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B-1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed projects are categorized under category “B1” Activity 1(a) (mining lease area in cluster situation) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance. “Draft EIA report prepared on the basis of ToR issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”.

Environmental monitoring and audit mechanism have been recommended before and after commencement of the project, where necessary, to verify the accuracy of the EIA predictions and the effectiveness of recommended mitigation measures.

The main scope of the EIA study is to quantify the cumulative impact in the study area due to cluster quarries and formulate the effective mitigation measures for each individual leases. 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, Dust generation etc., have been discussed in this report. The baseline monitoring study has been carried out during the months March– May2024 for various environmental components so as to assess the anticipated impacts of quarry project on the environment and suitable mitigation measures for likely adverse impacts due to the proposed project is suggested individually for the respective proposed project under Chapter 10.

The project proponent ensures to obtain necessary clearances and quarrying will be carried out as per rules and regulations. The Mining Activity will be carried out in a phased manner as per the approved mining plan after obtaining EC, CTO from TNPCB, execution of lease deed and obtaining DGMS Permission and working will be carried out under the supervision of Competent Persons employed.

Overall, the EIA report has predicted that the project will comply with all environment standards and legislation after commencement of the project and operational stage mitigation measures are implemented.

Mining operations has positive impact on environment and socio economy such as landscape improvement, water as by-product, economy development and better public services, providing and supply of Rough Stone as per market demand.

Sustainable and modern mining leads us to see positive impact of mining operation and providing consistent employment for nearly 34 people directly in the proposed projects and indirectly around 50 people.

As discussed, it is safe to say that the proposed quarries are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigate technique, as well as to serve as biological indicators for the pollutants released from the Thiru. D. Sakthivel Rough Stone and Gravel Quarry Extent:4.75.01 Ha.

12. DISCLOSURE OF CONSULTANT

The Project Proponent –

Thiru. D.Sakthivel have engaged M/s Geo Exploration and Mining Solutions, an Accredited Organization under Quality Council of India – National Accreditation Board for Education & Training, New Delhi, for carrying out the EIA Study as per the ToR Issued.

Name and address of the consultancy:

GEO EXPLORATION AND MINING SOLUTIONS

No 17, Advaita Ashram Road,
Alagapuram, Salem – 636 004
Tamil Nadu, India
Email:infogeoexploration@gmail.com
Web: www.gemssalem.com
Phone: 0427 2431989.

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

Sl.No.	Name of the expert	In house/ Empanelled	EIA Coordinator		FAE	
			Sector	Category	Sector	Category
1	Dr. M. Ifthikhar Ahmed	In-house	1	A	WP GEO SC	B A A
2	Dr. P. Thangaraju	In-house	-	-	HG GEO	A A
3	Mr. A. Jagannathan	In-house	-	-	AP NV SHW	B A B
4	Mr. N. Senthilkumar	Empanelled	38 28	B B	AQ WP RH	B B A
5	Mrs. Jisha parameswaran	In-house	-	-	SW	B
6	Mr. Govindasamy	In-house	-	-	WP	B
7	Mrs. K. Anitha	In-house	-	-	SE	A
8	Mrs. Amirtham	In-house	-	-	EB	B
9	Mr. Alagappa Moses	Empanelled	-	-	EB	A
10	Mr. A. Allimuthu	In-house	-	-	LU	B
11	Mr. S. Pavel	Empanelled	-	-	RH	B
12	Mr. J. R. Vikram Krishna	Empanelled	-	-	SHW	A

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

DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA/EMP

Declaration by experts contributing to the Draft EIA & EMP report prepared for our Rough Stone and Gravel quarry situated in S.F. No 217/2A(Part), 2B, 4, 221/3(Part), 4A(Part), 4B(Part), 222/1(Part), 2, 3A, 3B1 and 2B, over an extent of 4.75.01Ha in Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

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

Name: **Dr. M. Ifthikhar Ahmed**

Designation: **EIA Coordinator**

Date & Signature:

Dr. M. Ifthikhar Ahmed


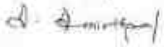










Period of Involvement: **January 2024 to till date**

Associated Team Member with EIA Coordinator:

1. Mr. Viswanathan
2. Mr. Santhoshkumar
3. Mr. S. Ilavarasan

FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT




Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	<ul style="list-style-type: none"> ▪ Identification of different sources of air pollution due to the proposed mine activity ▪ Prediction of air pollution and propose mitigation measures / control measures 	Mr. A. Jagannathan	<i>[Signature]</i>
2	WP	<ul style="list-style-type: none"> ▪ Suggesting water treatment systems, drainage facilities ▪ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures. 	Dr. M. Ifthikhar Ahmed	<i>Dr. M. Ifthikhar Ahmed</i>
			Mr. N. Senthilkumar	<i>[Signature]</i>
3	HG	<ul style="list-style-type: none"> ▪ Interpretation of ground water table and predict impact and propose mitigation measures. ▪ Analysis and description of aquifer Characteristics 	Dr. P. Thangaraju	<i>[Signature]</i>
4	GEO	<ul style="list-style-type: none"> ▪ 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. 	Dr. M. Ifthikhar Ahmed	<i>Dr. M. Ifthikhar Ahmed</i>
			Dr. P. Thangaraju	<i>[Signature]</i>

5	SE	<ul style="list-style-type: none"> Revision in secondary data as per Census of India, 2011. Impact Assessment & Preventive Management Plan Corporate Environment Responsibility. 	Mrs. K. Anitha	
6	EB	<ul style="list-style-type: none"> Collection of Baseline data of Flora and Fauna. Identification of species labelled as Rare, Endangered and threatened as per IUCN list. Impact of the project on flora and fauna. Suggesting species for greenbelt development. 	Mrs. Amirtham	
			Mr. Alagappa Moses	
7	RH	<ul style="list-style-type: none"> Identification of hazards and hazardous substances Risks and consequences analysis Vulnerability assessment Preparation of Emergency Preparedness Plan Management plan for safety. 	Mr. N. Senthilkumar	
			Mr. S. Pavel	
			Mr. J. R. Vikram Krishna	
8	LU	<ul style="list-style-type: none"> Construction of Land use Map Impact of project on surrounding land use Suggesting post closure sustainable land use and mitigative measures. 	Mr. A. Allimuthu	
9	NV	<ul style="list-style-type: none"> Identify impacts due to noise and vibrations Suggesting appropriate mitigation measures for EMP. 	Mr. A. Jagannathan	
10	AQ	<ul style="list-style-type: none"> Identifying different source of emissions and propose predictions of incremental GLC using AERMOD. Recommending mitigations measures for EMP 	Mr. N. Senthilkumar	
11	SC	<ul style="list-style-type: none"> Assessing the impact on soil environment and proposed mitigation measures for soil conservation 	Dr. M. Ifthikhar Ahmed	
12	SHW	<ul style="list-style-type: none"> Identify source of generation of non-hazardous solid waste and hazardous waste. Suggesting measures for minimization of generation of waste and how it can be reused or recycled. 	Mr. A. Jagannathan	
			Mr. J. R. Vikram Krishna	

LIST OF TEAM MEMBERS ENGAGED IN THIS PROJECT

Sl.No.	Name	Functional Area	Involvement	Signature
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1	Mr. S. Nagamani	AP; GEO; AQ	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures ▪ Provide inputs on Geological Aspects ▪ Analyse & provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures 	<i>S. Nagamani</i>
2	Mr. Viswathanan	AP; WP; LU	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs & Assisting FAE with sources of Air Pollution, its impact and suggest control measures ▪ Assisting FAE on sources of water pollution, its impacts and suggest control measures ▪ Assisting FAE in preparation of land use maps 	<i>P. Viswathanan</i>
3	Mr. Santhoshkumar	GEO; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>Mr. Santhoshkumar</i>
4	Mr. Umamahesvaran	GEO	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Provide inputs on Geological Aspects ▪ Assist in Resources & Reserve Calculation and preparation of Production Plan & Conceptual Plan 	<i>U. Umamahesvaran</i>
5	Mr. A. Allimuthu	SE	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of data's ▪ Provide inputs by analysing primary and secondary data 	<i>A. Allimuthu</i>
6	Mr. S. Ilavarasan	LU; SC	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assisting FAE in preparation of land use maps ▪ Provide inputs & Assisting FAE with soil conservation methods and identifying impacts 	<i>S. Ilavarasan</i>
7	Mr. E. Vadivel	HG	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE & provide inputs on aquifer characteristics, ground water level/table ▪ Assist with methods of ground water recharge and conduct pump test, flow rate 	<i>E. Vadivel</i>

8	Mr. D. Dinesh	NV	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE and provide inputs on impacts due to proposed mine activity and suggest mitigation measures ▪ Assist FAE with prediction modelling 	
9	Mr. Panneer Selvam	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	
10	Mrs. Nathiya	EB	<ul style="list-style-type: none"> ▪ Site Visit with FAE ▪ Assist FAE with collection of baseline data ▪ Provide inputs and assist with labelling of Flora and Fauna 	

DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION

I, Dr. M. Ifthikhar Ahmed, Managing Partner, Geo Exploration and Mining Solutions, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the Draft EIA & EMP report prepared for our Rough stone and Gravel quarry situated in S.F. No 217/2A(Part), 2B, 4, 221/3(Part), 4A(Part), 4B(Part), 222/1(Part), 2, 3A, 3B1 and 2B, over an extent of 4.75.01Ha in Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State. It is also certified that information furnished in the EIA study are true and correct to the best of our knowledge.

Signature & Date:



Name:

Dr. M. Ifthikhar Ahmed

Designation:

Managing Partner

Name of the EIA Consultant Organization:

M/s. Geo Exploration and Mining Solutions

NABET Certificate No & Issue Date:

NABET/EIA/2225/RA 0276 Dated: 20-2-2023

Validity:

Valid till 06.08.2025

ANNEXURE

THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY

S.F. Nos. 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P),

222/1(P),2,3A,3B1 & 223/2B,

Thirumal Village,

Kallikudi Taluk,

Madurai District.

EXTENT = 4.75.01 ha

ToR obtained vide

File No: 10611 ToR Identification: TO23B0108TN5116021N Dated: 12.04.2024

Project Proponent

Thiru. D. Sakthivel,

S/o. Durairaj,

No.15, Melaratha Veethi,

Thirupparankundram,

Madurai District - 625 005.

LIST OF ANNEXURES

ANNEXURES	DESCRIPTION	PAGE NOS
P1 THIRU. D. SAKTHIVEL	COPY OF TERMS OF REFERENCE	1A – 14A
	COPY OF 500M RADIUS QUARRIES DETAILS LETTER	15A – 17A
	COPY OF MINING PLAN APPROVED LETTER	18A – 20A
	COPY OF APPROVED MINING PLAN WITH PLATES	21A – 107A
	COPY OF HYDROGEOLOGICAL REPORT	108A – 125A
	COPY OF EXPLOSIVES LETTER	126A – 132A
	COPY OF 300m & VAO ATTESTATION LETTER	133A – 134A
E1 THIRU. D. SAKTHIVEL	COPY OF ENVIRONMENTAL CLEARANCE	135A – 151A
	COPY OF BASE LINE MONITORING DATA	152A – 193A
	COPY OF CONSULTANT ACCREDITATION CERTIFICATE	194A



File No: 10611

Government of India

Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), TAMIL NADU)



Dated 12/04/2024



To,

DURAIRAJ SAKTHIVEL
DURAIRAJ SAKTHIVEL
15, Melaratha Veethi, Thiruparankundram,, MADURAI, TAMIL NADU, 625005
sakthiveldurai071989@gmail.com

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

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Thiru. D. Sakthivel, Rough Stone and Gravel Quarry Project at over an Extent of 4.75.01ha of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State submitted to Ministry vide proposal number SIA/TN/MIN/455777/2023 dated 22/02/2024.

Ref:

1. Online proposal No. SIA/TN/MIN/455777/2023, Dated:16.12.2023
2. Your application submitted for Terms of Reference dated: 21.12.2023

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO23B0108TN5116021N
(ii) File No.	10611
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals Thiru. D. Sakthivel, Rough Stone and Gravel Quarry Project at over an Extent of 4.75.01ha of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State
(vii) Name of Project	DURAIRAJ SAKTHIVEL
(viii) Name of Company/Organization	

(ix) Location of Project (District, State)	MADURAI, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the Ministry for an appraisal by the State Environment Impact Assessment Authority(SEIAA) Appraisal Committee (SEIAA) in the Ministry under the provision of EIA notification 2006 and its subsequent amendments.
4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) Appraisal Committee of SEIAA in the meeting held on 27/03/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.
5. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).
6. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the State Environment Impact Assessment Authority(SEIAA) Appraisal Committee hereby decided to grant Terms of Reference for instant proposal of Mr. DURAIRAJ SAKTHIVEL under the provisions of EIA Notification, 2006 and as amended thereof.
7. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.
8. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
9. This issues with the approval of the Competent Authority.
10. The TORs with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

Copy To

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

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Seiaa Specific Conditions

S. No	Terms of Reference
1.1	<p>1. The PP shall submit the slope stability action plan by carrying out the scientific studies to assess the slope stability of the working benches to be constructed 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.</p> <p>The PP shall carry out the scientific studies on ‘Design of Controlled Blast Parameters and Techniques for reducing the impact of blast-induced ground & air vibrations and fly rock caused due to the blasting operations’ using NONEL systems to evaluate its performance for the implementation, by involving anyone of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining and Fuel Research / Nagpur, NIRM-Bangaluru, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus</p>
1.2	<p>SEIAA STANDARD CONDITIONS:</p> <p>Cluster Management Committee</p> <ol style="list-style-type: none"> 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. <p>Impact study of mining</p> <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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.

S. No	Terms of Reference
	<p>g) Bio-geochemical processes and its foot prints including environmental stress.</p> <p>h) Sediment geochemistry in the surface streams.</p> <p>Agriculture & Agro-Biodiversity</p> <p>13. Impact on surrounding agricultural fields around the proposed mining Area.</p> <p>14. Impact on soil flora & vegetation around the project site.</p> <p>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.</p> <p>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.</p> <p>17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.</p> <p>18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.</p> <p>Forests</p> <p>19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.</p> <p>20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.</p> <p>21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.</p> <p>22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.</p> <p>Water Environment</p> <p>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.</p> <p>24. Erosion Control measures.</p> <p>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.</p> <p>26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.</p> <p>27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.</p> <p>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.</p> <p>29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.</p> <p>30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.</p> <p>Energy</p> <p>31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.</p> <p>Climate Change</p> <p>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.</p> <p>33. The Environmental Impact Assessment should study impact on climate change, temperature</p>

S. No	Terms of Reference
	<p>rise, pollution and above soil & below soil carbon stock.</p> <p>Mine Closure Plan</p> <p>34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.</p> <p>EMP</p> <p>35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.</p> <p>36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.</p> <p>Risk Assessment</p> <p>37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.</p> <p>Disaster Management Plan</p> <p>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.</p> <p>Others</p> <p>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.</p> <p>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.</p> <p>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.</p>

2. Seac Standard Conditions

S. No	Terms of Reference
2.1	<p>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:</p> <ul style="list-style-type: none"> (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. <p>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.</p> <p>3. 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.</p> <p>4. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall</p>

S. No	Terms of Reference
	<p>be included in EIA Report.</p> <p>5. 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.</p> <p>6. 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.</p> <p>7. 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.</p> <p>8. 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.</p> <p>9. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.</p> <p>10. 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.</p> <p>11. 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,</p> <p>12. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?</p> <p>13. Quantity of minerals mined out.</p> <ul style="list-style-type: none"> ● 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. <p>14. 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).</p> <p>15. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,</p> <p>16. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.</p> <p>17. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.</p> <p>18. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and</p>

S. No	Terms of Reference
	<p>systematically in order to ensure safety and to protect the environment.</p> <p>19. 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.</p> <p>20. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.</p> <p>21. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.</p> <p>22. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.</p> <p>23. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p> <p>24. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.</p> <p>25. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.</p> <p>26. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.</p> <p>27. Impact on local transport infrastructure due to the Project should be indicated.</p> <p>28. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.</p> <p>29. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.</p> <p>30. 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.</p> <p>31. 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.</p> <p>32. 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</p>

S. No	Terms of Reference
	<p>manner</p> <p>33. 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.</p> <p>34. 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.</p> <p>35. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.</p> <p>36. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.</p> <p>37. 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.</p> <p>38. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.</p> <p>39. 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.</p> <p>40. 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.</p> <p>41. 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.</p> <p>42. 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.</p>

3. Seac Mining Conditions - Site Specific

S. No	Terms of Reference
3.1	<p>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 along with EIA Report.</p> <p>2. The proponent shall obtain NOC from the Competent Authority under the provisions of the Central Electricity Authority Notification No. CEA-PS-16/1/2021-CEI Division dt 08.07.2023 due to the existence of HT line at 67 m.</p> <p>3. Since the waterbodies are situated nearby, 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 Institutions - 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 along with EIA Report.</p> <p>4. The PP shall furnish the details of the Periyakulam Kanmoi, extent of the Kanmoi and</p>

S. No	Terms of Reference
	<p>Ownership, ayacut, details of cultivation, distance from the site, etc, within 1 km radius around the proposed mining area from the Govt records.</p> <p>5. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc located within 1 km of the proposed quarry.</p> <p>6. 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.</p> <p>7. The Proponent shall carry out Bio diversity study through Department of Ecology and Environmental Sciences, Pondicherry University and the same shall be included in EIA Report.</p> <p>8. 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.</p> <p>9. The PP shall prepare a conceptual working plan accommodating the remedial actions such as inclusion of haul road accessibility keeping the benches intact, based on the studies carried out to assess the slope stability of the working benches to be constructed and existing quarry wall apart from the proposed mining methodology.</p>

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.

S. No	Terms of Reference																																													
1.7	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted																																													
1.8	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.																																													
1.9	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.																																													
1.10	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through 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, CHP, ETP, 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	<p>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</p> <table border="1" data-bbox="335 1456 1468 1747"> <thead> <tr> <th>S.N</th> <th>ML/Project Land use</th> <th>Area under Surface Rights(ha)</th> <th>Area Under Mining Rights(ha)</th> <th>Area under Both (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Agricultural land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Forest Land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Grazing Land</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Settlements</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Others (specify)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="335 1792 1468 2016"> <thead> <tr> <th>S.N.</th> <th>Details</th> <th>Area (ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Buildings</td> <td></td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td></td> </tr> <tr> <td>3</td> <td>Roads</td> <td></td> </tr> <tr> <td>4</td> <td>Others (specify)</td> <td></td> </tr> </tbody> </table>	S.N	ML/Project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1	Agricultural land				2	Forest Land				3	Grazing Land				4	Settlements				5	Others (specify)				S.N.	Details	Area (ha)	1	Buildings		2	Infrastructure		3	Roads		4	Others (specify)	
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S. No	Terms of Reference
	Total
1.13	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.
1.14	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SO _x , NO _x 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.
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

S. No	Terms of Reference
	area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
1.20	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.
1.21	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
1.22	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
1.23	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.
1.24	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users should be provided.
1.25	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
1.26	PP 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/ washery plant 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, 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.

S. No	Terms of Reference
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 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 transportaion 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 Managemant 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.

S. No	Terms of Reference																												
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.																												
1.48	<p>Details on the Forest Clearance should be given as per the format given:</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">Total ML Total</td> <td style="width: 15%;">Date</td> <td style="width: 15%;">Extent</td> <td style="width: 15%;">of</td> <td style="width: 15%;">Balance area for which</td> <td style="width: 15%;">Status of appl For</td> </tr> <tr> <td>Project Area</td> <td>Forest</td> <td>of FC</td> <td>Forest Land</td> <td>FC</td> <td>is yet to be</td> <td>diversion of forest</td> </tr> <tr> <td>(ha)</td> <td>land (ha)</td> <td></td> <td></td> <td>obtained</td> <td></td> <td>land</td> </tr> <tr> <td></td> <td colspan="6">If more than one provide details of each FC</td> </tr> </table>		Total ML Total	Date	Extent	of	Balance area for which	Status of appl For	Project Area	Forest	of FC	Forest Land	FC	is yet to be	diversion of forest	(ha)	land (ha)			obtained		land		If more than one provide details of each FC					
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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 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.																												
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)																												
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.																												

Signature Not Verified

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

Date: 12/04/2024

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director /
Assistant Director (i/c),
Dept. of Geology and Mining,
Madurai.

To

Thiru.D.Sakthivel,
S/o.Durairaj,
No.15, Melaratha Veethi,
Thiruparankundram,
Madurai.

Roc. No.996/Mines/2023-2, dated.22.11.2023

Madam,

Sub: Mines and Minerals - Minor Mineral – Rough stone and Gravel - Madurai District – Kallikudi Taluk – Thirumal Village – Patta lands - S.F. Nos. 217/2A(part) etc., Over an extent of 4.75.01 Hects - Application preferred by Thiru.D.Sakthivel - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - 500m details requested - Furnished - Reg.

- Ref: 1. Quarry lease application preferred by Thiru.D.Sakthivel, dated.28.08.2023.
2. Precise area communication letter Roc No.996/Mines/2023, dated.12.10.2023.
3. Letter dated.18.11.2023. Received from Thiru.D.Sakthivel along with draft mining plan on 18.11.2023
4. This office letter even No. dated.22.11.2023.
5. Letter dated Nil. Received from Thiru.D.Sakthivel on, 22.11.2023.

Thiru.D.Sakthivel has preferred an application for the grant of lease to quarry Rough stone and Gravel in SF.Nos. 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (P) (0.52.81), 221/4B (P) (0.37.48), 217/2A (P) (0.53.25) & 221/3 (P) (0.34.78) over an extent of 4.75.01 Hects of Thirumal Village, Thirumangalam Taluk under Rule 19(1) of Tamil Nadu Minor Mineral Concession Rules, 1959.

Based on reports and recommendations of the Revenue Divisional Officer, Thirumangalam and Assistant Geologist (Mines), precise area was communicated to the applicant vide reference 2nd cited with a direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly Thiru.D.Sakthivel has submitted the draft Mining Plan and the same has been approved on 22.11.2023. In this connection the applicant has requested to furnish the details of quarry lease / mining lease situated within 500 mts radius from the subject quarry for obtaining Environment Clearance from the State level Environment Impact Assessment Authority.

In this connection it is stated that, the following existing, abandoned / expired and proposed quarries are located within 500m radius distance from the proposed area.

a. Existing Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)	Joint Director/ Assistant Director (I/c) Proceedings No & date	Lease period
1.	Thiru.D.Sakthivel	Kurayur Bit 1	14/2F (0.26.0), 14/2G (0.25.0), 14/4E (0.30.5), 14/3B (0.71.84), 14/4B (0.26.5), 14/1B2 (0.31.16), 14/3A (0.39.66), 14/4A (0.26.5), 14/2E1 (0.28.5) & 14/4C1 (0.53.56)	3.49.22	Roc.No.1884/201 8/Mines. Dated.06.10.2020	09.10.2020 to 08.10.2025

b. Expired / Abandoned Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)	Collector's Proceedings No & date	Lease period
1.				Nil		

c. Proposed Quarries

Sl No	Name of the Owner	Village	S.F.No.	Extent (in hecets)
E.	Thiru.D.Sakthivel	Thurumal	217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (P) (0.52.81), 221/4B (P) (0.37.48), 217/2A (P) (0.53.25) & 221/3 (P) (0.34.78)	4.75.01

DM
22/11/2023

Deputy Director /
Assistant Director (i/c),
Dept. of Geology and Mining,
Madurai

Copy to:

The Chairman,
State Level Environment Impact,
Assessment Authority, Tamil Nadu,
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet, Chennai-15.

DM
22/11

From

Thiru.G.Gurusamy, M.Sc.,
Deputy Director /
Assistant Director (i/c),
Dept. of Geology and Mining,
Madurai.

To

Thiru.D.Sakthivel,
S/o.Durairaj,
No.15, Melaratha Veethi,
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Madam,

Sub: Mines and Minerals - Minor Mineral – Rough stone and Gravel - Madurai District – Kallikudi Taluk – Thirumal Village – Patta lands - S.F. Nos. 217/2A(part) etc., Over an extent of 4.75.01 Hects - Application preferred by Thiru.D.Sakthivel - Precise Area Communicated - Draft Mining Plan submitted - Approval Accorded - Reg.

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was communicated to the applicant vide reference 2nd cited with a direction to submit mining plan as stipulated in rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Accordingly, Thiru.D.Sakthivel has submitted the draft Mining Plan and the same has been examined in detail and found correct. The mining plan submitted by Thiru.D.Sakthivel in respect of the subject area is approved subject to the following conditions:

- (i). That the mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.
- (ii). This approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act, 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under the Tamil Nadu Minor Mineral Concession Rules, 1959.
- (iii). That the mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- (iv). Quarrying shall be done as per the approved Mining Plan and that the mining plan is approved without prejudice to any other law applicable to the quarry lease from time to time whether such laws are made by the Central Government, State Government or any other authority.

- (v). If anything is found to be concealed as required by the Mines Act in the contents of the Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- (vi). Waste material should be dumped within the lease granted area as earmarked in the Mining Plan.
- (vii). Quarrying operations and production shall be carried out as per the approved Mining Plan and the applicant shall be liable to pay the cost of mineral if there is any deviation in the quantum indicated in the approved year wise quantum of production and any such cases as on date are to be dealt with as per Court direction.
- (viii). 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.
- (ix). The applicant shall strictly adhere to the statutory and safety requirements.

Encl: Approved Mining Plan.

Shree
22.11.2023
Deputy Director /
Assistant Director (i/c),
Dept. of Geology and Mining,
Madurai.

Copy To:

The Director,
Department of Geology and Mining,
Guindy, Chennai - 600 032

Shree
22/11



**MINING PLAN AND PROGRESSIVE QUARRY
CLOSURE PLAN FOR THIRUMAL
ROUGH STONE AND GRAVEL QUARRY**

(PREPARED UNDER RULES 41 & 42 AS PER THE AMENDED UNDER TAMIL NADU MINOR MINERAL
CONCESSION RULES, 1959)

Patta Land / Lease period = Ten years

IN

LOCATION OF THE QUARRY LEASE APPLIED AREA

EXTENT : 4.75.01Ha
S.F.NOS. : 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P),
222/1(P),2,3A,3B1 and 223/2B
VILLAGE : THIRUMAL
TALUK : KALLIKUDI
DISTRICT : MADURAI
STATE : TAMIL NADU

FOR

APPLICANT

THIRU. D. SAKTHIVEL,

S/o. Durairaj,

No.15, Melaratha Veethi, Thirupparankundram,

Madurai District,

Tamil Nadu State – 625 005.

PREPARED BY

M. SANTHOSHKUMAR, M.Sc.,

Qualified Person

(Under Rule 15(I)(a) and (I)(b) of MCR, 2016)

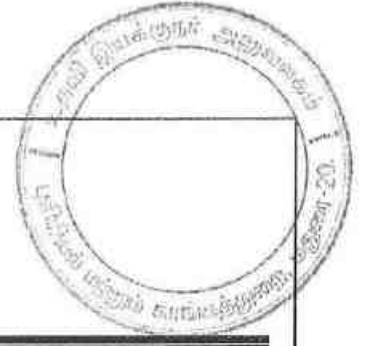
Plot No.3, Kattuvattam, Kothukara Samathi Via,

Kannakurichi, Salem - 636 008.

Cell: +91 97914 41745

E-Mail: santoshgeo2004@gmail.com

D. Sakthivel,
S/o. Durairaj,
No.15, Melaratha Veethi, Thirupparankundram,
Madurai District,
Tamil Nadu State – 625 005.



CONSENT LETTER FROM THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Thirumal Rough Stone and Gravel Quarry lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared by

M. Santhoshkumar, M.Sc.,
Qualified Person

I have entrusted the works to prepare the Mining Plan based upon the production requirements to me as per the Mines Acts, Rules, Regulations and Amendments as on date. I request to the Deputy Director/Assistant Director(i/c), Department of Geology and Mining, Madurai District, Tamil Nadu State to make further correspondence regarding the modification of the Mining Plan with the said Qualified Person at his following address.

M. Santhoshkumar, M.Sc.,
Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi, Salem - 636 008.
Cell: +91 97914 41745

I hereby undertake that all the responsibilities of contents in the Mining Plan and if any corrections made in the Mining Plan by the Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects. If there is any substantial change during operation I will carry out a Modified Mining plan and seek its approval from concerned Authorities

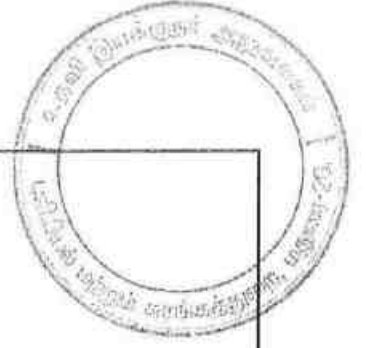
Signature of the Applicant

D. Sakthivel

Place: Madurai

Date: 13.10.2023

D. Sakthivel,
S/o. Durairaj,
No.15, Melaratha Veethi,
Thirupparankundram,
Madurai District,
Tamil Nadu State – 625 005.



DECLARATION OF THE APPLICANT

The Mining Plan and Progressive Quarry Closure Plan in Respect of Thirumal Rough Stone and Gravel Quarry lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared in full consultation with me.

I have understood its contents and agree to implement the same in accordance with Laws, Rules and Act applicable to quarry and I will take all the responsibility for working the quarry in a manure under Rule 23 of Tamil Nadu Minor Mineral Concession Rules, 1959.

Signature of the Applicant

D. Sakthivel

Place: Madurai

Date: 20.10.2023

CERTIFICATE

Certified that I am, **M. Santhoshkumar, M.Sc.**, residing at Plot No.3, Kattuvattam, Kothukara Samathi Via, Kannakurichi, Salem - 636 008, holding a Post Graduate Degree in Geology (M.Sc. Applied Geology) from Annamalai University, Chidambaram and I worked in the field of Mining in a role of Geologist.

Rule 15(I)(a) and (b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 stipulates the eligibility for preparing Revised Mining Plans as "(I)(a) a post graduate degree in Geology granted by a university established" and (I)(b) "Professional experience of five years of working in a supervisory capacity in the field of mining after obtaining the degree". Since my qualification and experience are satisfied the Rule (I)(a) and (I)(b) of 15 of the said Rules, I am eligible to prepare Revised Mining Plans for both Major and Minor Minerals.

Accordingly, I prepared this Mining Plan along with Progressive Quarry Closure Plan in respect of Thirumal Rough Stone and Gravel Quarry lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State for **Thiru. D. Sakthivel**, S/o. Durairaj, residing at No.15, Melaratha Veethi, Thirupparankundram, Madurai District, Tamil Nadu State – 625 005. Since the Mining Plan is prepared as per the provisions contained in Rule 15(I)(a) and (I)(b) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Signature of the Qualified Person


M. Santhoshkumar, M.Sc.,

Place: Salem

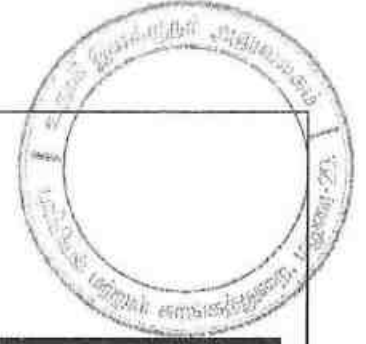
Date: 20.10.2023

M. Santhoshkumar, M.Sc.,

Plot No.3, Kattuvattam, Kothukara Samathi Via,

Kannakurichi, Salem - 636 008.

Cell: +91 97914 41745.



CERTIFICATE FROM THE QUALIFIED PERSON

This is to certify that the Provisions of Prepared under Rules 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959. The preparation of Mining Plan and Progressive Quarry Closure Plan for Thirumal Rough Stone and Gravel Quarry lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared for

Thiru. D. Sakthivel,

S/o. Durairaj,

No.15, Melaratha Veethi, Thirupparankundram,


Madurai District,

Tamil Nadu State – 625 005.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of the Deputy Director/Assistant Director(i/c), Department of Geology and Mining, Madurai District, Tamil Nadu State for such permissions/ exemptions/ relaxations and approvals.

It is also certified that information furnished in the above Mining Plan are true and correct to the best of my knowledge.

Signature of the Qualified Person


M. Santhoshkumar, M.Sc.,

Place: Salem

Date: 20.10.2023

M. Santhoshkumar, M.Sc.,

Plot No.3, Kattuvattam, Kothukara Samathi Via,

Kannakurichi, Salem - 636 008.

Cell: +91 97914 41745.



CERTIFICATE FROM THE QUALIFIED PERSON

Certified that the Provisions of Mines Act, Rules and Regulations or Orders made there under have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Thirumal Rough Stone and Gravel Quarry lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared for

Thiru. D. Sakthivel,

S/o. Durairaj,

No.15, Melaratha Veethi, Thirupparankundram,

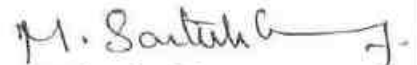
Madurai District,

Tamil Nadu State – 625 005.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of Director of Mines Safety (DMS), No.5, II Street, Block-AA, Anna Nagar, Chennai-40, Tamil Nadu State for such permissions / exemptions / relaxations and approvals.

It is also certified that information furnished in the Mining Plan are true and correct to the best of my knowledge.

Signature of the Qualified Person


M. Santhoshkumar, M.Sc.,

Place: Salem

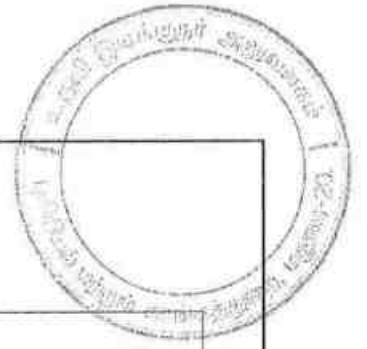
Date: 20.10.2023



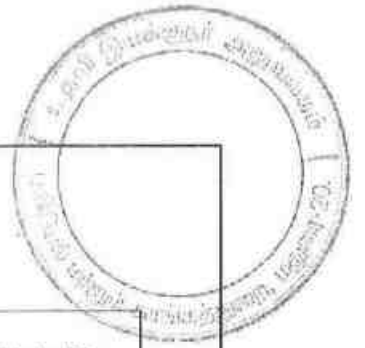
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LIST OF PLATES

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MINING PLAN ALONG WITH PROGRESSIVE QUARRY CLOSURE PLAN FOR THIRUMAL ROUGH STONE AND GRAVEL.

(PREPARED UNDER RULES 41 & 42 AS PER THE AMENDED UNDER TAMIL NADU MINOR MINERAL
CONCESSION RULES, 1959)

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The Mining Plan and Environmental Management plan is prepared for **Thiru. D. Sakthivel**, S/o. Durairaj, residing at No.15, Melaratha Veethi, Thirupparankundram, Madurai District, Tamil Nadu State – 625 005.

The applicant applied for Rough stone and Gravel quarry over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State under Rules 19 (1), 20 & 33 of Tamil Nadu Minor Mineral Concession Rules, 1959.

The application was processed by the Deputy Director/Assistant Director(i/c), Department of Geology and Mining, Madurai District and passed a precise area communication letter vide **Rc.No.996/Mines/2023, Dated: 12.10.2023** to submit an approved Mining Plan and obtain Environmental Clearance from the State Level Environment Impact Assessment Authority, Tamil Nadu State with the conditions to provide (Please refer Annexure No. D):

1. A safety distance of 7.5 meters should be provided to the adjacent Patta lands.
2. A safety distance of 50 meters should be provided to the Odai passing in S.F.No. 219/5 situated on the Eastern side of the lease applied area.
3. A safety distance of 50 meters should be provided to the Electricity High Tension Tower line passing from Southeast to Northwest side of the lease applied area.
4. A safety distance of 50 meters should be provided to the Kurayur Bit-1 periyakulam Kanmoi situated on the Southern side of the lease applied area.
5. The applicant should be submit Approved Mining Plan and Environmental Clearance for the proposed Rough Stone and Gravel quarry applied area for over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District.

In order to ensure compliance of the order of the Honourable Supreme Court Dated: 27.02.2012 in I.A.No.12.13.2011 in Special Leave Petition SLP (C) No 19628-19629/2009, it has been now decided that all mining projects of minor minerals including their renewal is require prior environmental clearance. As per amendment in EIA Notification 2006 vide S.O. 1886(E), Dated:20.04.2022 “All mining lease area in respect of minor mineral mining leases and \leq 250 ha mining lease area in respect of major mineral mining lease other than coal” would be treated as category B and will be considered by the state notified by Ministry of Environment, Forest and Climate Change as prescribed procedure under EIA notification 2006.

In the above circumstances the applicant through his consultant is hereby preparing the Mining Plan, Environmental Management Plan and Progressive Quarry Closure Plan for approval and subsequent submission of Form-I, Form-IM and Pre-feasibility report to obtain Environmental Clearance from the State Level Environment Impact Assessment Authority, Tamil Nadu State for Rough Stone and Gravel quarry. This mining plan is prepared by considering the Rules 41 & 42 as Amended in Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the EIA Notification 2006 and its subsequent Amendment and judgments till 2023.

Short Notes of Mining plan:

- a. Village Panchayat - Thirumal
- b. Panchayat Union - Kallikudi
- c. The Geological Resources are **21,37,545m³** of Rough stone and **95,002m³** of Gravel formation in the entire area.
- d. The Total Mineable Reserves are **6,53,795m³** of Rough stone and **69,908m³** of Gravel in the entire area.
- e. The proposed quantity of reserves/ (level of production) to be mined are **6,53,795m³** of Rough stone (**5,21,325m³** for **first five years** and **1,32,470m³** for **second five years period**) for **ten years** and **69,908m³** of Gravel for first three years in the entire area.
- f. Total extent of the lease applied area is about 4.75.01Ha.
- g. Topography of the area = The area is exhibiting plain terrain
- h. Proposed Depth of mining = 47m below ground level for first five years and Ten Years.
- i. Lease Period = Ten years
- j. It is a fresh lease application.
- k. Method of mining / level of mechanization.
Opencast mechanized method, the quarry operation involves shallow jack hammer drilling, slurry blasting with NONEL initiation.
- l. Type of machineries proposed in the quarrying operation is given below.
Excavators attached with rock breaker.
Wagon Drill Machine, Jack hammer, Compressor (Diesel drive) (4 Jack Hammer capacity).
- m. No trees will be uprooted due to this quarry operation.
- n. The approach road from the main road to quarry will be constructed and maintained in a good condition for the haulage of quarry materials and machineries.
- o. There is No Export of this Rough stone and Gravel.

- p. Topo sketch covering 10km and 1km radius around the proposed area with markings of habitations, water bodies including streams, rivers, roads, major structure like bridges, wells, archaeological importance and places of worships is marked and enclosed as Plate Nos. IA & IB.
- q. The lease applied area is about 4.75.01Ha bounded by twenty four corners; the corners are designated as 1-24 clock-wise from the Southwest corner and the Co – ordinates for all the corners are clearly marked in the Quarry Lease Plan and Surface Plan enclosed as Plate No. II.
- r. The plans of proposed quarrying area showing the dimensions of the pit, their proposed depth and maximum area of proposed quarrying are enclosed as Plate Nos. III, III-A & IV.
- s. General conditions will not applicable for the proposed area. The area applied for lease is 10Km away from the,
- Interstate Boundary,*
 - Protected area under wild life protection ACT, 1972,*
 - Critically polluted areas as identified by CPCB,*
 - Notified Eco sensitive areas.*
- t. There is no waste anticipated during this quarry operation, hence waste dump is not proposed in the lease applied area.
- u. Around 34 employees are deploying in the quarrying operation.
- v. Total Cost of the project is about **Rs.3,22,11,000/-**.
- w. Infrastructures around the quarry lease applied area:

TABLE-1

Particulars	Location	Approximate aerial distance from lease applied area
Nearest Post Office	Thirumal	1.0km – NE
Nearest Government School	Thirumal	1.0km – NE
Nearest Dispensary	Kallikudi	8.0km – SW
Nearest Town	Kallikudi	8.0km – SW
Nearest Police Station	Kallikudi	8.0km – SW
Nearest Govt. Hospital	Kallikudi	8.0km – SW
Nearest D.S.P. Office	Thirumangalam	14.0km – NW
Nearest Railway Station	Kallikudi	8.0km – SW
Nearest Railway Line	Madurai – Virudhunagar	7.2km – West
Nearest National Highway	Kanniyakumari – Bengaluru (NH-44)	7.5km – West
Nearest State Highway	Kallikudi – Kariapatti (SH-154)	2.0km – South
Nearest Major District Road	Koodakovil – Mythanpatti (960)	250m – East
Nearest Airport	Madurai	15.0km – NE
Nearest Seaport	Thoothukudi	105.0km – SE
District Head Quarters	Madurai	25.0km – NE

**2.0 GENERAL INFORMATION**

2.1 a) Name of the Applicant : Thiru. D. Sakthivel,
S/o. Durairaj,

b) Address of the Applicant (With Phone No and Aadhaar No.)

Address : No.15, Melaratha Veethi,
Thiruparankundram,
Madurai District.

State with Pin Code : Tamil Nadu – 625 005

Mobile No : +91 98421 26789

Aadhaar No : 5136 7829 0979 (Annexure No. VIII)

E-mail : kuppusamns@gmail.com

c) Status of the Applicant (Individual / Company / Firm):

The applicant is an individual.

2.2 a) Mineral which the Applicant intends to mine:

The Applicant intends to quarry Rough stone and Gravel only.

b) Precise area communication letter details received from the Competent Authority of the Government:

The precise area communication letter was received from the Deputy Director/Assistant Director(i/c), Department of Geology and Mining, Madurai District vide **Rc.No.996/Mines/2023, Dated: 12.10.2023** (Refer Annexure No. I).

c) Period of permission / lease to be granted:

Ten Years.

d) Name and address of the Qualified Person who preparing the Mining Plan:

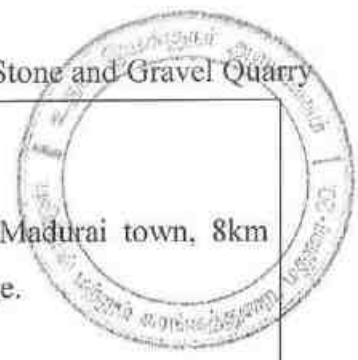
Name : **M. SANTHOSHKUMAR, M.Sc.,**
Qualified Person
Under Rule 15(I)(a) and (I)(b) of MCR, 2016

Address : Plot No.3, Kattuvattam, Kothukara Samathi Via,
Kannakurichi,
Salem – 636 008.

Mobile : +91 97914 41745

Email : santoshgeo2004@gmail.com

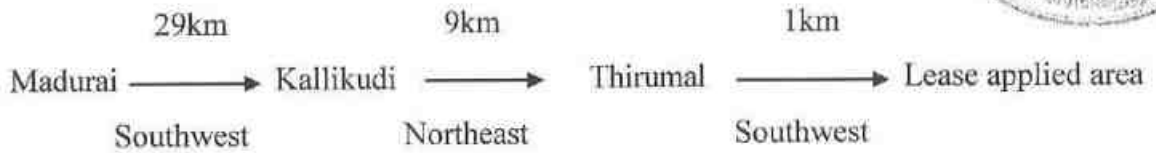
(Please Refer Annexure No. IX and IX-A).



3.0 LOCATION

a) Details of the area with location map:

The lease applied area is located about 25km Southwest side of Madurai town, 8km Northeast side of Kallikudi town and 1km Southwest side of Thirumal Village.



Location Map of the Lease Applied area

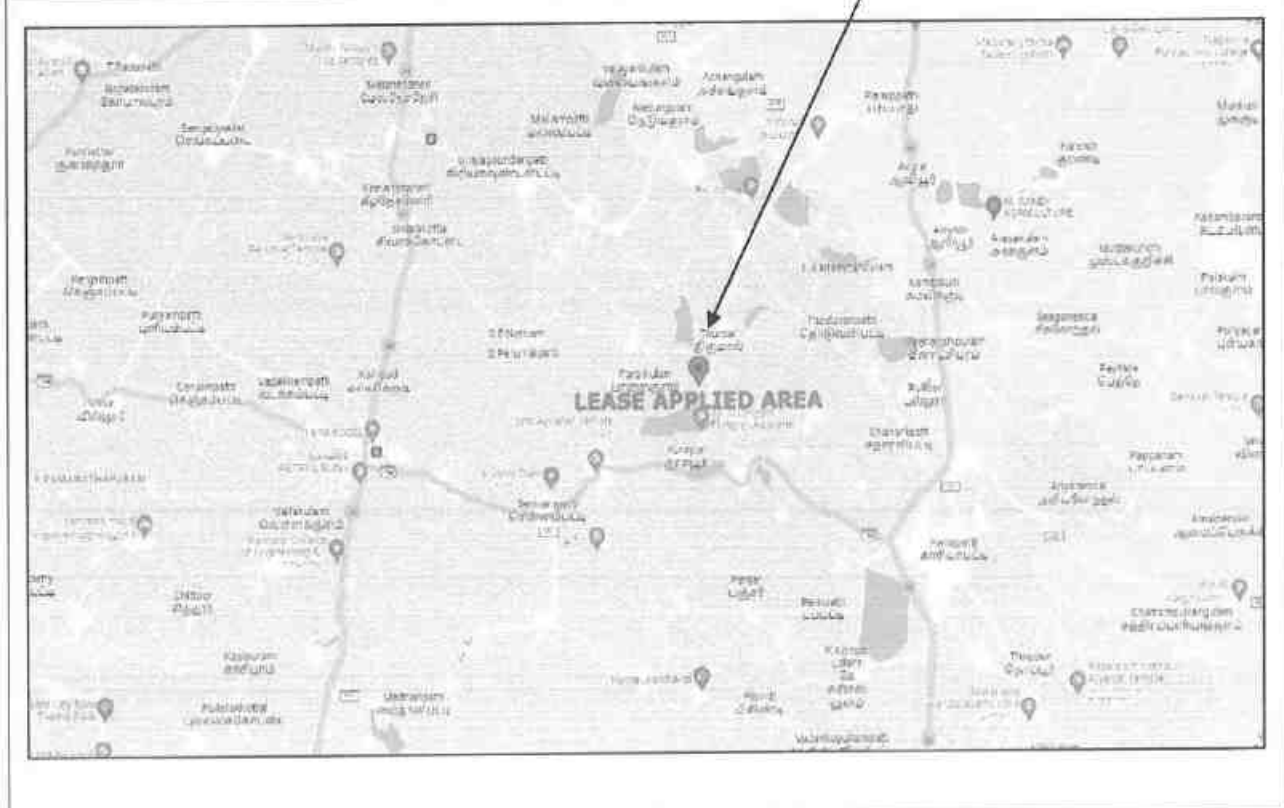
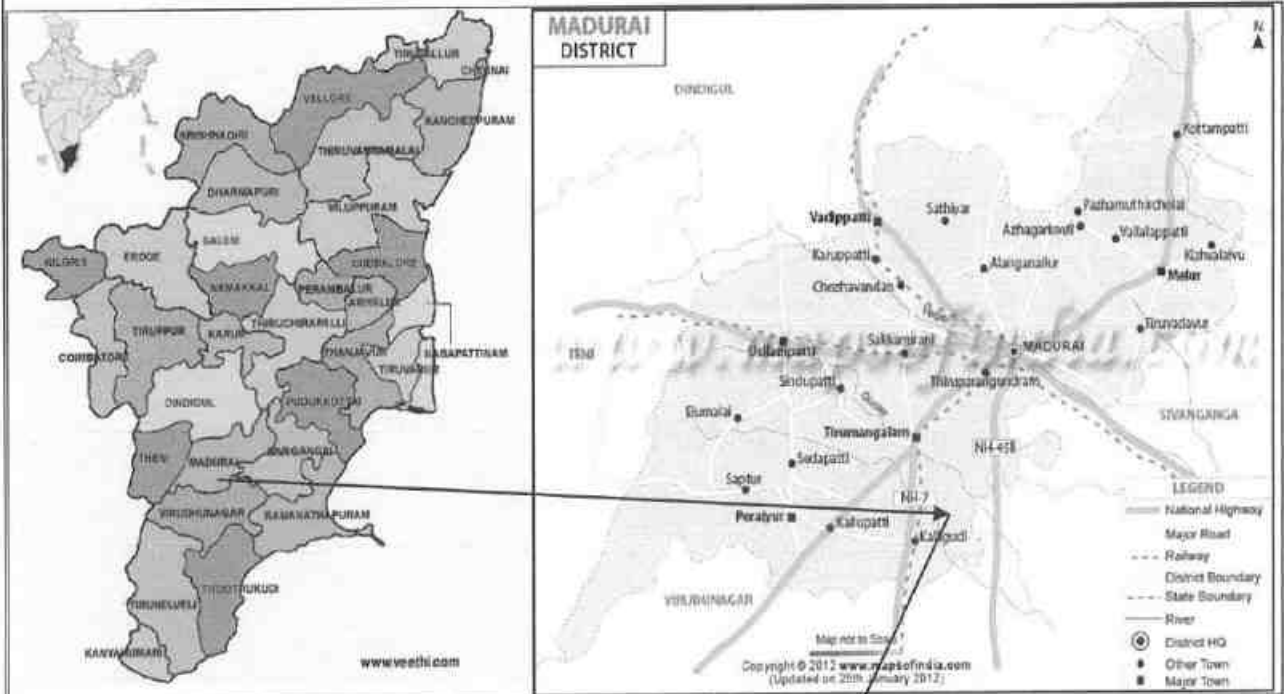


TABLE-2

District	Taluk	Village	S.F. Nos.	Area in Ha.	Patta No.
Madurai	Kallikudi	Thirumal	217/2A(P)	0.53.25	3418
			217/2B	0.17.01	3436
			221/3(P)	0.34.78	3051
			217/4	0.69.00	3325
			222/2	0.43.50	
			221/4A(P)	0.52.81	3063
			221/4B(P)	0.37.48	
			222/1(P)	0.63.68	
			222/3A	0.46.00	
			222/3B1	0.24.50	
			223/2B	0.33.00	
Total Extent				4.75.01	

b) Classification of the area (Ryotwari/ Poramboke / others):

It is Patta lands, classified as Punsei (Barren land) which is not fit for vegetation/ Cultivation.

c) Ownership / Occupancy of the applied area (surface right):

It is Patta lands, the S.F.Nos. 217/2A and 217/2B registered in the name of Thiru. T. Duraigopalsamy, S/o. Thalapathy vide patta Nos. 3418 and 3436 and other S.F.Nos. are registered in the name of Tmt. D. Dhanalakshmi, W/o. T. Duraigopalsamy vide Patta Nos. 3051, 3325 and 3063 (Refer Annexure Nos. IV & VI). The applicant has obtained consent from the pattadar for the period of ten years (Refer Annexure Nos. VII and VII-A).

d) Toposheet No. with latitude and longitude:

The lease applied area falls in the Toposheet No: 58 K/02 Latitude between: 09°42'26.88"N to 09°42'38.86"N and Longitude between: 78°02'42.36"E to 78°02'50.07"E on WGS datum-1984. Please refer the Plate Nos. I to II.

e) Existence of public road / Railway line, if any nearby and approximate distance:

The approach (cart track) road is situated on the Southern side, which is connects to the Koodakovil – Mythanpatti Road is located at 250m on the Eastern side of the lease applied area.

Multiple road access is available from the quarry to state highways and National Highway, no towns are enrooted hence the traffic density is not much more due to the transportation of Rough stone and Gravel.

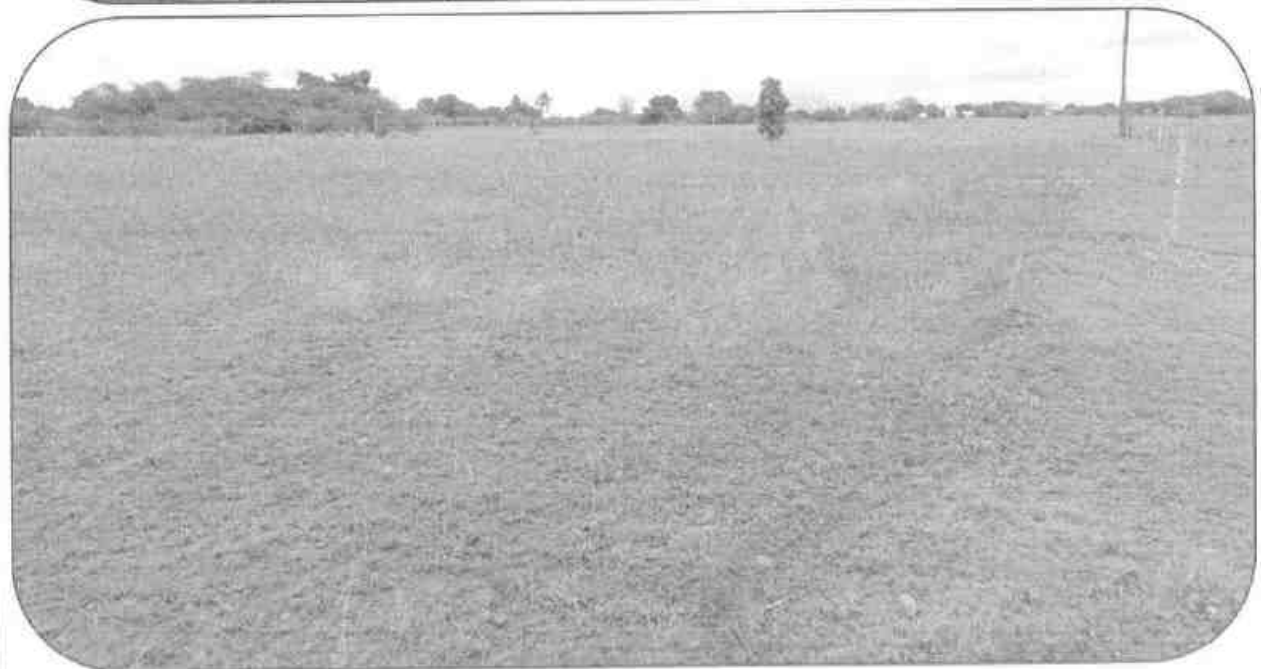
The approach road from the quarry will be constructed and the same has been utilized for haulage and maintained during the entire lease period.

The Nearest Railway line is Madurai - Virudhunagar which is located about 7.2km on the Western side of the area.

PART – A**4.0 GEOLOGY AND MINERAL RESERVES****4.1 Brief description of the Topography and general Geology of the area (with plans):**

The lease applied area is exhibiting plain terrain. The area has gentle sloping towards Southeast side and altitude of the area is 127m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pit.

The Water level in the surrounding area is 57m below general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.

Topographical View of Lease Applied Area

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E – S40°W with dipping towards SE60°.

The general geological sequences of the rocks in this area are given below:

↑	AGE	FORMATION
	Recent	- Quaternary formation (Gravel)
	-----Unconformity-----	
	Archaean	- Charnockite
		Peninsular Gneiss complex

4.2 Details of exploration already carried out if any:

State Geology and Mining Dept, Govt. of Tamil Nadu, has carried out the regional prospecting and exploration in these areas during 1992 to 1993.

Geological Survey of India has carried out detailed mapping in Madurai District. Besides, the Recognized Qualified Person and his team members made a detailed geological study of the proposed area. The Rough stone formation is clearly inferred from the nearby existing quarry pit.

4.3 Estimation of Reserves:

a) Geological reserves with geological sections on a scale of 1:1000 / 1:2000

As far as Rough stone (Charnockite) is concerned, the only practical method is the systematic geological mapping and delineation of Rough stone within the field and careful evaluation of body luster, physical properties, engineering properties, commercial aspects etc.,

Totally seven sections have been drawn, three sections drawn along the strike direction as (X-Y, X1-Y1 and X2-Y2) Length wise and other four cross sections are drawn perpendicular to strike as (A-B, C-D and E-F) Width wise to cover the maximum area considered for lease upto 47m depth.

The Topographical, Geological plan and sections demarcated the commercial marketable Rough stone (Charnockite) deposit has been prepared in the scale of 1:1000 (please refer the Geological plan and sections Plate Nos. III and III-A). As the sale of Rough stone are in terms of cubic metres (Volume) only and not in terms of tonnage.

Estimation of Geological Resources (Plate Nos. III & III-A):

The Geological Resources of Rough Stone and Gravel are calculated upto a depth of 47m [2m Gravel + 45m Rough stone] below ground level. The total **Geological Resources are calculated by area method**. The total geological resources are given below:

TABLE - 3

GEOLOGICAL RESOURCES			
Area (m ²)	Depth (m)	Geological Resources in Rough stone (m ³)	Gravel (m ³)
47501	2	-	95002
47501	45	2137545	-
Total		2137545	95002

The Geological Resources of Gravel : 95,002m³

The Geological Resources of Rough Stone : 21,37,545m³

Estimation of Mineable Reserves:

The mineable reserves are calculated after leaving the safety distance and Bench loss.

TABLE - 4

Section	Bench	Length (m)	Width (m)	Depth (m)	Mineable Reserves in Rough stone (m ³)	Gravel (m ³)
XY-AB	i	108	107	2	-	23112
	ii	105	101	5	53025	-
	iii	100	91	5	45500	-
	iv	95	81	5	38475	-
	v	90	71	5	31950	-
	vi	85	61	5	25925	-
	vii	80	51	5	20400	-
	viii	75	41	5	15375	-
	ix	70	31	5	10850	-
	x	65	21	5	6825	-
Total					248325	23112
X1Y1-CD	i	100	146	2	-	29200
	ii	94	140	5	65800	-
	iii	84	130	5	54600	-
	iv	74	120	5	44400	-
	v	64	110	5	35200	-
	vi	54	100	5	27000	-
	vii	44	90	5	19800	-
	viii	34	80	5	13600	-
	ix	24	70	5	8400	-
	x	14	60	5	4200	-
Total					273000	29200
X2Y2-EF	i	106	83	2	-	17596
	ii	103	77	5	39655	-
	iii	98	67	5	32830	-
	iv	86	57	5	24510	-
	v	74	47	5	17390	-
	vi	62	37	5	11470	-
	vii	49	27	5	6615	-
Total					132470	17596
Grand Total					653795	69908

Total Mineable Reserves of Gravel : 69,908m³

Total Mineable Recoverable Reserves of Rough stone @ 100% : 6,53,795m³

The mineable reserves have been computed as 6,53,795 m³ of Rough stone at the rate of 100% recovery and 69,908m³ of Gravel for a period of ten years upto a depth of 47m below ground level.

5.0 MINING

5.1. Method of mining (opencast / underground):

Open cast Mechanized Mining is being carried out with 5.0 meter vertical bench with a bench width is not less than the bench height.

However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) is available with Director General of Mines Safety. If the applicant/lessee intends to modify the dimensions of benches, relaxation and permission are available with Director General of Mines Safety under 106 (2) (b) of Metalliferous Mines Regulations, 1961. In such a scenario if there is any drastic change in the Resources and Reserves a modified plan will be submitted to the concerned authority for necessary relaxation, clearance and permission. The relaxation will be applied and obtained after the execution of lease deed / commencement of quarry operation.

5.2. Mode of working (mechanized, semi mechanized, manual):

The Rough Stone is proposed to quarry at 5m bench height & width with conventional Opencast Mechanized Method.

The quarry operation involves shallow jack hammer and Wagon drilling, slurry explosives in blasting, excavation, Loading and transportation of Rough stone to the needy crusher.

The production of Rough stone in this quarry involves the following method which is typical for Rough Stone quarrying in contrast to other major mineral mining.

Splitting of rock mass of considerable volume from the parent rock mass by Wagon and jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers.

Occasionally hydraulic excavators are attached with rock breakers for fragmentation to avoid secondary blasting. The primary boulders thus splitted are removed from the pits by excavators and further made to smaller sizes by rock breakers attached in excavators. It is a conventional opencast mechanized method of mining.

**5.3. Proposed Bench Height and Width:**

The bench height is proposed 5.0 meter vertical bench the width of the bench is not less than the Height.

5.4. Indicate the overburden / mineral production expected pit wise as detailed below (composite plan and section showing pit layout, dumps, disposal of waste if any etc.):

The overburden in the form of Gravel, the Gravel will be directly loaded into Trucks for the filling and levelling of low-lying areas, this will be done only after obtaining permission and paying necessary seigniorage fee to the Government. The excavated rough stone will be directly loaded into Trucks to the needy customers. The Composite year wise Development and production plan and sections indicating the pit lay out and green belt development are shown in Plate Nos. III and III-A.

Year wise Development and Production**TABLE - 5**

YEARWISE PRODUCTION FOR FIRST FIVE YEARS								
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves in Rough stone (m³)	Gravel (m³)	
I	X1Y1-CD	i	68	146	2	-	19856	
		ii	62	140	5	43400	-	
		iii	52	130	5	33800	-	
		iv	42	120	5	25200	-	
	Total						102400	19856
II	X1Y1-CD	i	32	146	2	-	9344	
		ii	32	140	5	22400	-	
		iii	32	130	5	20800	-	
		iv	32	120	5	19200	-	
	XY-AB	i	48	107	2	-	10272	
		ii	45	101	5	22725	-	
		iii	40	91	5	18200	-	
		iv	35	81	5	14175	-	
	Total						117500	19616
	III	X2Y2-EF	i	106	83	2	-	17596
XY-AB		i	60	107	2	-	12840	
		ii	60	101	5	30300	-	
		iii	60	91	5	27300	-	
		iv	60	81	5	24300	-	
		v	60	71	5	21300	-	
Total						103200	30436	

IV	XY-AB	v	30	71	5	10650	-
		vi	85	61	5	25925	-
	X1Y1-CD	v	64	110	5	35200	-
		vi	54	100	5	27000	-
		vii	44	90	5	19800	-
	Total						118575
V	XY-AB	vii	80	51	5	20400	-
		viii	75	41	5	15375	-
		ix	70	31	5	10850	-
		x	65	21	5	6825	-
	X1Y1-CD	viii	34	80	5	13600	-
		ix	24	70	5	8400	-
		x	14	60	5	4200	-
	Total						79650
Grand Total						521325	69908

The Recoverable reserves have been computed as **5,21,325m³** of Rough stone at 100% recovery for first five years and **69,908m³** of Gravel for first three years upto a depth of 47m below ground level (R.L.127m to R.L.80m) (Refer Plate No. III).

TABLE - 5A

YEARWISE PRODUCTION FOR SECOND FIVE YEARS						
Year	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves in Rough stone (m ³)
VI	X2Y2-EF	ii	103	77	5	39655
VII	X2Y2-EF	iii	98	67	5	32830
VIII	X2Y2-EF	iv	86	57	5	24510
IX	X2Y2-EF	v	74	47	5	17390
X	X2Y2-EF	vi	62	37	5	11470
		vii	49	27	5	6615
Total						18085
Grand Total						132470

The Recoverable reserves have been computed as **1,32,470m³** of Rough stone only at 100% recovery to a depth of 32m below ground level (R.L.127m to R.L.95m) for remaining five years of the lease period (Refer Plate No. IIIA). The proposed depth of quarrying at 47m during the first five year hence, the depth considered for 47m for the entire lease period. Total excavation will be proposed **6,53,795m³** of Rough stone and **69,908m³** of Gravel for the period of ten years.

The applicant ensures the total quantity proposed in the benches will not exceed during the quarrying operation. Besides the rough stone locked up in benches will be exploited after obtaining necessary permission from the office of Director of Mine Safety, Chennai region by submitting relevant documents, appropriate safety plans and its Mitigation measures.

One lorry load	=	12m ³ (approx.)
Total No of Working days	=	300 Days per year
Total quantity to be removed during the ten years plan period	=	6,53,795m ³
Hence total Lorry loads per day	=	6,53,795m ³ /12m ³
	=	54,483 Lorry loads
	=	54,483/10 years
	=	5,448/300 days
Rough Stone	=	18 Lorry loads per day
Total quantity to be removed during the first three years	=	69,908m ³
Hence total Lorry loads per day	=	69,908m ³ /12m ³
	=	5,826 Lorry loads
	=	5,826/3 years
	=	1,942/300 days
Gravel	=	6 Lorry loads per day
Working hours = 8.00 am to 5.00 pm (with 12.00-1.00 P.M. lunch break)		

5.5. Machineries to be used:

For Mining:

The following machineries are utilized on rental basis for the development and production work at this quarry.

TABLE - 6

I. DRILLING MACHINE:

S. No.	Type	Nos	Dia Hole mm	Size Capacity	Motive power
1	Jack-Hammer	6	32	1.2m to 2.0m	Compressed air
2	Compressor	2	-	400 psi	Diesel Drive
3	Wagon Drill	1	32	800psi	Diesel Drive

II. EXCAVATION & LOADING EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Excavator with Bucket and Rock Breaker	1	300	Diesel Drive

III. HAULAGE WITHIN THE MINE & TRANSPORT EQUIPMENT:

S. No.	Type	Nos	Capacity	Motive Power
1	Trucks	3	35 tonnes	Diesel Drive
2	Water Sprinkler	1	10000 litres	Diesel Drive

5.6. Disposal of Overburden/Waste:

The overburden in the form of Gravel, the Gravel will be directly loaded into Trucks for the filling and levelling of low-lying areas. The excavated rough stone (100%) will be directly loaded into Trucks to the needy customers. There is no Waste anticipated during this plan period hence, disposal of waste does not arise.

5.7. Brief note on conceptual mining plan for the entire lease period base on the geological, mining and environmental considerations:

Conceptual mining plan is prepared with an object of long-term systematic development of benches, layouts, selection of permanent structures, depth of quarrying and ultimate pit dimensions, selection of sites for construction of infrastructure, etc.,

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.,

As the applicant has applied quarry lease for ten years, the ultimate pit limit (dimension) at the end of this mining plan period is given below:

TABLE - 7

Section	Length (m) (Max.)	Width (m) (Avg.)	Depth (m) (Max.)
XY-AB	108	107	47m below ground level
X1Y1-CD	100	146	47m below ground level
X2Y2-EF	106	83	32m below ground level

Greenbelt has proposed on the safety zone and Panchayat roads by planting Neem, Pongamia pinnata, Casuarina, etc., trees of native species. All the base line information studies like Air quality monitoring, Noise and vibration monitoring, Water analysis studies will be carried out every year as per the MoEF & CC Norms. Please refer Plate Nos. III, III-A & IV.

It is proposed to engage any local institution to monitor the EIA and EMP during the course of quarrying operation after the grant of quarry lease.

There is no waste anticipated during the entire life of quarry. Hence, backfilling is not possible in this Rough stone quarry. After completion of quarry operation the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle (Refer Plate No. IV and V).

6.0 BLASTING

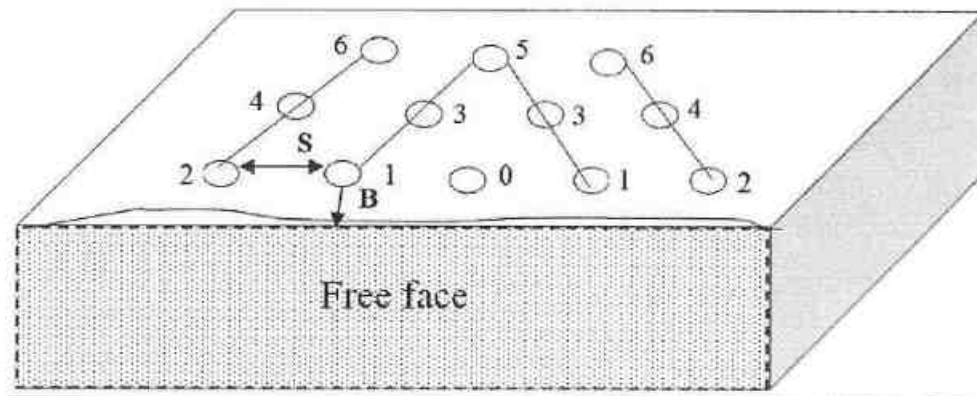
6.1 Blasting pattern:

The quarrying operation is proposed to be carried out by Mechanized Opencast Method in conjunction with conventional method of mining using Wagon, Jack hammer drilling and blasting with NONEL initiation of shattering effect for loosening the Rough stone. Nonel initiation provides a reasonably good solution to the fly rock problem. The main objectives of Nonel Blasting are to reduce the ground vibration, noise, flyrocks generated due to blasting operations. The overall cost of blasting in NONEL is very less compared to electrical blasting and hence it optimizes the cost of blasting.

Drilling and blasting parameters are as follows:

Depth of Each hole	:	1.5m
Spacing between holes	:	1.2m
Burden for hole	:	1.0m
Diameter of hole	:	32mm
Pattern of hole	:	Zigzag – Multi-rows
Inclination of holes	:	80° from horizontal
Use of delay detonators	:	25 millisecond delays
Detonating fuse	:	Non-Electric Detonators

BLASTING PATTERN DRAWING



Staggered "V" Pattern of Blasting Design

Spacing	=	1.2m
Burden	=	1.0m
Depth of the hole	=	1.5m
No of holes proposed per day	=	190 Holes

6.2 Type of explosives to be used:

Small Dia. 25mm Slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of Rough stone. No deep hole drilling or secondary blasting is proposed.

6.3 Measures proposed to minimize ground vibration due to blasting:

The quarry is situated more than 300m away from the nearby villages, Controlled blasting measures of NONEL initiation is being adopt for minimizing ground vibration and fly rock.

Shallow depths jackhammer and Wagon drilling & blasting is proposed to be carried out with minimum use of explosive mainly to give heaving effect in rough stone for easy excavation and to control fly rock.

NONEL Delay detonators:

Delay blasting (millisecond delays) permits to divide the shot in to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals.

The major advantages of delay blasting are:

- Reduction of ground vibration.
- Reduction in air blast.
- Reduction in over break.
- Improved fragmentation.
- Better control of fly-rock.

Blasting program for the production per day:

No of Holes	= 190 Holes
Yield	= 570 Tons
Powder factor	= 6 Tons/Kg of explosives
Total explosive required	= 95 Kg-Slurry explosives
Charge/ hole	= 0.5 Kg
Blasting at day time only	= 12.00 – 12.30 P.M. (whenever required)

6.4 Storage and safety measures to be taken while blasting:

The applicant will engage authorized explosive agency to carry out the small amount of blasting and it will be supervised by competent and statutory foreman/Permit Mines Manager. The explosives agencies should be having the valid Blaster certificate. He will blast holes in the quarry site. After the completion of Blasting the explosives Agencies will take it out back the remaining quantity of Explosives. The Competent Qualified Statutory personnel appointed by the applicant will maintain the records of Explosives as per the Indian Explosives Act.

7.0 MINE DRAINAGE**7.1 Depth of water table (based on nearby wells and water bodies):**

The water table in the area is about 57m which is observed from the existing private boreholes. The lease area is fully covered by Massive Charnockite formation. The quarry operation confined to well above the water table hence, the Ground Water problem will not arise. If water seepage may occur due to the fracture, the same will be used for Greenbelt. Anyhow, Garland drain will be constructed all along the boundary to prevent surface run-off water entering into the quarry.

TABLE – 8

Type	Distance & Direction	Location
Bore Well	265m Western side	09°42'36.24"N 78°02'34.53"E

7.2 Arrangements and places where the mine water is finally proposed to be discharged:

The quarry operations are confined to well above the water table during the entire lease period. If water is encountered at quarry due to rain water and seepage, the same will be pumped out by 5HP water pump and discharge to the Green belt development areas. Besides, the water will also be used for dust suppression on haul roads during Haulage of machineries.

8.0 OTHER PERMANENT STRUCTURES (also shown in the map)**TABLE – 9**

S. No.	Salient Features Present around site	Prescribed safety distance	If any present within Prescribed distance it's actual distance and direction from the area
8.1	Railways, Highways	50m	None of the above situated within 50m radius. Nearest National Highway is Kanniyakumari – Bengaluru (NH-44) – 7.5km – W. Nearest State Highway is Kallikudi – Kariapatti (SH-154) – 2km – South. Nearest Major District is Koodakovil – Mythanpatti (960) – 250m – East. Nearest Railway line is Madurai – Virudhunagar – 7.2km – West.
8.2	Water Bodies (River, Pond, Lake, Odai, Canal)	50m	Odai is passing in S.F.No. 219/5 situated on the Eastern side, a safety distance of 50m has been provided to the Odai. Kurayur Bit-1 Periyakulam Kanmoi is situated at 65m on the Southern side. There is no other water bodies located within 50m radius of the area (Refer Plate No. IB and II).

8.3	Village Road	10m	No village road is passing within 10m radius on the lease applied area.																				
8.4	Habitation/ Public Archaeological historical Places of worships	Village/ building/ or monument/ Places of worships	300m	None of the above situated within 300m radius from the lease applied area (Refer Plate No I-B).																			
8.5	Housing area, EB line (HT & LT Line)	50m	There is an EB-HT Tower line passing on the Southwest side, a safety distance of 50m has been provided to the power line. No other EB line or Housing area located within 50m radius from the lease applied area.																				
8.6	Adjacent Patta lands / Govt. Land	7.5m/10m	<table border="1"> <thead> <tr> <th>Direction</th> <th>S.F.No.</th> <th>Classification</th> <th>Safety Distance</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>217/2A(P),3A,3B and 3C</td> <td>Patta land</td> <td>7.5m</td> </tr> <tr> <td>East</td> <td>217/5, 221/4C, 222/3B2,3C, 3D and 219</td> <td>Patta land</td> <td>7.5m and 50m to the Odai</td> </tr> <tr> <td>South</td> <td>221/3(P),4A(P) and 4B(P)</td> <td>Patta land</td> <td>7.5m and 50m to the Odai</td> </tr> <tr> <td>West</td> <td>217/1I, 1J, 1K1C, 1K2, 1K3, 1K4, 1K5, 1K6, 221/1A, 1B, 1D, 2, 222/1(P) and 223</td> <td>Patta land</td> <td>7.5m and 50m to the EB-HT line and Kanmoi</td> </tr> </tbody> </table> <p>(Refer Plate No. II).</p>	Direction	S.F.No.	Classification	Safety Distance	North	217/2A(P),3A,3B and 3C	Patta land	7.5m	East	217/5, 221/4C, 222/3B2,3C, 3D and 219	Patta land	7.5m and 50m to the Odai	South	221/3(P),4A(P) and 4B(P)	Patta land	7.5m and 50m to the Odai	West	217/1I, 1J, 1K1C, 1K2, 1K3, 1K4, 1K5, 1K6, 221/1A, 1B, 1D, 2, 222/1(P) and 223	Patta land	7.5m and 50m to the EB-HT line and Kanmoi
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South	221/3(P),4A(P) and 4B(P)	Patta land	7.5m and 50m to the Odai																				
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8.7	Boundaries of the permitted area	7.5m/10m	<p>The boundaries of the permitted areas are as follows (Refer Plate No. II):</p> <p>North - S.F.Nos. 217/2A(P),3A,3B and 3C</p> <p>East - S.F.Nos. 217/5, 221/4C, 222/3B2, 3C, 3D and 219</p> <p>South - S.F.Nos. 221/3(P),4A(P) and 4B(P)</p> <p>West - S.F.Nos. 217/1I, 1J, 1K1C, 1K2, 1K3, 1K4, 1K5, 1K6, 221/1A, 1B, 1D, 2, 222/1(P) and 223.</p>																				
8.8	Reserve forest	60m	There is no reserve forest situated within 60m radius of the lease applied area (Refer Plate No. IA).																				
8.9	Protected area / ECO sensitive area/ Wild Life Sanctuary	10km	There is no Wild Life Sanctuary/ ECO sensitive Zone/ Critically Polluted Area/ HACA/ CRZ located within 10km radius of the area (Refer Plate No. IA).																				

9.0 EMPLOYMENT POTENTIAL & WELFARE MEASURES**9.1 Employment potential (skilled, semi-skilled, un skilled):**

The following manpower's are proposed in the mining plan to carry out the day-to-day quarrying activities, the same employment is maintaining aimed at the proposed production target and also to comply with the statutory provisions of the Metalliferous mines regulations, 1961.

a. Skilled labour:

Mine Foreman	:	1
Blaster/mate	:	1
Excavator – Operator	:	1
Truck Driver	:	4
Water sprinkler Driver	:	1
Wagon Drill Machine Operator	:	1
Jack-Hammer operator	:	12

b. Semi-skilled:

Security	:	1
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c. Unskilled:

Labour & Helper	:	4
Co-operator and Cleaner	:	8
Total	:	34

The above manpower is adequate to meet out the production schedule and the machinery strength envisaged in the mining plan and to comply with the statutory provisions of the Mines Safety Regulations. It is been ensured that the labour will not be employed less than 18 years, **No child labour** will engaged or entertained for any kind of quarrying operations. All the labours engaged for quarrying operations will be insured during the quarry lease period.

9.2 Welfare Measures:**a) Drinking Water:**

Packaged drinking water is available from the nearby water vendors in Kallikudi which is located about 8km on the Southwest side of the lease applied area.

b) Sanitary Facilities:

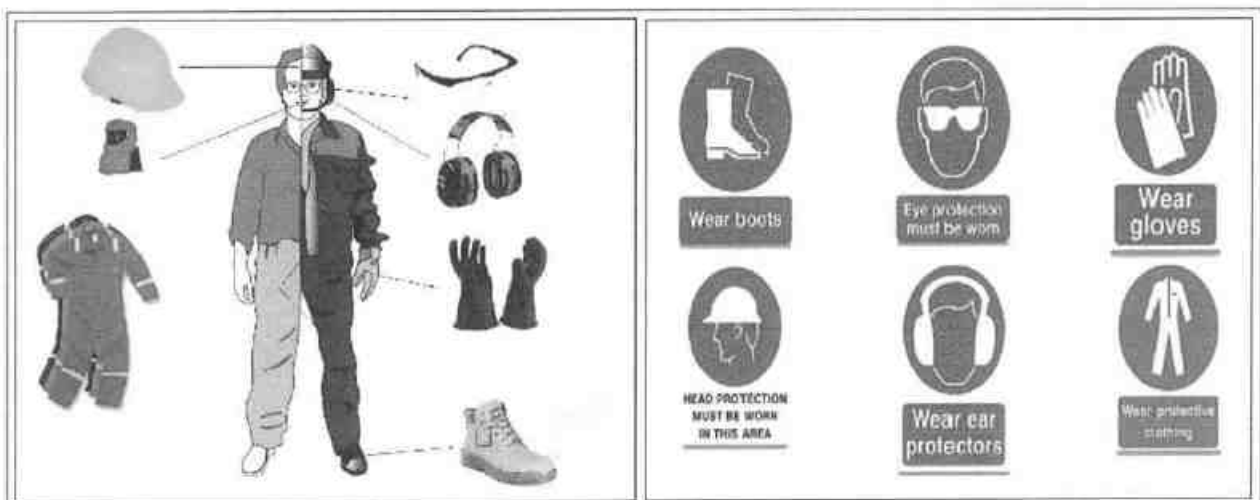
Hygienic modern Sanitary Facilities will be constructed in the safety area as semi-permanent structure and it will be maintained periodically.

c) First aid facility:

First aid kits are kept in Mines office room, in case of such eventuality is the victim will be given first aid immediately at the site by the competent and statutory foreman/permit manager/mate will be in charge of first aid and injured person will be taken to the hospital by the applicant's vehicle. Hospital is available in Kallikudi located at a distance of 8km on the Southwest side.

d) Labour Health:

Periodically medical check-up related to occupational health safety will be conducted to all the workers in applicant own cost.

e) Precautionary safety measures to the labourers:

- Helmets,
- Reflector Jackets
- Dust mask
- Mine Goggles,
- Ear plugs,
- Ear muffs
- Safety Shoes

All personnel protective devices will be provided as per the specification approved by Director of mines safety. Periodically medical check-up will be conducted for all workers for any mine health related problems. Proper training and vocational education will be given by qualified and experienced safety officer to all the employees about the safety and systematic Rough stone quarrying operations. The drillers and workers will be sent for vocational training periodically, to carry out the quarrying operations scientifically and to safe guard the men and machinery and to create awareness about conventional opencast quarrying operations.

PART – B**10.0 ENVIRONMENT MANAGEMENT PLAN****10.1 Existing Land use pattern:**

The quarry lease applied area is exhibiting plain terrain. The area is a dry barren land devoid of Agriculture. Hence, the area did not utilized any other purpose in earlier.

LAND USE TABLE – 10








Description	Present area (Ha)
Quarrying Pit	Nil
Infrastructure	Nil
Roads	Nil
Green Belt	Nil
Un-utilized Area	4.75.01
Grand Total	4.75.01

10.2 Water Regime:






It is a simple opencast quarry operation. The quality of water will not be affected due to this quarrying operation. During rainy season the water table in the adjacent area may raise up. The subject area is a hard batholithic formation hence, the water table will not encounter from adjacent lands. However, mitigation measures will be carried out like Garland drains constructed on all sides of quarry pit to avoid surface run-off rain water entering into the pit.

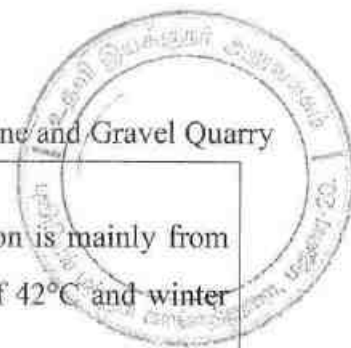
The waste water discharged to water bodies will be met the standard prescribed under the Environment (Protection) Act – 1986 by The Ministry of Environment, Forest and Climate change.

10.3 Flora and Fauna:**TABLE-11**

S.No	Name of the plant (Scientific)	Family Name	Common Name	Habit	Picture
1.	<i>Cocos nucifera</i>	Arecaceae	Coconut, Thennai	Tree	
2.	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree	
3.	<i>Casuarina equisetifolia</i>	Casuarinaceae	Soukku, coastal she-oak	Tree	
4.	<i>Borassus flabellifer</i>	Arecaceae	Palm tree	Tree	
5.	<i>Saccharum officinarum</i>	Poaceae	Karumbu, Sugarcane	perennial herb	
6.	<i>Prosopis juliflora</i>	Fabaceae	Seemai karuvelam, Mesquite	Tree	
7.	<i>Morinda citrifolia</i>	Rubiaceae	Manchanathi and Nuna	Tree	

List of Fauna

S.No.	Scientific Name	Common Name	Picture
1.	<i>Capra aegagrus hircus</i>	Goat	
2.	<i>Funambulus palmarum</i>	Squirrel	
3.	<i>Bos taurus</i>	Cow	
4.	<i>Corvus levaillantii</i>	Crow	
5.	<i>Gallus gallus domesticus</i>	Hen	

**10.4 Climatic Conditions:**

The area receives rainfall of about 985mm/annum and the rainy season is mainly from Oct - Dec during monsoon. The summer is hot with maximum temperature of 42°C and winter encounters a minimum temperature of 22°C.

10.5 Human settlement:

There are few villages located within 5km radius of the area; the approximate distance, direction and populations are given below:

TABLE - 12

S. No.	Name of the Village	Approximate distance & Direction from lease applied area	Approximate population
1.	Thirumal	1.0km - NE	3,100
2.	Kurayur	3.0km - SW	5,400
3.	Saluppapillayarnatham	3.0km - NW	2,200
4.	Maruthangudi	2.0km - SE	1,300

Basic human welfare Amenities such as Health Centre, Schools, Communication Facilities, and Commercial Centres etc., are available at Kallikudi located at a distance of 8km on the Southwest side of the area.

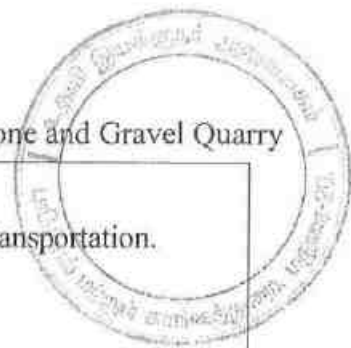
10.6 Plan for air, dust suppression:

The air quality will be affected by the Suspended Particulate Matter (SPM) generated by the mild blasting, hand jack hammer and Wagon drilling, Loading and unloading during the Rough stone quarry operation.

The following Mitigations measures will be adopted to arrest the dust at the source:

- Compaction, gradation and drainage on both sides for haulage road.
- Mist Water spraying will be carried out by means of water sprinklers to suppress the dust emission in the Haul roads.
- Vegetations will be formed on the non quarrying area.
- Avoiding spillages during the transportation.
- Wet drilling with latest eco friendly drill machine with separate dust extractor unit.
- Enforcing speed limits of 20km/hr within quarry area.
- Regular monitoring of exhaust fumes as per RTO norms.
- All personnel protective equipment like Nose-mask, earplug/ muffs will be provided to the Workers.

Air quality will be monitored periodically as per Norms and Mitigate measures carried out to prevent dust and Air propagation in to air. The estimated budget for dust suppression would be around **Rs.52,000/year**.



10.7 Plan for Noise level control:

The noise level increased due to the Excavation, Drilling, Blasting and Transportation.

Engineering Noise control:

Noise will be created due to the usage of Machineries and Vehicles. The following Care and techniques will be proposed to control the Noise and Vibration.

- Selection of new low – noise equipments for the Rough stone quarry operation.
- Proper maintenance done with regular interval by the Oiling and greasing for the machineries and vehicles to control the Source of noise during operation and transportation.
- Modifications of older equipment.
- NONEL blasting will be practiced to control Noise, ground vibration and fly rocks.
- Developing Green belts which act as Acoustic barrier, pollution absorbent and noise controller.
- Transporting vehicles are enforcing the speed limits of 20km/hour within quarry area and not exceed 40km per hour from despatch to destination to reduce Noise level.

Sentries with flags & whistle will be posted in village road junction and populated area to control and regulate traffic.

Shallow holes of 32mm diameter and maximum depth of 1.5m will be drilled and conventional low power explosives such as mild explosives, ordinary safety fuse will be used for Rough stone. Hence, ground vibration and noise pollution i.e., minimal and restricted within the quarry working area.

Noise level monitoring and other Mitigation measures will be carried out to reduce Noise and Vibration. The estimated budget for Noise level monitoring would be around **Rs.2,000/Year**.

10.8 Environmental impact assessment statement describing impact of mining on the next ten years:

In the mining plan proposed for a production of Rough stone does not involve deep hole drilling and blasting. Such limited mining activity is not likely to cause any impact adversely on the environment. As far as pollution of air, water and noise concerned, the environmental impact studies will be conducted as per EIA notification issued by MoEF& CC. It is B2 Category mine. The estimated budget would be around **Rs.7,60,000/-**.

10.9 Proposal for waste management:

There is no waste anticipated in this Rough stone and Gravel quarrying operation. The entire quarried out materials will be utilized (100%).

10.10 Proposal for reclamation of land affected during mining activities and at the end of mining (refilling / fencing etc.):

In the mining plan only to a maximum depth of 47m below ground level has been envisaged as workable depth for safe & economic quarrying operation during entire lease applied area. There is no waste generated hence, backfilling is not possible. After completion of quarry operation the quarried out pit will be allowed to collect the seepage and rainwater and the water storage will be kept as temporary reservoir for charging the nearby wells and the water will be utilized for Green belt development purpose. The quarry area will be fenced with Barbed wire fencing also safety bund constructed around the quarry to prevent inadvertent entry of public and cattle. The barbed wire fencing cost would be around **Rs.3,60,000/-**.

10.11 Programme of Greenbelt development (indicate extend, number, name of species to be afforested):

The safety zone along the boundary barrier has been identified to be utilized for Greenbelt development. Around 4,966m² area will be utilized for first five years on the North and western side and 4,363m² area for second five years on the Eastern side safety zone by planting 100 Numbers with 2m height tree saplings during this mining plan period with an anticipated survival rate of 80% (Please refer Plate No.III). Appropriate native species of trees will be planted in a phased manner as described below.

TABLE – 13

Years	No. of trees proposed to be planted	Area to be covered (m ²)	Name of the species	Survival %	No. of trees expected to be grown
I	100	933	Neem, Pongamia Pinnata, Casuarina, etc.,	80	80
II	100	933		80	80
III	100	933		80	80
IV	100	933		80	80
V	100	933		80	80
VI	100	933		80	80
VII	100	933		80	80
VIII	100	933		80	80
IX	100	933		80	80
X	100	932		80	80

Totally 9,329m² area is proposed to for Greenbelt by planting 1000 Numbers of tree saplings during lease period with an anticipated survival rate of 80% (Please refer Plate No. III and IIIA). The estimated budget for plantation and maintenance of green belt development would be around **Rs.2,00,000/-** for the period of ten years.

The greenbelt development will be formed in around the quarried out top benches with 500 tree saplings from third year onwards and 500 tree saplings in approach road at first year of the plan period. The cost would be around **Rs. 2,00,000/-**

10.12 Proposed financial estimate / budget for (EMP) environment management:

Budget Provision for the Mining Plan period:

TABLE – 14

S. No	Monitory and Analysis Description	Rate per location	No. of location	Total Charges/ six months	Total Charges/ year
1	Ambient air quality monitoring	6500	4	26000	52000
2	Noise level monitoring	250	4	1000	2000
3	Ground vibration monitoring	1000	2	2000	4000
4	Water sampling and analysis	9000	1	9000	18000
Total EMP Cost/ year					76,000

The EMP cost would be around Rs. 7,60,000/- for the period of ten years.

A. Operational Cost / Project Cost / Investment:

i)	Land cost	The Land value as per the Government Guideline land cost is about, Rs.12,35,500/ha, hence the total land cost is calculated about 4.75.01ha X Rs.12,35,500/- = Rs.58,68,749/- i.e., Rs.58,69,000/- (Source: https://tnreginet.gov.in/portal/)	Rs.58,69,000/-
ii)		The following machineries are proposed to meet out the productions. i. Excavator (1 No.) ii. Wagon Drill Machine (1No.) iii. Rock breaker (1 No.) iv. Trucks (3 Nos.) v. Compressor (2 No.) vi. Hand jack hammer and loose tools (6 Nos) vii. Water Sprinkling Tanker (1 No.)	56,00,000 50,00,000 1,00,000 90,00,000 15,00,000 3,00,000 15,00,000
		Total	2,30,00,000
iii)	Refilling/ Fencing	Fencing will be constructed around the quarry pit to prevent the inadvertent entry of public and cattle cost would be around	Rs.3,60,000/-
iv)	Labourers shed	Labour sheds already constructed as semi-permanent structure. The cost is around	Rs.5,00,000/-
v)	Sanitary facility	Adequate latrine and urinal accommodation has provided at conveniently accessible places the cost would be around	1,00,000
vi)	Others items	First aid room & accessories	50,000

vii) Drinking water facility for the labourers	Packaged drinking water will be provided for all the Labours. Drinking water will be readily available at conveniently accessible points during the whole of the working shift the cost would be around.	1,00,000
viii) Sanitary arrangement	The latrine and urinal will keep clean and sanitary condition. The maintenance cost would be around.	60,000
ix) Safety kit	All the Safety kit such as Helmet, Earmuffs, Goggles, Reflector Jackets, Safety shoes etc., will be provided to the workers by the applicant own cost which would be around.	50,000
x) Water sprinkling	Water will be sprinkled in the haul roads by own water sprinkler. Hence no cost would be arriving.	Nil
xi) Garland drain	Construction of Garland drain with check dam to prevent surface run-off rain water in to the quarry pit, the construction cost is around.	3,30,000
xii) Greenbelt etc.	Greenbelt development and maintenance will be carried out in the boundary barriers the cost would be around.	2,00,000
	Greenbelt development and maintenance will be carried out in the quarried out top benches.	1,00,000
	Greenbelt development and maintenance will be carried out in the Panchayat road.	1,00,000
	Total Project Cost	3,08,19,000
B. EMP Cost: (Per year)		
Air Quality monitoring		Rs. 52,000/-
Water Quality Sampling		Rs. 18,000/-
Noise Monitoring		Rs. 2,000/-
Ground vibration test		Rs. 4,000/-
	Total Cost	Rs. 76,000/-
Total EMP Cost for the ten years period is Rs.7,60,000/-		
	Description	Amount (Rs.)
	A. Operational Cost	Rs.3,08,19,000/-
	B. EMP Cost	Rs.7,60,000/-
	Total Project Cost (A+ B)	Rs.3,15,79,000/-
	The applicant Indents to involve corporate environment responsibilities (CER) activity like Water Purifier, Plantation, Books to Library, sanitary facility and as per requirement to the Thirumal Government School at 2.0% from the total project cost. The Cost would be around Rs.6,32,000/- .	Rs.6,32,000/-
	Total Cost	Rs.3,22,11,000/-
The Total cost would be around three crore twenty two lakh and eleven thousand only.		

11.0 PROGRESSIVE QUARRY CLOSURE PLAN**11.1 Introduction:**

The Progressive Quarry Closure Plan for Thirumal Rough Stone and Gravel Quarry-lease applied area over an extent 4.75.01 Hectares of Patta lands in S.F.Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu State has been prepared for **Thiru. D. Sakthivel**, S/o. Durairaj, residing at No.15, Melaratha Veethi, Thirupparankundram, Madurai District, Tamil Nadu State – 625 005.

11.2 Present Land use pattern:LAND USE TABLE – 15

Description	Present area (Ha)
Quarrying Pit	Nil
Infrastructure	Nil
Roads	Nil
Green Belt	Nil
Unutilized Area	4.75.01
Grand Total	4.75.01

11.3 Method of Mining:

Open cast Mechanized Mining is being carried out with 5.0 meter vertical bench with a bench width is not less than the bench height for Rough stone.

However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) is available with Director General of Mines Safety. If the applicant/lessee intends to modify the dimensions of benches, relaxation and permission are available with Director General of Mines Safety under 106 (2) (b) of Metalliferous Mines Regulations, 1961. In such a scenario if there is any drastic change in the Resources and Reserves a modified plan will be submitted to the concerned authority for necessary relaxation, clearance and permission. The relaxation will be applied and obtained after the execution of lease deed / commencement of quarry operation.

11.4 Mineral Processing Operations:

The quarried out Rough stone will be transported by the 35tons capacity Truck to the needy crushers. Splitting of rock mass of considerable volume from the parent rock mass by jackhammer and Wagon drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers.

11.5 Reasons for closure:

As the mineral is not going to be exhausted during the proposed plan period no immediate closure is planned due to sufficient reserves are available to carry on the activities. Hence, the reason for closure will be discussed in the final mine closure plan.

**11.6 Statutory obligations:**

The applicant ensures to comply all the conditions stipulated in the precise area communication letter before grant of quarry lease and during the course of quarry operations.

11.7 Progressive quarry closure plan preparation:

Name and address of the Qualified Person who prepared the progressive closure plan and name and address of the executing agency who is involved in the Preparation of progressive quarry closure plan.

Name : **M. Santhoshkumar, M.Sc.,**
 Qualified Person (Under Rule 15(I)(a) and (I)(b) of MCR, 2016)

Address : Plot No.3, Kattuvattam, Kothukara Samathi Via,
 Kannakurichi,
 Salem – 636 008.

Mobile No. : +91 97914 41745

The applicant will himself implement the closure plan; no outside agency will be involved.

11.8 Review of Implementation of Mining Plan including Progressive Closure Plan upto the Final Closure Plan:

Mining Plan and Progressive quarry closure plan are being submitted for the first time. It will be reviewed after ten years and review of implementation will be given with next review of mining plan.

11.9 Closure Plan:**(i) Mined Out Land:**

At the end of mining plan period, about 3.65.08Ha of area will be mined out. Land use at various stages is given in the table below.

LAND USE TABLE – 16

Description	Present area (Ha)	Area required during the first five year (Ha)	Area at the end of lease period (Ha)
Quarrying Pit	Nil	3.65.08	3.65.08
Infrastructure	Nil	0.01.00	0.01.00
Roads	Nil	0.02.00	0.02.00
Green Belt	Nil	0.49.66	0.93.29
Unutilized Area	4.75.01	0.57.27	0.13.64
Grand Total	4.75.01	4.75.01	4.75.01

**(ii) Water quality management:**

Following control measures will be adopted for controlling water pollution:

- Construction of Garland drain with check dams / gully plugs at strategic places to arrest silt wash off from broken up area.
- Collection of surface run-off from broken up area in mine pits for settling and only properly settled excess water from mine pit will be discharged to nearby users. The storm water/ mine water will be used for dust suppression, greenbelt development, etc.
- Periodic analysis of mine pit water and ground water quality in nearby villages.
- The quarried-out pit will be allowed to collect rain and seepage water which will act as a reservoir for storage. This water storage will enhance the static level and ground water recharge of nearby wells and it will be used for agriculture purpose to the nearby agriculture lands.
- Domestic sewage from site office & urinals/latrines provided in QL is discharged in septic tank followed by soak pits.

(iii) Air Quality Management:

The proposed mining method is not likely to produce much of dust and fugitive emissions to cause damage to ambient air quality of the area. Workers will be provided with personnel protective equipment like face-mask, earplug/ muffs.

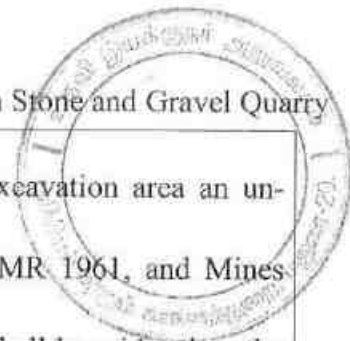
For air pollution management at the progressive quarry closure plan, greenbelt will be developed to prevent and control air pollution.

(iv) Top Soil and Waste Management:

There is no topsoil and waste generated during the proposed plan period. The entire quarried out Rough stone and Gravel is utilized (100%). Hence, waste management does not arise.

(v) Disposal of mining machinery:

All the Machineries will be purchased fresh, the same has been maintained in good condition during entire life of quarry. After completion of quarry operation all machineries will be utilized at another quarry area or sold out to the second hand. Hence, disposal or decommissioning of mining machinery does not arise.

**(vi) Safety & Security:**

Safety measures will be implemented to prevent access in the excavation area an unauthorized persons as per Mine Act 1952, MMR 1961.

- Safety measures will be implemented as per Mine Act 1952, MMR 1961, and Mines Rules 1955.
- Provisions of MMR 1961 shall be strictly followed and all roads shall be wider than the height of the bench or equal to the height of the bench and have a gradient of not more than 1 in 16.
- The bench height will be 5.0m.
- Width of working bench will be kept about 5.0 m for ease of operations and provide sufficient room for the movement of equipments.
- Protective equipment like dust masks, ear-plugs/ muffs and other equipments shall be provided for use by the work persons.
- Notices giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.
- Danger signs shall be displayed near the excavations and proper signal by siren alarm will be given to the public before blasting to prevent accident.
- Security guards will be posted.
- In the event of temporary closer, approaches will be fenced off and notice displayed.
- Installation of CCTV cameras in the quarry and entrance of the quarry.
- Monitoring of Quarrying operation by external agency as directed by authorities

(vii) Disaster Management and Risk Assessment:

This should deal with action plan for high risk accidents like landslides, subsidence, flood, fire, seismic activities, tailing dam failures etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of applicant to meet such eventualities and the assistance to be required from the local authorities should be described.

- The mechanized mining activities in the area may involve any high risk accident due to side falls/collapse, flying stones due to blasting etc.
- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, TNMMCR 1959 and other laws applicable to mine will be strictly complied with.
- During heavy rainfall the mining activities will be suspended.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Competent persons will be provided FIRST AID kits which they will always carry.
- The Greenbelt Development will be formed in around the quarried out top benches and panchayat road of the lease applied area.

Environmental Monitoring Cell:

A dedicated team nominated by the mine manager or Agent will monitor and maintain the environmental compliances of the quarry as per the approved Environment Management Plan and report the Compliance to the Mine Manager half yearly.

Disaster Management Cell:

The Competent Qualified Statutory managers appointed by the applicant as per the Director of Mines Safety will be responsible for Disaster Management. It care any eventualities his mobile number will be displayed and he will take all the precautions and safety measures as per Mines and Minerals (Development and Regulations) Act, 1957.

(viii) Care and Maintenance during Temporary Discontinuance:

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per the MMR 1961.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.
- Security Guards shall be posted for the safety and to prevent any unauthorized entry to the area.
- Carry out regular maintenance of the facilities/area detailed below in such a way as would have been done as if the mines were operation:
 - Quarry roads and approach roads,
 - Fencing on approach roads,
 - Checking and maintenance of machines and equipment,
 - Drinking water arrangements,
 - Quarry office, first aid stations etc.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out as per CPCB and IBM Guideline.
- Care and upkeep of plantation shall be carried out on regular basis.
- Status of the working and status monitoring for re-opening of the mines shall be discussed daily.

In case of discontinuance due to any natural calamities/abnormal conditions, mining operation will be restarted as early as possible after completing rescue work, restoring safety and security, repairs of roads etc.

(ix) Economic Repercussion of Closure of Quarry and manpower Retrenchments:

The quarry lease is granted for a period of ten years only. As per the production Programme envisaged, there will be no effect on the man power as the majority of persons belong to nearby villages and will have an option either to be available for employment for the next contract/ lease or do the agriculture in their fields.

(x) Time Scheduling for Abandonment:

The lease applied area has enormous potential for continuance of operations even after the expiry of the lease period. The details of time schedule of all abandonment will be given at the time of final closure plan.

(xi) Abandonment Cost:

As at present mining is not going to be closed so abandonment cost could not be assessed. However, based on the progressive quarry closure activities during the plan period, cost is assessed as given below:

LAND USE TABLE – 17

ACTIVITY	YEARS										RATE	COST (Rs.)	
	I	II	III	IV	V	VI	VII	VIII	IX	X			
Plantation under safety zone	Nos	100	100	100	100	100	100	100	100	100	100		2,00,000
	Cost	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000		
Plantation in quarried out top benches	Nos	-	-	100	100	100	100	100	-	-	-	@200 Rs Per sapling	1,00,000
	Cost	-	-	20000	20000	20000	20000	20000	-	-	-		
Plantation in approach road	Nos	500	-	-	-	-	-	-	-	-	-		1,00,000
	Cost	1,00,000	-	-	-	-	-	-	-	-	-		
Barbed Wire Fencing (In Mtrs) 1200 Mtrs		3,60,000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	3,60,000
Garland Drain (In Mtrs) 1100 Mtrs		3,30,000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	3,30,000
TOTAL													10,90,000

12.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT

This Mining plan for Rough stone (Charnockite) and Gravel is under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959. The provisions of the Mines Act, Rules and Regulations and orders made there under shall be complied within the quarrying operation, so that the safety of the mine, machinery and person will be well protected. Permission, relaxation or exemption wherever required for the safe and scientific quarrying of the deposit will be obtained from the Department of Mines Safety. Any violation pointed out by the inspecting authorities shall be rectified and modified after scrutiny comments as per the guidelines of the Concerned Department and Authorities.

This Mining Plan and mine design is prepared based on the requirement instructed by the applicant to me. If there is any change in the production schedule, change of technology, change in product mix the applicant is advice to prepare a modified mining plan and get approval by the concerned authority for subsequent clearance and approval. The same will be monitored by the inspecting authority of Department of Geology and mining and other Concerned Departments under Rule 25 and sub rule (5)(d) in Rule 36 of Tamil Nadu Minor Mineral Concession Rules, 1959.

I hereby ensure that the information provided is correct to best of my knowledge and experience, some of the information contained in this report has been provided by external sources and by the applicant and is presented as the form as submitted by the applicant. The information is not intended to serve as legal advice related to the individual situation. I do not owe and specifically disclaim any liability resulting from the use during the course of quarrying operations after the grant of lease. The document may be scrutinized by the competent authority before approval.

Prepared by

M. Santhoshkumar
M. Santhoshkumar, M.Sc.,

Qualified Person

(Under Rule 15(I)(a) and (I)(b) of MCR, 2016)

Place: Salem

Date: 20.10.2023

DONATE RED
SPREAD GREEN
SAVE BLUE

This Mining Plan is approved subject to the conditions/stipulate on indicated in the Mining Plan Approval
Rec. No. 576/Mines/2023 Dated. 11/10/2023

This Mining Plan is approved based on incorporation of the particulars specified under guidelines given by the Commissioner of Geology and Mining (P/c.) Rec. No. 3866/LC/2012 Dated 19-11-2012
[Signature]
22-11-2023
Assistant Director
Geology and Mining
Madurai

புவியியல் மற்றும் சுரங்கத்துறை

ந.க.எண்.996/கனிமம்/2023

உதவி இயக்குநர் அலுவலகம்,
மாவட்ட ஆட்சியர் அலுவலக வளாகம்,
மதுரை.

நாள்:12 .10.2023

குறிப்பாணை

பொருள்: கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - சாதாரணகற்கள் மற்றும் கிராவல் - மதுரை மாவட்டம் - கள்ளிக்குடி வட்டம், திருமால் கிராமம், புல எண்கள். 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (வடபுறம்) (0.52.81), 221/4B (வடபுறம்) (0.37.48), 217/2A (தென்புறம்) (0.53.25) மற்றும் 221/3 (வடபுறம்) (0.34.78) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 4.75.01 ஹெக்டேர் - 10 (பத்து) வருடங்களுக்கு சாதாரணகற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்கல் - உகந்த பரப்பு (Precise Area) தேர்வு செய்யப்பட்டது - சுரங்கத்திட்டம் மற்றும் மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்க கோருவது - தொடர்பாக.

- பார்வை: 1. திரு.D.சக்திவேல், த/பெ.துரைராஜ், எண்.15, மேலரதவீதி, திருப்பரங்குன்றம், மதுரை 625 005 என்பவரது மனு நாள். 28.08.2023.
2. திருமங்கலம் வருவாய் கோட்டாட்சியரின் ந.க.எண். 4270/2023/அ1, நாள்.03.10.2023.
3. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை, புலத்தணிக்கை அறிக்கை, நாள்.05.10.2023.
4. தொடர்புடைய ஆவணங்கள்.

மதுரை மாவட்டம், கள்ளிக்குடி வட்டம், திருமால் கிராமம், புல எண்கள். 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (வடபுறம்) (0.52.81), 221/4B (வடபுறம்) (0.37.48), 217/2A (தென்புறம்) (0.53.25) மற்றும் 221/3 (வடபுறம்) (0.34.78) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 4.75.01 ஹெக்டேர் பரப்பளவு பட்டா நிலத்தில் சாதாரணகற்கள் மற்றும் கிராவல் வெட்டியெடுக்க 10 வருடங்களுக்கு குவாரி குத்தகை உரிமம் வழங்க அனுமதி கோரி திரு.D.சக்திவேல் என்பவர் பார்வையில் கண்டுள்ளவாறு விண்ணப்பம் செய்துள்ளார்.



திருமங்கலம், வருவாய் கோட்டாட்சியர் மற்றும் புவியியல் மற்றும் சுரங்கத்துறை, உதவி புவியியலாளர் ஆகியோரின் ஆய்வு அறிக்கையில், மதுரை மாவட்டம், கள்ளிக்குடி வட்டம், திருமால் கிராமம், கிராம கணக்கு பட்டா எண்.3063, 3325 மற்றும் 3051 -ன்படி, விண்ணப்பப் புல எண்கள் 221/4A, 221/4B, 222/1(P), 222/3A, 222/3B1, 223/2B, 222/2, 217/4 221/3 ஆனது துரைகோபால்ச்சாமி மனைவி தனலெட்சுமி பெயரில் பட்டா கிராமக்கணக்கில் தாக்கலாகியுள்ளது மற்றும் கிராம கணக்கு பட்டா எண்.3418 மற்றும் 3436 -ன்படி, விண்ணப்பப் புல எண்கள் 217/2A, 217/2B ஆனது தளபதி மகன் துரைகோபால்ச்சாமி பெயரில் பட்டா கிராமக்கணக்கில் தாக்கலாகியுள்ளது. மேலும் மனுதாரர் திரு.D.சக்திவேல் என்பவர் பட்டாதாரர்களான துரைகோபால்ச்சாமி மற்றும் தனலெட்சுமி ஆகியோர்களிடம் மேற்கண்ட புல எண்களில் உடைகல் மற்றும் கிராவல் எடுத்துக் கொள்ள பதிவு செய்யப்படாத ரூ.20/- மதிப்பிலான பத்திரத்தில் அரசு அனுமதி பெற்ற நாளிலிருந்து பத்து வருட காலத்திற்கு நோட்டரி பப்ளிக் மூலம் ஒப்பந்தப் பத்திரம் பெற்று சமர்ப்பித்துள்ளார் என அறிக்கையில் தெரிவித்துள்ளனர்.

மேலும் விண்ணப்பிக்கப்பட்ட புலங்களை சுற்றிலும் 300 மீட்டர் சுற்றளவில் குடியிருப்புகள், தெல்லியல்துறையின் மூலம் பாதுகாக்கப்பட்ட பகுதிகளாக அறிவிக்கப்பட்ட இடங்கள் மற்றும் வரலாற்று சின்னங்கள் எதும் இல்லை. 60 மீட்டர் சுற்றளவில் காப்பு காடுகள் மற்றும் 50 மீட்டர் சுற்றளவில் தேசிய / மாநில நெடுஞ்சாலைகள், கட்டிடங்கள் எதும் இல்லை. விண்ணப்பபுலத்தின் கிழக்கில் புல எண். 219/5 -ல் ஓடை அமைந்துள்ளது. விண்ணப்ப புலத்தின் மேற்கில், தென்கிழக்கிலிருந்து வடமேற்காக, உயர் மின்னழுத்த மின் கோபுரங்கள் மற்றும் மின்கம்பிகள் அமைந்துள்ளது. விண்ணப்ப புலத்தின் தெற்கில், குராயூர் 1 பிட் கிராம புல எண். 21-ல் பெரியகுளம் கண்மாய் அமைந்துள்ளது என அறிக்கை செய்து, பின்வரும் நிபந்தனைகளுக்கு உட்பட்டு குவாரி உரிமம் வழங்க பரிந்துரை செய்துள்ளனர்.



நிபந்தனைகள்

1. விண்ணப்பப் புலங்களைச் சுற்றியுள்ள பட்டா நிலங்களுக்கு 7.5 மீட்டர் பாதுகாப்பு இடைவெளி விட வேண்டும்.
2. விண்ணப்ப புலத்தின் கிழக்கில் புல எண். 219/5 -ல் செல்லும் ஓடைக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
3. விண்ணப்ப புலத்தின் மேற்கில், தென்கிழக்கிலிருந்து வடமேற்காக அமைந்துள்ள உயர் மின்னழுத்த மின் கோபுரங்கள் மற்றும் மின்கம்பிகளுக்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
4. விண்ணப்ப புலத்தின் தெற்கில், குராபூர் 1 பிட் கிராம புல எண். 21-ல் அமைந்துள்ள பெரியகுளம் கண்மாய்க்கு 50 மீட்டர் பாதுகாப்பு இடைவெளி விடப்பட வேண்டும்.
5. மதுரை மாவட்டம், கள்ளிக்குடி வட்டம், திருமால் கிராமம், புல எண்கள். 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (வடபுறம்) (0.52.81), 221/4B (வடபுறம்) (0.37.48), 217/2A (தென்புறம்) (0.53.25) மற்றும் 221/3 (வடபுறம்) (0.34.78) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 4.75.01 ஹெக்டேர் பரப்பளவுள்ள பூமியிலிருந்து சாதாரண கற்கள் மற்றும் கிராவல் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் வழங்குவது தொடர்பாக, ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் சுற்றுச்சூழல் ஒப்புதல் ஆகியன பெற்றளிக்கப்பட வேண்டும்.

எனவே, துறை அலுவலர்களின் பரிந்துரையினை ஏற்றும் நிபந்தனைகளுக்கு உட்பட்டும், மதுரை மாவட்டம், கள்ளிக்குடி வட்டம், திருமால் கிராமம், புல எண்கள். 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 223/2B (0.33.0), 217/4 (0.69.0), 221/4A (வடபுறம்) (0.52.81), 221/4B (வடபுறம்) (0.37.48), 217/2A (தென்புறம்) (0.53.25) மற்றும் 221/3 (வடபுறம்) (0.34.78) ஆகியவற்றில் மொத்த விஸ்தீர்ணம் 4.75.01 ஹெக்டேர் பரப்பில் 1959-ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள் விதி எண்: 19 (1), 20 மற்றும் 33-ன்படி 10 (பத்து) ஆண்டுகளுக்கு சாதாரணகற்கள் மற்றும் கிராவல் குவாரி உரிமம் வழங்க தகுதி வாய்ந்த நிலப்பரப்பாக (Precise area) கருதப்படுகிறது.

தமிழ்நாடு சிறுகனிம சலுகை விதிகள்-1959 விதி எண்:41-இன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்கத் திட்டத்தினை (Mining Plan) 90 தினங்களுக்குள் சமர்ப்பிக்குமாறும், விதி எண்:42-இன்படி மாநில அளவிலான சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் (State Level Environmental Impact Assessment Authority) இசைவினைப் பெற்று சமர்ப்பிக்குமாறும் மனுதாரர் திரு.D.சக்திவேல் கேட்டுக் கொள்ளப்படுகிறார்.

SM
12/10/2025
துணை இயக்குநர் /
உதவி இயக்குநர்(பொ),
புவியியல் மற்றும் சுரங்கத்துறை,
மதுரை.
L
12/10/25

பெறுநர்:

திரு.D.சக்திவேல்,
த/பெ.துரைராஜ்,
எண்.15, மேலரதவீதி,
திருப்பரங்குன்றம்,
மதுரை 625 005.

நகல்:

உறுப்பினர் செயலர்,
மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையம் (SEIAA),
சென்னை.

ANNEXURE II



LIBRARY: Government

New sub division 1K1 to 1K4
Plotted as per TRKA/522/148
Dt 9.11.20

New sub Division 1K1A, 1K1B
1K1C plotted as per
TRKA/950/1430 dt 20.2.21

New sub divisions
1J1, 1J2, 1J1, 1J2
Plotted by ASP/TKR
80/42/1480
dt 8.7.10



7	55.4	150.4	C	323.0
6	46.8	162.4	A	202.8
5	31.8	166.4	B	200
4	26.8	145.6	D	17.4
				3.0

A = 80, 822
 147 TRKA/113/1484
 dt 23.1.14
 100000
 1000

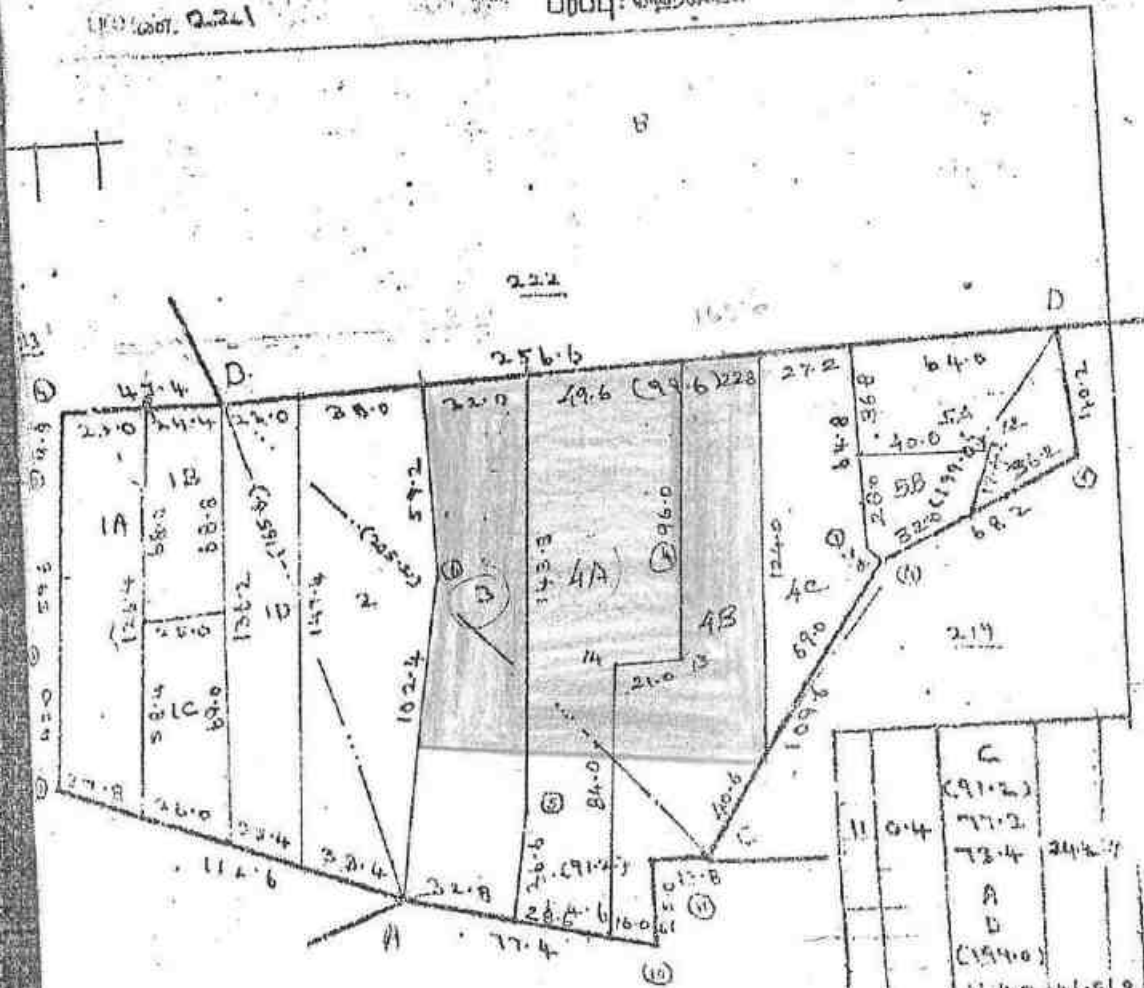
SHRUTI, 10/15: 2000 W.M.E

ಅನುಮೋದನೆ
 ರಿಜಿಸ್ಟ್ರಾರ್
 21/11/2020
 ಸಿ.ಎ.ಎಸ್.

LEASE APPLIED AREA



ದಿ. 13.9.05
 ದಿ. 20.5.05
 ದಿ. 13.9.05



New Subdivn 4A, 4B, 4C plotted as per
 TR 8A/128/05 dt. 13.9.05
 as per
 PS 27905

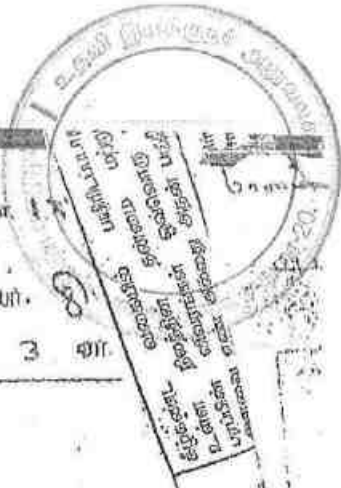
New Subdivn
 5A, 5B, 5C plotted as per
 8A/586/14/4 dt. 20.5.05
 as per
 PS 27905

11	0.4	C	(91.2)	77.2	73.4	24.2
		A				
		B	(1940)	16.15	26.69	
8	6.0		10.2			
7	9.6		108.4			
		C				
		B	(2072)	12.24	6.0	6
5	31.0		47.0			
		C				
4	6.2		11.2	8.0		
		B	(1654)			
2	52.6		113.2			
6	73.0		65.6			
1	88.0		49.0			
		A				

ದಿ. 25/1/2005
 ದಿ. 25/1/2005
 ದಿ. 25/1/2005

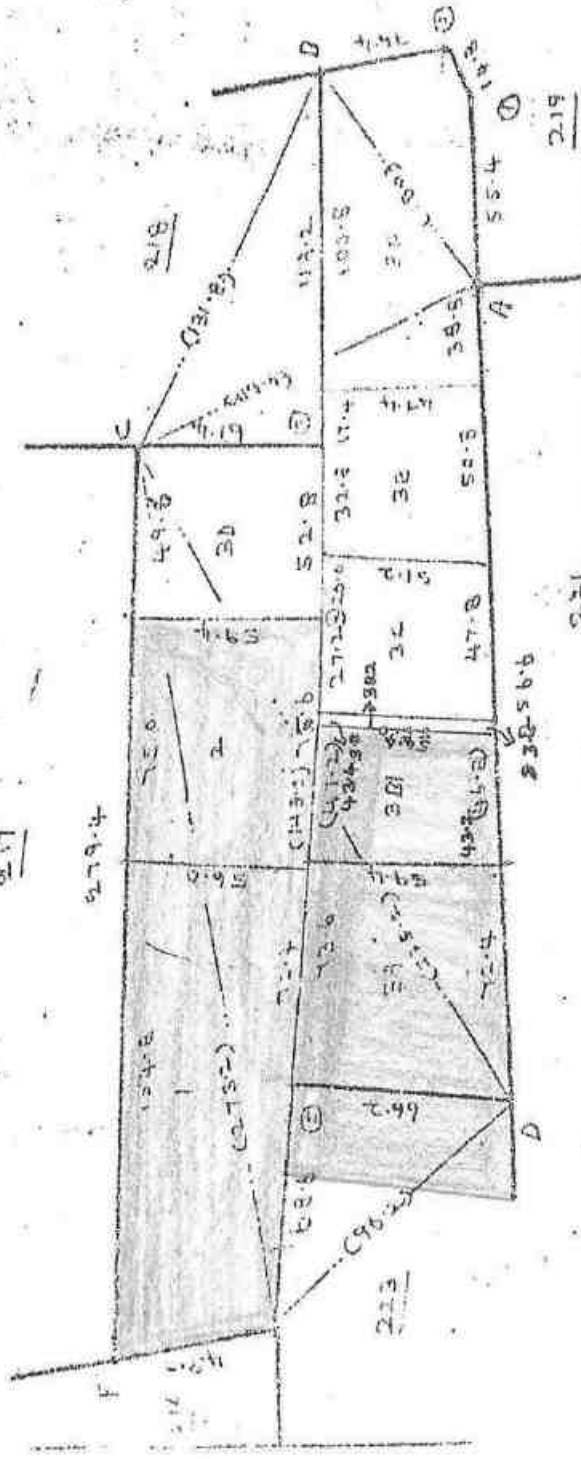
LEASE APPLIED AREA

மாண்புமிகு உயர்நீதிமன்றத்தின் மூலம் பி.சி.என். 321/2019



பரப்பளவு: 2.22 ஏக்கர்

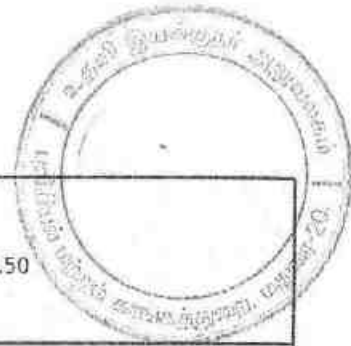
பரப்பளவு: 2.22 ஏக்கர்



221
 New sub division 381, 382 plotted as PDS
 Treaty 381, 382 dt 23.6.20

1.	(96.2)	
2.	46.0	
B	(23.5)	
C	76.2	
B	(131.8)	
C	29.6	550
B		

LEASE APPLIED AREA

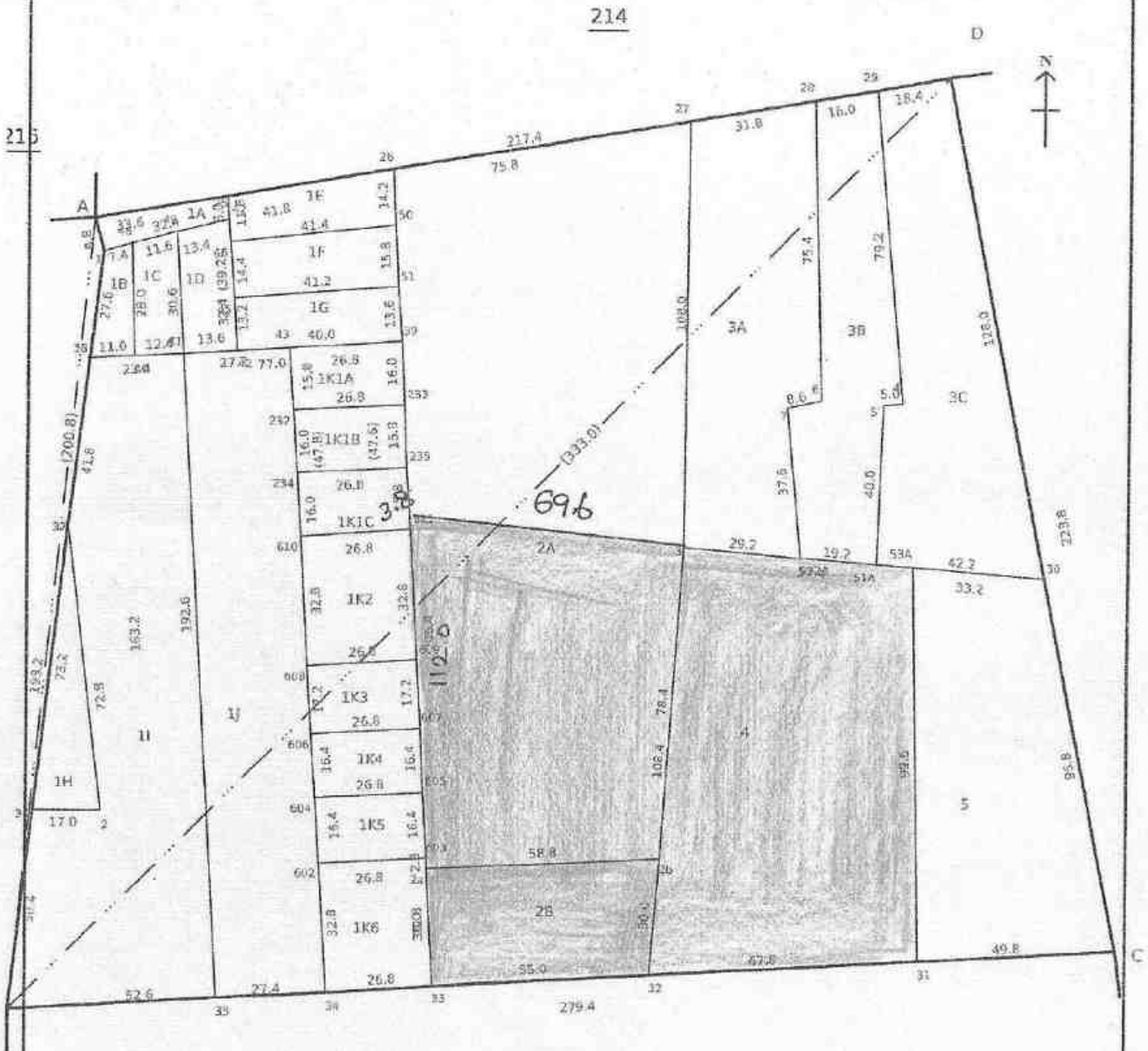


District : Madurai
Taluk : Kalligudi
Village : Thirumal

[129]



Survey No : 217
Area : Hect 05 Ares 23.50
Scale : 1 : 1000



222

LEASE APPLIED AREA

(Signature)
 நி.வி.ப.ப.ப.
 வட்டம்கியர் அலுவலகம்
 கள்ளிக்குடி

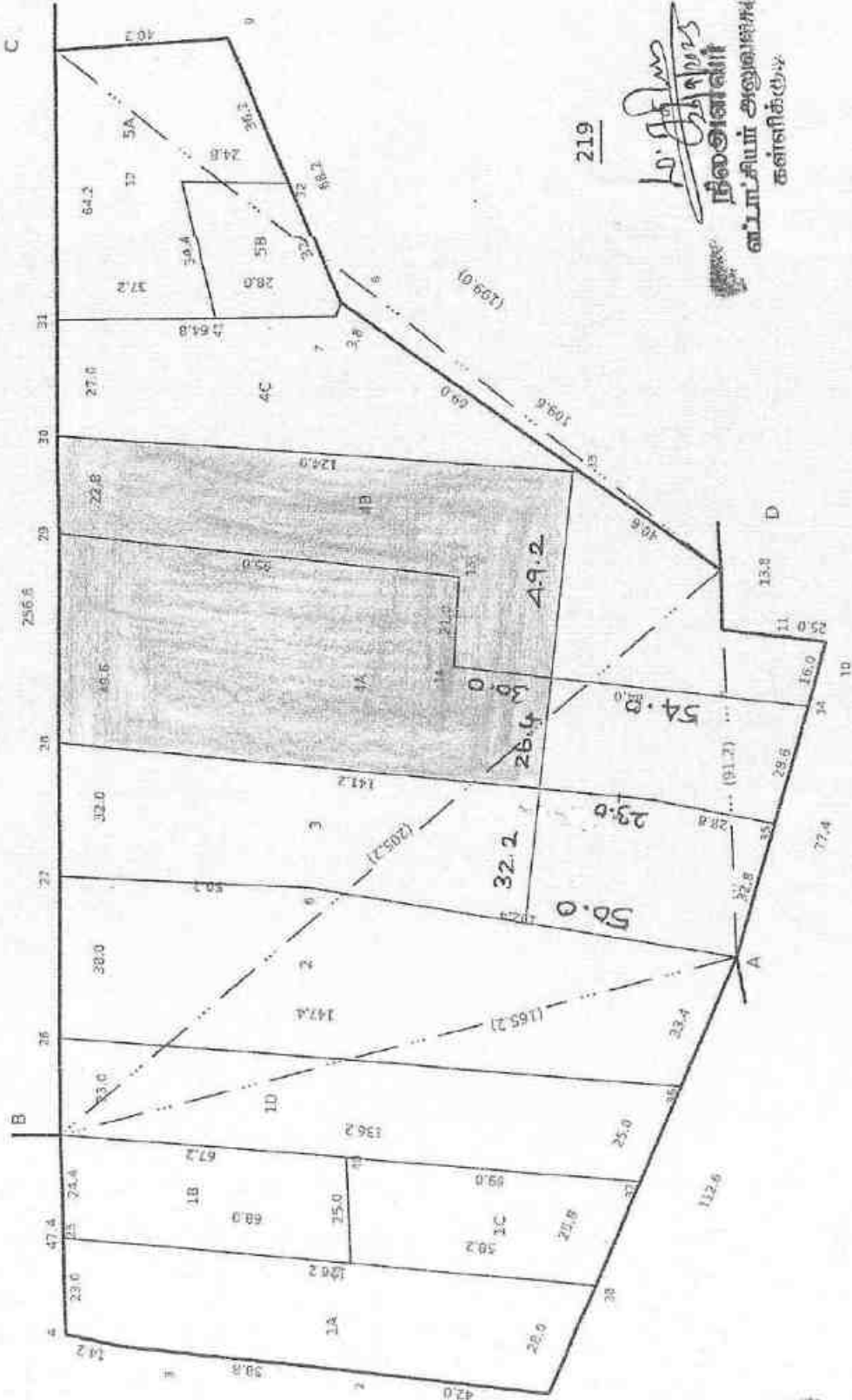
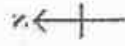


District : Madurai
Taluk : Kalligudi
Village : Thirumal

[129]

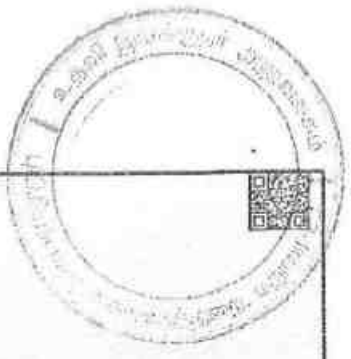


Survey No : 221
Area : Hect 03 Ares 91.50
Scale : 1 : 1000



LEASE APPLIED AREA

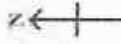
219
[Signature]
நிலை அளவினர்
எ. ப. சிவன் அலுவலகம்
கள்ளிக்கோடு



District : Madurai
 Taluk : Kalligudi
 Village : Thirumal [129]

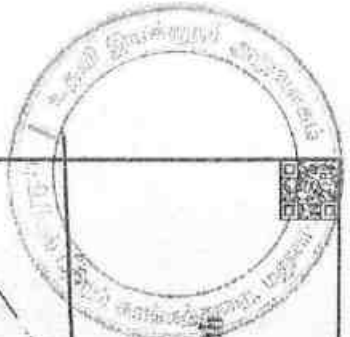
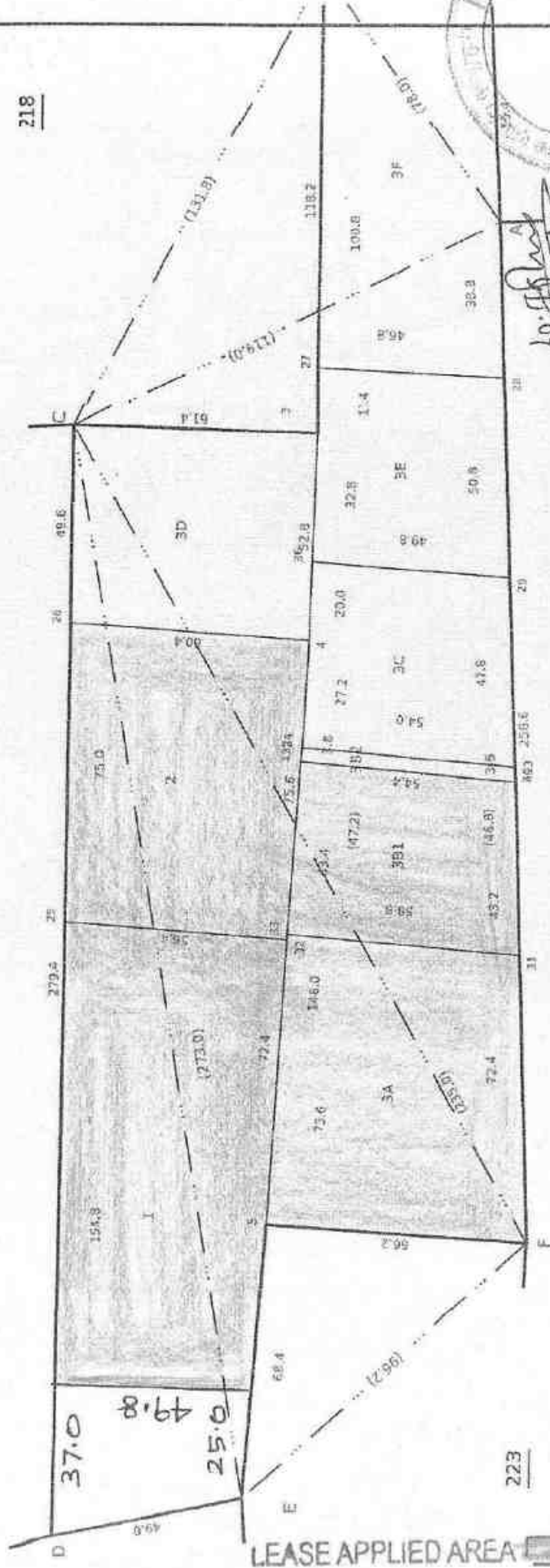


Survey No : 222
 Area : Hect 03 Ares 23.83
 Scale : 1 : 1000



217

218



Lo. J. J. J.
 20/11/2023
 நில அளவாளர்
 வட்டாட்சியர் அலுவலகம்
 கள்ளிக்கோடு

221
 260 Iv.2

223

74 A

216

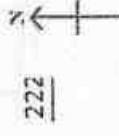
District : Madurai
Taluk : Kalligudi
Village : Thirumal

[129]

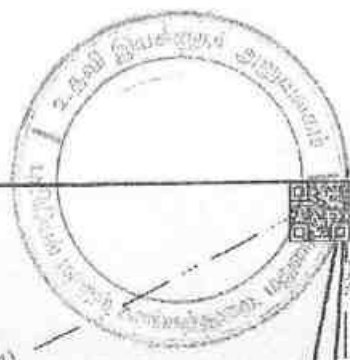
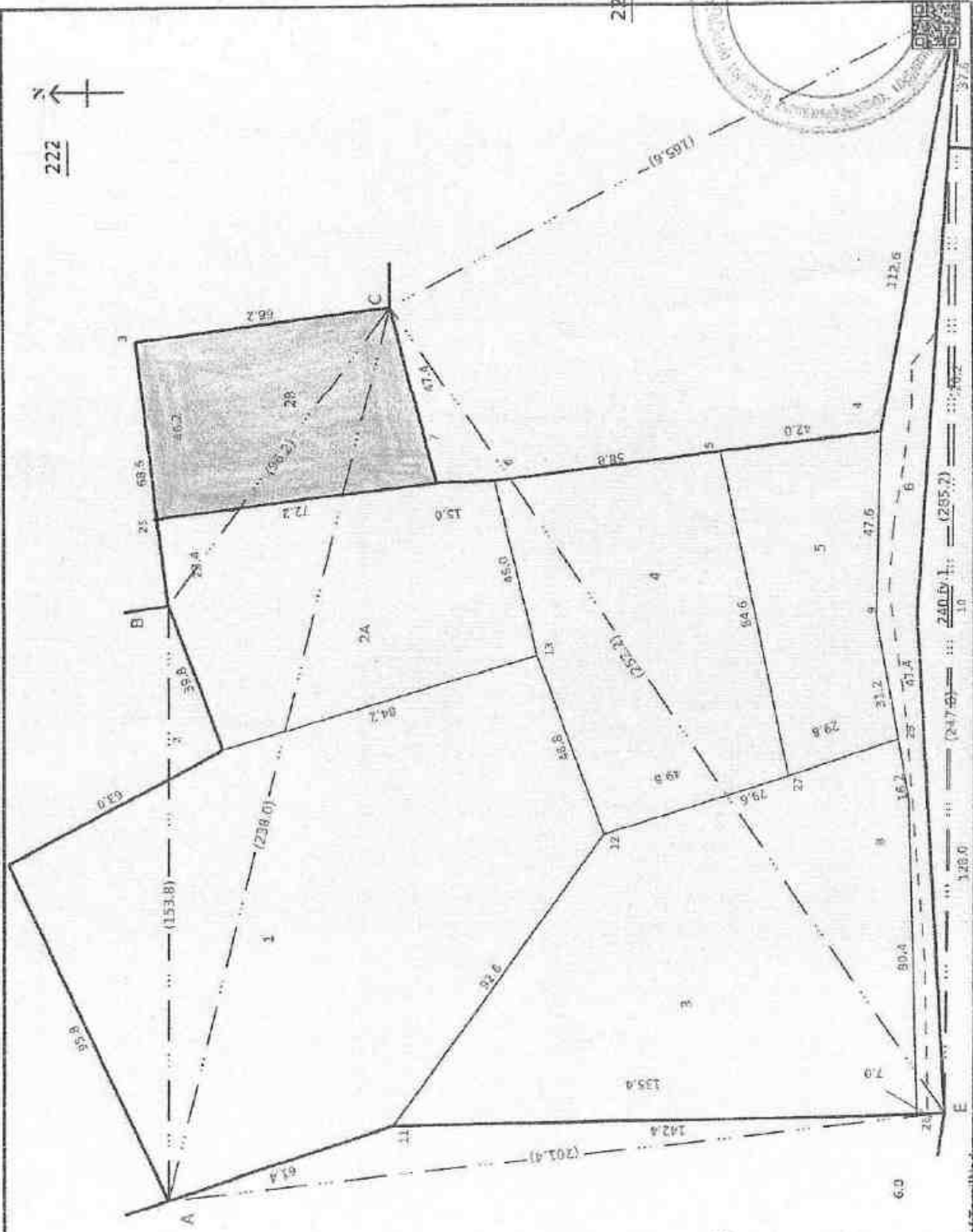


216

Survey No : 223
Area : Hect 03 Aires 93.50
Scale : 1 : 1000



222



224

10.07.2023

நிலை அளவாளர்
வட்டமடாட்சியார் அலுவலகம்
கள்ளக்குறி

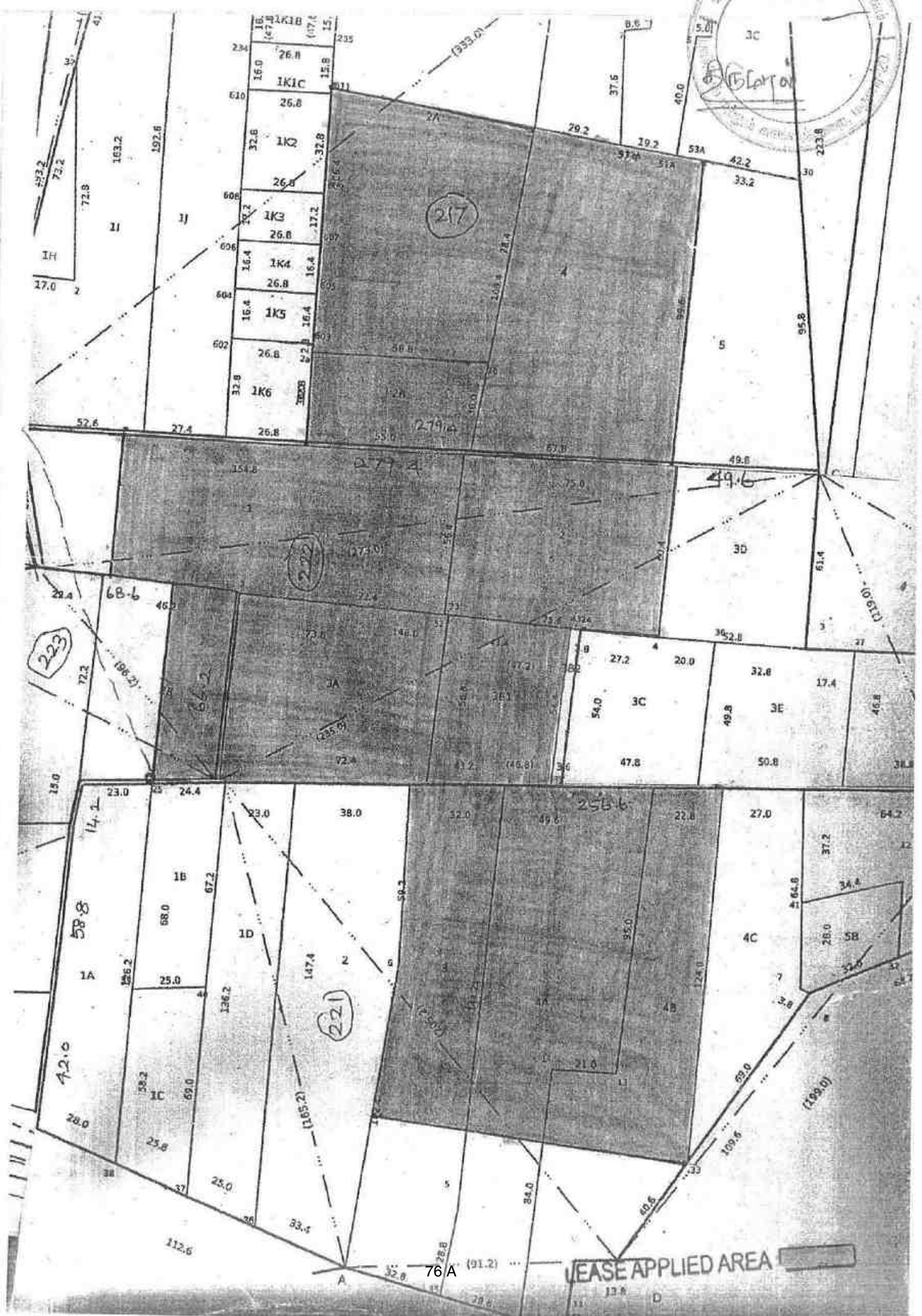
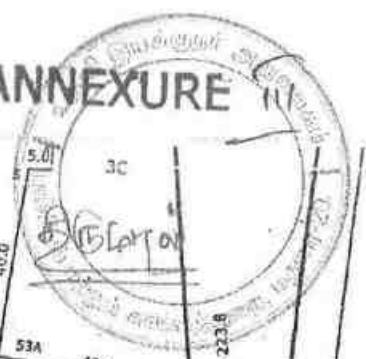
LEASE APPLIED AREA

75 A

Date of Issue: 21-07-2023 10:49:28

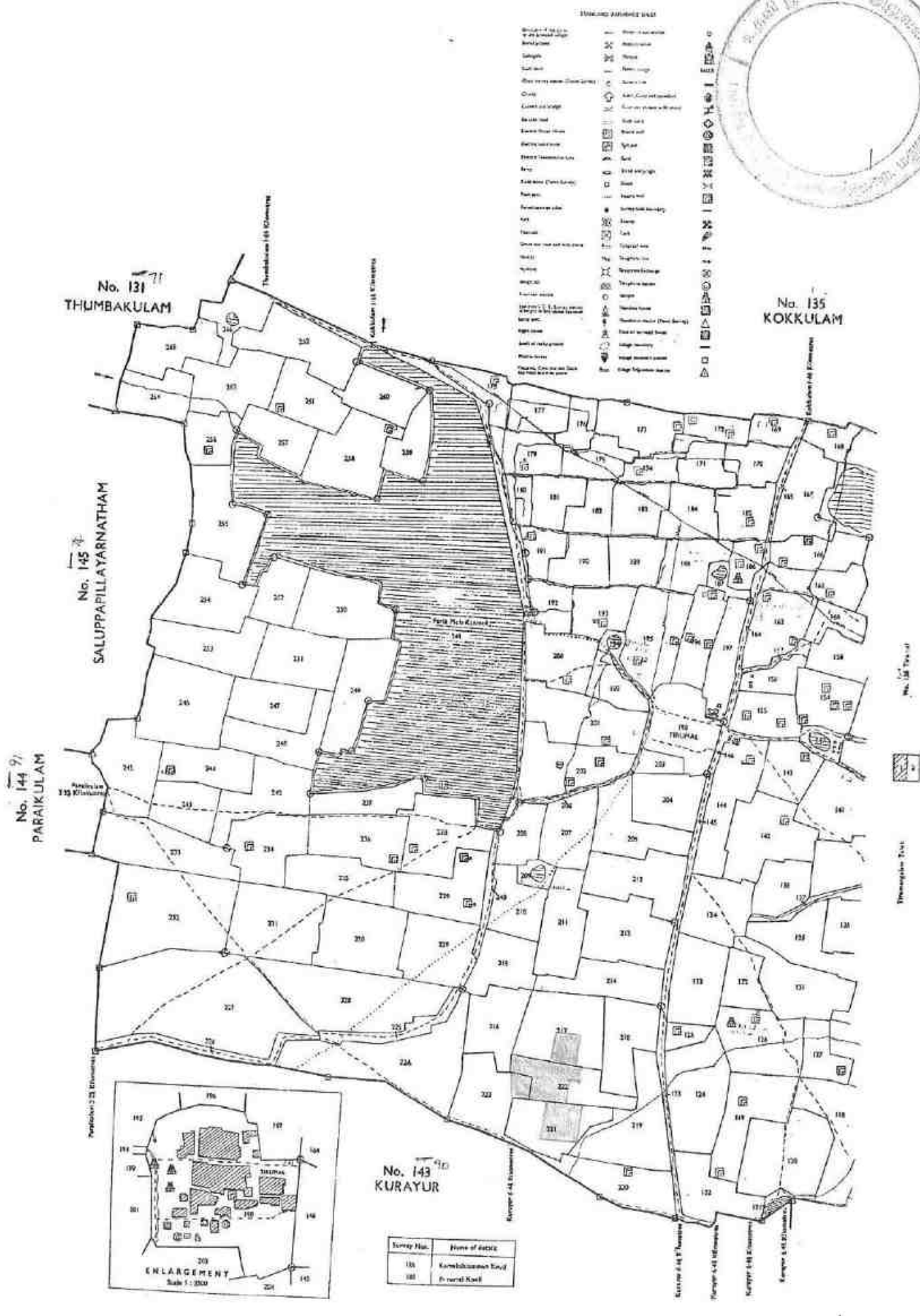
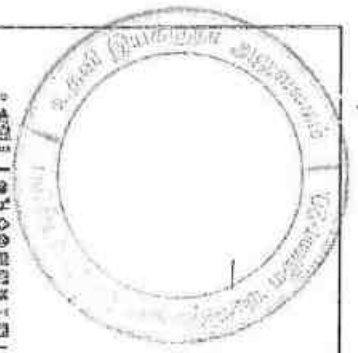
Survey and Settlement Department, Government of Tamil Nadu

ANNEXURE II



LEASE APPLIED AREA

76A



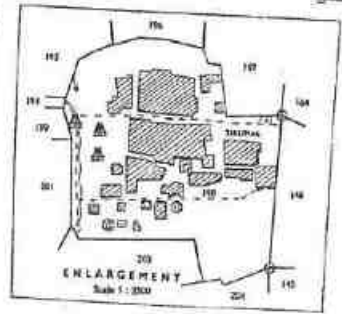
No. 144
PARAIKULAM

No. 145
SALUPPAPILLAYARNATHAM

No. 131
THUMBAKULAM

No. 135
KOKKULAM

No. 143
KURAYUR



Survey No.	Name of estate
135	Korabittanum Encl
143	Parvathi Kovil

SYMBOLS

- Boundary of village
- Boundary of estate
- Boundary of survey
- Boundary of land
- Boundary of water
- Boundary of road
- Boundary of field
- Boundary of garden
- Boundary of orchard
- Boundary of plantation
- Boundary of house
- Boundary of well
- Boundary of tank
- Boundary of pond
- Boundary of stream
- Boundary of river
- Boundary of canal
- Boundary of railway
- Boundary of telegraph
- Boundary of electricity
- Boundary of telephone
- Boundary of post
- Boundary of school
- Boundary of temple
- Boundary of mosque
- Boundary of church
- Boundary of school
- Boundary of temple
- Boundary of mosque
- Boundary of church

LEASE APPLIED AREA



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : கள்ளக்குடி

வருவாய் கிராமம் : 129 இராமால்

பட்டா எண் : 3063

உரிமையாளர்கள் பெயர்

1. துரைகோபால்சாமி

மனைவி

தலைக்கமி

புல எண்	உட்பிரிவு	புன்செய்		நுன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
216	6B	0 - 5.68	1.00	--	--	--	--	2022/0105/24/416771- -2022/24/24/000235SD -- 11-08-2022
219	6A	0 - 4.80	0.13	--	--	--	--	2022/0103/24/220468- -586/1414 -- 27-07- 2022
219	8B1B	0 - 4.00	1.00	--	--	--	--	2022/0105/24/416770- -2022/24/24/000234SD -- 11-08-2022
221	4A /	0 - 71.00	1.98	--	--	--	--	2022/0103/24/220468- -129/1415 -- 27-07- 2022
221	4B /	0 - 51.50	1.43	--	--	--	--	2022/0103/24/220468- -129/1415 -- 27-07- 2022
222	1 /	0 - 79.50	2.19	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
222	3A /	0 - 46.00	1.26	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
222	3B1 /	0 - 24.50	0.70	--	--	--	--	2022/0103/24/220468- -2020/24/24/000073SD -- 27-07-2022
223	1	1 - 26.00	3.50	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
223	2A	0 - 46.50	1.28	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
223	2B /	0 - 33.00	0.91	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
223	5	0 - 27.50	0.75	--	--	--	--	2022/0103/24/220468- -- -- 27-07-2022
		5 - 19.98	16.13					

குறிப்பு2 :



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : கள்ளிக்குடி

வருவாய் கிராமம் : 129 திருமால்

பட்டா எண் : 3325

உரிமையாளர்கள் பெயர்

1. துரைகோபால்சாமி

யனைவி

தலைட்சுமி



புல எண்	உட்பிரிவு	புன்செய்		நள்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
217	4	0 - 69.00	1.94	--	--	--	--	2023/0103/24/246743- -- -- 02-02-2023
222	2	0 - 43.50	1.19	--	--	--	--	2023/0103/24/246743- -- -- 02-02-2023
		1 - 12.50	3.13					

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/129/03325/30993 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 22-07-2023 அன்று 10:42:51 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : கள்ளிக்குடி

வருவாய் கிராமம் : 129 திருமால்

பட்டா எண் : 3051

உரிமையாளர்கள் பெயர்

1. துரைகோபால்சாமி

மனைவி

தனலட்சுமி



புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
221	3	0 - 52.00	1.44	--	--	--	--	2022/0103/24/221441- -- -- 22-07-2022
		0 - 52.00	1.44					

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை.. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/129/03051/30959 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 22-07-2023 அன்று 10:43:51 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : கள்ளக்குடி

வருவாய் கிராமம் : 129 திருமால்

பட்டா எண் : 3436

உரிமையாளர்கள் பெயர்

1. தபாதி மகன் துரைகோபால்சாமி

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
217	2B	0 - 17.01	0.47	--	--	--	--	2023/0105/24/475607- -2023/24/24/000323SD -- 27-05-2023
		0 - 17.01	0.47					

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/129/03436/30906 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 22-07-2023 அன்று 10:41:41 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : மதுரை

வட்டம் : கள்ளிக்குடி

வருவாய் கிராமம் : 129 திருமால்

பட்டா எண் : 3418

உரிமையாளர்கள் பெயர்

1. தளபதி

மகன்

துரைகோபால்சாமி

புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	ஹெக்ட - ஏர்	ரூ - பை	
217	2A	1 - 25.49	3.48	--	--	--	--	2023/0105/24/475607- -2023/24/24/000323SD -- 27-05-2023
		1 - 25.49	3.48					

குறிப்பு 2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் யின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 24/24/129/03418/30926 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 22-07-2023 அன்று 10:36:16 AM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்.



1432 - ஆம் பக்கத்தில் **Lo உரை** மாவட்டம் **திருச்சிங்கப்பா** வட்டம்

நில வரித் திட்டத்தின்படி புலங்களின் விபரம்.					சார்பு மாளிக் பெயர்.	முதல் போகம்.						
நில ஆளவை எண்.	உட்பிரிவு எண்.	பரப்பு.	தீர்வை.	ஒரு போகம் அல்லது இரு போகம்.		கைப்பற்று தாரகுடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரகுடைய பெயர்.	நிலத்தின் எந்த பகுதி யாவது சாகுபடியாளராக யமரிக்கப்பட்டுள்ளது.	எந்த மாநகரத்தில் யமிர் செய்யப்பட்டது எந்த மாநகரத்தில் அறவடை செய்யப்பட்டது.	யமிரின் பெயர்.	யமிரான / அறவடை யான பரப்பு.	உண்மையான பாய்ச்சல் ஆதாரம்.	விளைச்சல் ஆளவு விழுக்காடு.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
217	4	069.0	1.94	3325	திரு. சிவசுந்தரி							
221	3	052.0	1.44	3051	- do -							
221	4A	071.0	1.98	3063	- do -							
221	4B	051.5	1.43	3063	- do -							
222	1	079.5	2.19	3063	- do -							
222	2	043.5	1.19	3325	- do -							
222	3A	046.0	1.26	3063	- do -							
222	3B	024.5	0.70	3063	- do -							
223	2B	033.0	0.91	3063	1/2 do -							
					JA ;							
					10/06/23							
					சுராய நிர்வாக அலுவலர்							
					திருவாரூர்							
					கன்னிச்சேரி வட்டம்							

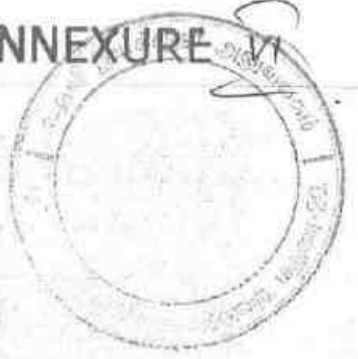


1432 - ஆம் பச்சியில் **Lo 319**

மாவட்டம் **சீமங்குடி** வட்டம்

கிராமக் கணக்கு **1020**

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.					சாகுபடி யானதில் பெயர்.	முதல் கோவை.						
(1) நில அளவை எண்.	(2) உட்பிரிவு எண்.	(3) பாப்பு.	(4) திசை.	(5) ஒரு போகம் அல்லது இரண்டு போகம்.		(6) கையிற்று தாரகூடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரகூடைய பெயர்.	(7) நிலத்தின் எந்த பகுதி யாவது சாகுபடியாளரால் பயிரிடப்பட்டுள்ளதா.	(8) எந்த யாத்தத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	(9) மரிகின் பெயர்.	(10) பரிசான (அறுவடை யான பாப்பு.	(11) உண்மைவான பாய்ச்சல ஆதாரம்.	(12) விளைச்சல் இளவு விழுக்காடு.
217	2A	1.25.49	348	3418	சு. சிவசுப்பிரமணியன்				கடு			
217	2B	0.17.07	0.41	3426	- do -				கடு			
					12-06-2023							
					10/06/23							
					கிராம நிர்வாக அலுவலர்							
					நிதியாளர்							
					தலைநகர வட்டம்							



தமிழ்நாடு அரசு



அறங்காவலத்துறை

அ - பதிவேடு

அலுவலகம் உட்பெயர்ச்சிற்றுகட்டிடம்

பெயர்	சாலை	பெயர்
சென்னை	சென்னை	சென்னை

வசதி முறை	கட்டிடப்பெயர்	பொது இடம்	பகுதி அளவு	நிலத்தின் வகை	கட்டிடப்பெயர்	மனை	மனை தரவை		மரபு	மொத்த		பெயர்	குறிப்பு
							மனை	மனை		மனை	மனை		
1	217 1A	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	2.5	0	1559	
2	217 1B	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	2	0	1405	
3	217 1C	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	3.5	0	2571	
4	217 1D	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	4	0	2522	
5	217 1E	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	5	0	1405	
6	217 1F	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	6.5	0	2571	
7	217 1G	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	5.5	0	1405	
8	217 1H	1P	சென்னை	சென்னை	0	8-1	4	2 77	0	6	0	3076	
9	217 1I	217-1I	P	சென்னை	0	8-1	4	2 77	0	43.5	1	1729	
10	217 1J	217-1J	P	சென்னை	0	8-1	4	2 77	0	12	0	1883	
11	217 1J1	217-1J	P	சென்னை	0	8-1	4	2 77	0	23	0	1725	
12	217 1J2	217-1J	P	சென்னை	0	8-1	4	2 77	0	22.5	0	1883	
13	217 1K1A	217-1K1	P	சென்னை	0	8-1	4	2 77	0	4.56	0	15	
14	217 1K1B	217-1K1	P	சென்னை	0	8-1	4	2 77	0	4.55	0	15	
15	217 1K1C	217-1K1	P	சென்னை	0	8-1	4	2 77	0	4.55	0	15	
16	217 1K2	217-1K	P	சென்னை	0	8-1	4	2 77	0	8.9	0	25	
17	217 1K3	217-1K	P	சென்னை	0	8-1	4	2 77	0	4.65	0	15	
18	217 1K4	217-1K	P	சென்னை	0	8-1	4	2 77	0	4.45	0	15	
19	217 1K5	217-1K	P	சென்னை	0	8-1	4	2 77	0	4.45	0	15	
20	217 1K6	217-1K	P	சென்னை	0	8-1	4	2 77	0	8.9	0	25	
21	217 1A	217-2	P	சென்னை	0	8-1	4	2 77	1	25.43	3	45	
22	217 1B	217-2	P	சென்னை	0	8-1	4	2 77	0	17.61	0	47	
23	217 1A	3P	சென்னை	சென்னை	0	8-1	4	2 77	0	31.5	0	86	
24	217 1B	3P	சென்னை	சென்னை	0	8-1	4	2 77	0	26.5	0	74	
25	217 1C	3P	சென்னை	சென்னை	0	8-1	4	2 77	0	32.5	0	90	
26	217 1	4	சென்னை	சென்னை	0	8-1	4	2 77	0	69	1	94	
27	217 5	5	சென்னை	சென்னை	0	8-1	4	2 77	0	40.5	1	12	

தமிழ்நாடு அரசு



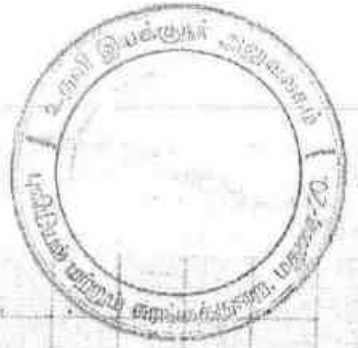
வருவாய்துறை

அ - பதிவேடு

அலுவலக உபயோகத்திற்கு மட்டும்

மாவட்டம்	வட்டம்	கிராமம்
சேலம் (24)	காளியக்குடி (24)	129 திருமலை (129)

பண்டம் எண்	உட்பிரிவு எண்	பழைய புல உட்பிரிவு எண்	பகுதி அரசு - ரயத்துவாரி	நிலத்தின் வகை	பாசன ஆதாரம்	இரு போகமாவயணமும் தரம் ரகமும்	மண் திரைவு - ரகமும்	பரப்பு		மொத்த திரைவு	பட்டா எண்	குறிப்பு
								ஹெக்டா	பை			
221	1A	1P	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	31.50	89	3324
221	1B	1P	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	17 0	47	1.தனலட்சுமி
221	1C	1P	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	15 0	43	1.மலையாளபகவதி
221	1D	1P	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	32 0	90	1.மலையாளபகவதி
221	2	2	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	57.51	62	1956
221	3	3	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	52 1	44	1.பாண்டி
221	4A	4	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	71 1	98	1.தனலட்சுமி
221	4B	4	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	51.51	43	3063
221	4C	4	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	30 0	84	1.தனலட்சுமி
0	221	5A	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	25.50	70	3312
1	221	5B	ரயத்துவாரி புஞ்சை	புஞ்சை	0	8-1	4	2 77	0	8.5 0	25	3312
									மொத்தம்	3	91.5	



தமிழ்நாடு அரசு



வருவாய்த்துறை

அ - பதிவேடு

அலுவலக உபயோகத்திற்கு மட்டும்

பகுதி அளவு (24)	சு. ப. ம. ம. (24)	கிராமம்
108500.10	129 திருமலை (129)	

வ.எண் புல எண்	உட்பிரிவு எண்	பழைய புல உட்பிரிவு எண்	பகுதி அளவு - ரயத்துவாரி புஞ்சை	நிலத்தின் வகை	பாசன ஆதாரம்	இரு போகமளவு	மண் வகையும் வகையும்	மண் தரம்	மண் தரம்	மண் தரம்		பரப்பு	மொத்த தீர்வை		பட்டா எண்	குறிப்பு	This Land Is Under
										பு	பை		பு	பை			
1	222	1	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	79	52	19	3063	1	தனலட்சுமி		
2	222	2	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	43	51	19	3325	1	தனலட்சுமி		
3	222	3A	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	46	1	26	3063	1	தனலட்சுமி		
4	222	3B1	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	24	50	70	3063	1	தனலட்சுமி		
5	222	3B2	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	2	0	10	2574	1	தனலட்சுமி		
6	222	3C	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	25	0	69	161	1	சுந்தரம்		
7	222	3D	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	31	0	86	161	1	சுந்தரம்		
8	222	3E	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	24	50	68	1728	1	சுந்தரம்		
9	222	3F	ரயத்துவாரி புஞ்சை	புஞ்சை	8-1	4	2	77	0	48	1	34	1728	1	சுந்தரம்		
										மொத்தம்: 3		24	0				



தமிழ்நாடு அரசு



வருவாய்துறை

அ - பதிவேடு

அலுவலக உபயோகத்திற்கு மட்டும்

பாடல்கள் (24)	வட்டம்	கிராமம்
மதுரை (24)	கள்ளிகுடு (24)	129 திருமலை (129)

வ.எண்	புல எண்	புல உட்பிரிவு எண்	பகுதி அரசு	நிலத்தின் வகை	பாசன ஆதாரம்	இரு போகமா	மண் வயனாரும் ரகமும்	மண் தீர்வை - தரம்	மொத்த தீர்வை	பரப்பு	மொத்த தீர்வை		குறிப்பு	This Land is Under
											ரூ	பை		
1	223	1	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	1	26 3	50	3063	
2	223	2A	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	0	46.5 1	28	3063	1. தனலட்சுமி
3	223	2B	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	0	33 0	91	3063	1. தனலட்சுமி
4	223	3	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	0	88 2	44	2517	1. தனலட்சுமி
5	223	4	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	0	50 1	37	3324	1. சாவித்திரி எ வீரலெட்சுமி
6	223	5	ரயத்துவாரி	பஞ்சை	0	0	8-1	4	2 77	0	27.5 0	75	3063	1. தனலட்சுமி
7	223	6	அரசு	புறம்போக்கு	0	0	0-0	0	0 0	0	22.5 0	0	0	1. தனலட்சுமி
											மொத்தம் 3	93.5		



ANNEXURE VII



தமிழ்நாடு தமிழ்நாடு TAMIL NADU

2-8-2023

பி.சக்திவேல்
ஆதார

சம்மதப்பத்திரம்

ஆர் ஜானகிராம், எப்பாண்ட
குந்தியாண்டி கிளையாண்டி
12AC 191037
5, பத்திர சாலை தெரு, மதுரை
சம்மதப்பத்திரம்

12AC 191037

2023 - ம் ஆகஸ்ட் மாதம் 21 - ம் தேதிக்கு

தமிழ் ஸ்ரீ சோபகிருது வருடம் ஆவணி மாதம் 4 - ம் தேதிக்கு

மதுரை மாவட்டம் திருப்பரங்குன்றம் வட்டம், மேலரத விதி, கதவு எண் - 15 என்ற முகவரியில் வசித்து வரும் திருதுரைராஜ் அவர்களின் குமாரர் திரு.பி.சக்திவேல் அவர்கள் (ஆதார எண் :5136 7829 0979) 1 வது பார்ட்டியாகவும், மதுரை மாவட்டம் திருப்பரங்குன்றம் பசுமலை கோபால்சாமி நகர் கதவு எண் 2/1 என்ற முகவரியில் வசித்து வரும் திரு ததுரைகோபால்சாமி அவர்களின் மனைவி திருமதி பதனலட்சுமி ஆதார எண் (2544 0147 9034) 2 வது பார்ட்டியாகவும் ஆக நாமிரு பார்ட்டிகளும் கேர்ந்து எழுதிக்கொள்ளும் சம்மதப்பத்திரம் என்னவென்றால்

1வதுபார்ட்டி

P. சக்திவேல்



2வதுபார்ட்டி

P. Shanalakshmi



நம்மில் 2வது பார்ட்டிக்கு பாத்தியப்பட்டதும், தற்போது 2வது பார்ட்டியின் அனுபவத்தில் இருந்து வரும் மதுரை மாவட்டம், கள்ளிக்குடி தாலுகா, திருமால் கிராமத்தில் பட்டா எண் 3063, சர்வே எண் 221/4A, 0.71.0 ஏர்சில் வடபுறம் 0.52.81 ஏர்கம், சர்வே எண் 221/4B 0.51.5 ஏர்சில் வடபுறம் 0.37.48 ஏர்கம் சர்வே எண் 222/1 0.79.5 ஏர்சில் 0.63.68 ஏர்கம் சர்வே எண் 222/3A 0.46.0 ஏர்கம் சர்வே எண் 222/3B1 0.24.5 ஏர்கம் சர்வே எண் 223/2B 0.33.0 ஏர்கம் பட்டா எண் 3325 சர்வே எண் 222/2 0.43.5 ஏர்கம் சர்வே எண் 217/4 0.69.0 ஏர்கம் பட்டா எண் 3051 சர்வே எண் 221/3 0.52.0 ஏர்சில் வடபுறம் 0.34.78 ஏர்கம் சேர்த்து ஆக மொத்தம் 4.04.75 ஹெக்டர் அளவுள்ள நிலங்களில் நம்மில் 1-வது பார்ட்டி தனது தொழிலுக்கு தேவையான கிராவல், உடைகல் எடுத்துக்கொள்ள நம்மில் 2-வது பார்ட்டி முழுமன சம்மதம் தெரிவித்துள்ளார், என்றும், இதன்படி நம்மில் 1-வது பார்ட்டி அரசின் அனுமதிப் பெற்ற நாளிலிருந்து 10 ஆண்டுகள் 1-வது பார்ட்டி தனக்கு தேவையான கிராவல், உடைகல் எடுத்துக்கொள்ள வேண்டியது என்று நாம் இரு பார்ட்டிகளும் மனம் ஒப்பி எழுதி படித்துப்பார்த்து கையொப்பம் செய்து கொண்ட சம்மத பத்திரம் இதுவாகும்.

சொத்துக்கள் விபரம்

மதுரை மாவட்டம், கள்ளிக்குடி தாலுகா, திருமால் கிராமத்தில் பட்டா எண் 3063, சர்வே எண் 221/4A, 0.71.0 ஏர்சில் வடபுறம் 0.52.81 ஏர்கம், சர்வே எண் 221/4B 0.51.5 ஏர்சில் வடபுறம் 0.37.48 ஏர்கம் சர்வே எண் 222/1 0.79.5 ஏர்சில் 0.63.68 ஏர்கம் சர்வே எண் 222/3A 0.46.0 ஏர்கம் சர்வே எண் 222/3B1 0.24.5 ஏர்கம் சர்வே எண் 223/2B 0.33.0 ஏர்கம் பட்டா எண் 3325 சர்வே எண் 222/2 0.43.5 ஏர்கம் சர்வே எண் 217/4 0.69.0 ஏர்கம் பட்டா எண் 3051 சர்வே எண் 221/3 0.52.0 ஏர்சில் வடபுறம் 0.34.78 ஏர்கம் சேர்த்து ஆக மொத்தம் 4.04.75 ஹெக்டரில் கட்டுப்பட்டது ஆகும்.

1வதுபார்ட்டி

S. சிவசுந்தர்

சாட்சிகள்

1 S. P. S. Pillai s/o V. Sankaran, 108, ARV. Nagar, Thirunagar, Madurai - 6 -

2 N. K. P. (N. K. P. Sany) S/o Nallu Sany s/o N. Sany, middle street, Vekasapuram, Madurai - 6 -

2வதுபார்ட்டி

P. Dhavalakshmi



R. JEYARAM, B.A., B.L.,
Advocate & Notary Public
Government of India
Regn. No. 22044
No. 11, Sankaravathi Street,
Madurai - 625 007.
Cell. 98902 14474



தமிழ்நாடு தமிழ்நாடு TAMIL NADU

21-8-2023

D. சக்திவேல்
ஆதார

4-ஆம் ஜானகிராம, எம்.எஸ்.
முத்தியாத்தாள் விற்பனைபவர்
மா.ப. அலுவலகம்
3, பந்தடி, 4வது தெரு, மதுரை
ஆ.ப.சி. 8191/93/82/90

12AC 191036

சம்மத பத்திரம்

2023 -ம் ஆகஸ்ட் மாதம் 21-ம் தேதிக்கு ,

தமிழ் ஸ்ரீ சோபகிருது வருடம் ஆவணி மாதம் 4-ம் தேதிக்கு

மதுரை மாவட்டம் திருப்பரங்குன்றம் வட்டம், மேலரத வீதி , கதவு எண் - 15
என்ற முகவரியில் வசித்து வரும் திரு. துரைராஜ் அவர்களின் குமாரர்
திரு. D. சக்திவேல் அவர்கள் (ஆதார எண் : 5136 7829 0979) 1 வது
பார்ட்டியாகவும், மதுரை மாவட்டம் திருப்பரங்குன்றம் பசுமலை
கோபால்சாமி நகர் கதவு எண் 2/1 என்ற முகவரியில் வசித்து வரும்
திரு. கோ. தளபதி அவர்களின் குமாரர் திரு. துரைகோபால்சாமி அவர்கள்
(ஆதார எண் : 3060 5537 6119) 2 வது பார்ட்டியாகவும் ஆக நாமிரு
பார்ட்டிகளும் சேர்ந்து எழுதிக்கொள்ளும் சம்மத பத்திரம் என்னவென்றால்

1 வது பார்ட்டி

D. சக்திவேல்



2 வது பார்ட்டி

h. Jayaram



நம்மில் 2வது பார்ட்டிக்கு பாத்தியப்பட்டதும், தற்போது 2வது பார்ட்டியின் அனுபவத்தில் இருந்து வரும் மதுரை மாவட்டம், கள்ளிக்குடி தாலுகா, திருமால் கிராமத்தில் பட்டா எண் 3418, சர்வே எண் 217/2A, 1.25.49 ஏக்கரில் தென்புறம் 0.53.25 ஏக்கம், பட்டா எண் 3436 சர்வே எண் 217/2B 0.17.01 ஏக்கம் சேர்த்து ஆக மொத்தம் 0.70.26 ஹெக்டர் அளவுள்ள நிலங்களில் நம்மில் 1வது பார்ட்டி தனது தொழிலுக்கு தேவையான கிராவல், உடைகல் எடுத்துக்கொள்ள நம்மில் 2வது பார்ட்டி முழுமன சம்மதம் தெரிவித்துள்ளார், என்றும், இதன்படி நம்மில் 1வது பார்ட்டி அரசின் அனுமதிப் பெற்ற நாளிலிருந்து 10 ஆண்டுகள் 1வது பார்ட்டி தனக்கு தேவையான கிராவல், உடைகல் எடுத்துக்கொள்ள வேண்டியது என்று நாம் இரு பார்ட்டிகளும் மனம் ஒப்பி எழுதி படித்துப்பார்த்து கையொப்பம் செய்து கொண்ட சம்மத பத்திரம் இதுவாகும்.

சொத்துக்கள் விபரம்

மதுரை மாவட்டம், கள்ளிக்குடி தாலுகா, திருமால் கிராமத்தில் பட்டா எண் 3418, சர்வே எண் 217/2A, 1.25.49 ஏக்கரில் தென்புறம் 0.53.25 ஏக்கம், பட்டா எண் 3436 சர்வே எண் 217/2B 0.17.01 ஏக்கம் சேர்த்து ஆக மொத்தம் 0.70.26 ஹெக்டரில் கட்டுப்பட்டது ஆகும்.

1வது பார்ட்டி

D. Sankaran

2வது பார்ட்டி

J. Jeyaram

சாட்சிகள்

1 *S. Ponnappa* s/o *V. Sankaran*, 108 Ann Nagar, Thirunagar, Madurai-6

2 *N. Kuppusamy* (N. Kuppusamy) s/o *Nallusamy*, 259 B Middle Street, Vadarpalayalam, Madurai-6.



R. Jeyaram
3211123
R. JEYARAM, B.A., B.L.
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Phone: 225474



புது உடையாளம் / புது உடையாளம்

இந்திய அரசாங்கம்
Unique Identification Authority of India
Government of India

புது உடையாளம் / Enrollment No.: 260720924/01759

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று குடியரிமைக்கு அல்ல.
- அடையாள சான்றை இணையதளம் மூலம் உறுதிப்படுத்திக் கொள்ளவும்

INFORMATION

- Aadhaar is proof of identity, not of citizenship.
- To establish identity, authenticate online.

To
சக்திவேல் துரைராஜ்
Sakthivel Durairaj
S/O Durairaj
15 MELARATHA VEETHI
THIRUPARANKUNDRAM
Thiruparankundram
Thiruparankundram
Madurai South Madurai
Tamil Nadu 625005
9842524576



உங்கள் ஆதார் எண் / Your Aadhaar No. :

5136 7829 0979

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும்.
- Aadhaar is valid throughout the country.
- Aadhaar will be helpful in availing Government and Non-Government services in future.



இந்திய அரசாங்கம்

Government of India

சக்திவேல் துரைராஜ்
Sakthivel Durairaj
தகவல் துரைராஜ்
Father: DURAIRAJ
பிறந்த நாள் / DOB: 10/11/1968
ஆண் / Male



5136 7829 0979

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

ஆதார்
முகவரி
S/O துரைராஜ் 15, செவ்வா வீதி,
திருப்பரங்குண்டாம்
திருப்பரங்குண்டாம், மதுரை,
திருப்பரங்குண்டாம், தமிழ் நாடு
625005

இந்திய அரசாங்கம் / புது உடையாளம் / புது உடையாளம்
Unique Identification Authority of India

Address:
S/O Durairaj, 15, MELARATHA
VEETHI,
THIRUPARANKUNDRAM,
Thiruparankundram, Madurai,
Thiruparankundram, Tamil Nadu,
625005

5136 7829 0979



ச. சி. சி. சி.



आयकर विभाग INCOME TAX DEPARTMENT B SAKTHIVEL DURAIKAV DIKOTI 95B LIXPESROEM <i>[Signature]</i>	भारत सरकार GOVT OF INDIA <i>[Signature]</i>	आयकर विभाग Income Tax Department Government of India Department of Revenue Ministry of Finance New Delhi 20/01/2014
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D. Sakthivel

அண்ணாமலைப்



பல்கலைக்கழகம்

ANNAMALAI

UNIVERSITY



அறிவியற்புலம்
FACULTY OF SCIENCE,

மே, 2010 இல்

பயன்பாட்டு நிலத்தியல்

பிரிவில்

நடத்திய தேர்வுகளில்

சந்தோஷ்குமார் ம/

கூடுதல்

மதிப்புப்புள்ளிகள் 10.00 க்கு சராசரியாக 7.04 பெற்று

முதல் வகுப்பில்

தேர்ச்சியடைந்து முறையாக அமைக்கப்பெற்ற தேர்வுக்குழுவினர் சான்றளித்தபடி,

அறிவியல் நிறைஞர் பட்டம் பெறுவதற்கு உரியவர் ஆகின்றார்

என அண்ணாமலைப் பல்கலைக்கழக ஆளவை இதன்வழி அறிவிக்கின்றது.

The Senate of the ANNAMALAI UNIVERSITY hereby makes known that **SANTHOSHKUMAR M/** has been admitted to the Degree of **MASTER OF SCIENCE in APPLIED GEOLOGY,** he/she having secured **OGPA of 7.04/** out of **10.00** been certified by duly appointed Examiners at the Examination held in **MAY,2010/** to be qualified to receive the same and that he/she was placed in **FIRST CLASS.**

பல்கலைக்கழக முத்திரை பெறுகின்றது

Given under the seal of the University



அண்ணாமலைநகர்
Annamalainagar

நாள்:

Dated: 06/10/2010

Senthilvel

துணை தேர்வாணையர் (கல்விகார்ந்த)
Dy. Controller of Examination 95 Academic

Dr. M. Rathinasabapathi

Dr. M. Rathinasabapathi

பதிவாளர்

Registrar

Dr. M. Ramanathan

Dr. M. Ramanathan

துணை வேந்தர்

Vice-Chancellor



**GOVERNMENT OF INDIA
MINISTRY OF LABOUR AND EMPLOYMENT DIRECTORATE GENERAL OF
MINES SAFETY**

Certificate of Practical Experience granted by the Manager to a Candidate for a Manager's/ Surveyor's/ Mining foreman/ Mining Mate/ Blasters certificate of competency examination under Metalliferous Mines Regulation, 1961.

I, M.S.Pavel being the Manager of K.Pitchampatti Multicolor Granite Mine belong to M/s. Anupkumar Lohia do hereby certify that **Thiru. M.santhoshkumar** son of **Thiru. R.Mathiyazhagan** (whose signature is appended) worked in the above mine from 10.07.2012 to 31.07.2018. During his term of work aforesaid, he has obtained practical experience as detailed overleaf. The duties connected with his work have involved continuous attendance at the mine and have been efficiently performed by him.

I believe him to be of good character and a fit and proper candidate to be examined for certificate of competency.

M.S. Pavel

(Signature with date and official seal)

(Mines Manager 1st class)
MANAGER (MINES)
MULTICOLOUR GRANITE MINE
K. PITCHAMPATTI,
KARUR - TALUK & DIST.

M. Santosh Kumar
(Signature of Candidate)

State the name of the mineral works: Multi Colour Granite

S. No.	Particulars of Practical experience (a)	Place of Experience (b) Opencast	Period of Practical experience (c)		Total Experience (e)		
			From	To	Yrs.	Months	Days
1.	As a trainee in drilling operation	Open cast	10.07.2012	24.10.2013	01	03	16
2.	As a trainee in deep hole blasting operation	Open cast	25.10.2013	31.12.2014	01	02	07
3.	Production incharge quality control and Supervisor of Earth moving Mining Machinery	Open cast	01.01.2015	31.07.2018	03	07	00
GRAND TOTAL					06	00	23
In words : Six years twenty three days							

In below ground working	In open cast working	In all
Nil	Average monthly output 250m ³	250m ³
Nil	Average daily employment 25Nos	25Nos

Note: The average employment is less because this is mechanized mines having deep hole drilling, blasting and Heavy Earth Moving Machinerics operation.

M. S. Senthil
(Signature of Candidate)

M. S. Senthil
(Signature with date and official seal)

(Mines Manager 1st class)
MANAGER (MINES)
MULTICOLOUR GRANITE MINE
K. PITCHAMPATTI,
KARUR - TALUK & DIST.

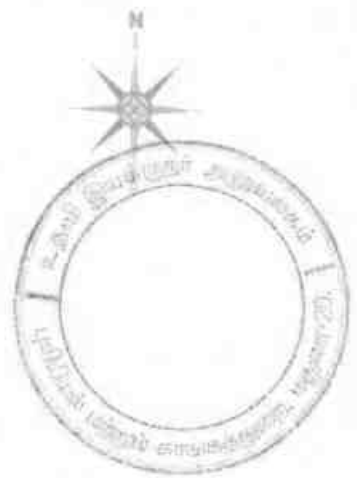
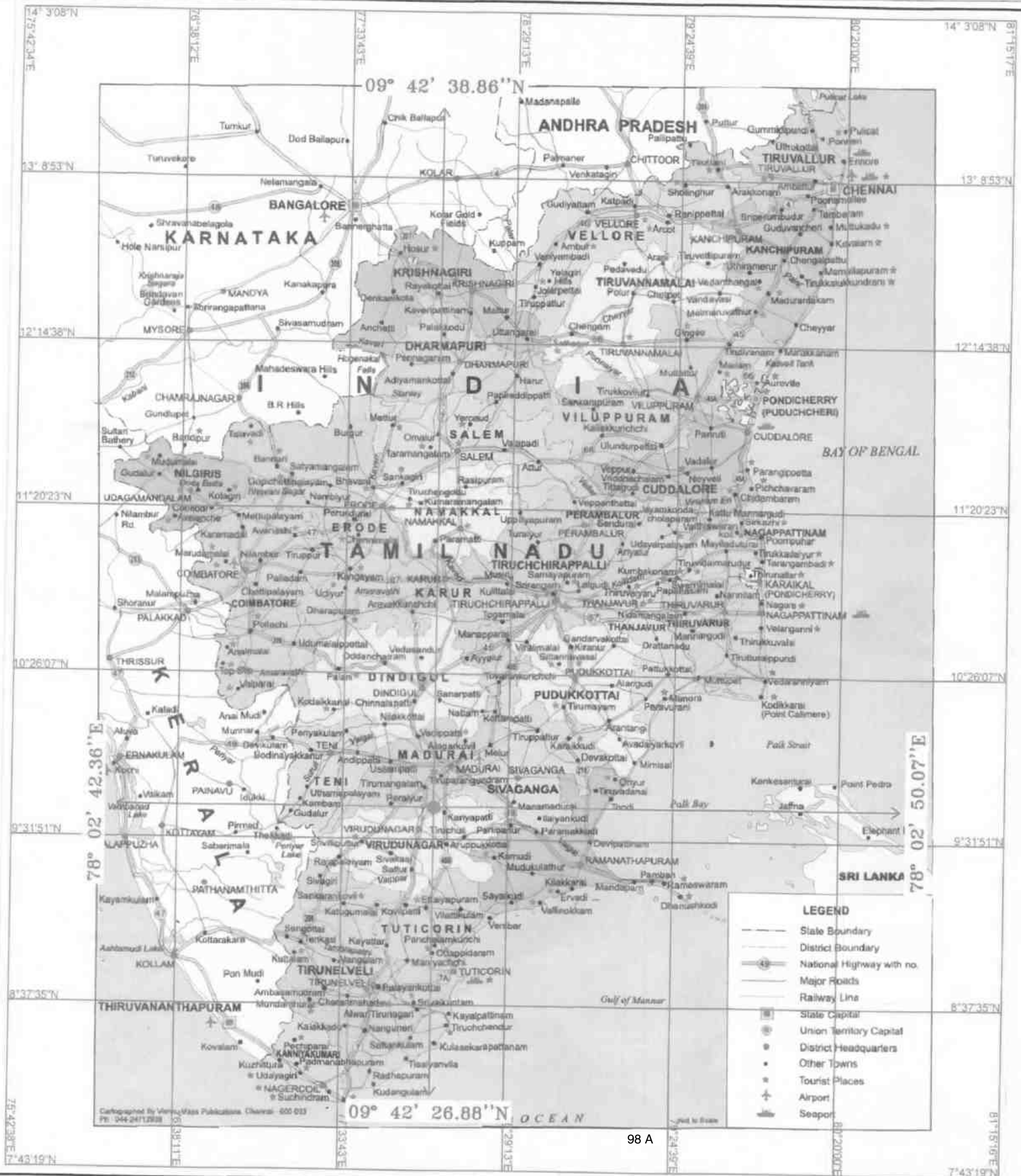


PLATE NO: I

DATE OF SURVEY : 13.10.2023

APPLICANT:

THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1.&223/2B,
EXTENT : 4.75.01Ha,
VILLAGE :THIRUMAL,
TALUK : kALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

Q. L. A. AREA : ●

TOPO SHEET NO. : 58 K/02

LATITUDE : 09° 42' 26.88"N to 09° 42' 38.86"N

LONGITUDE : 78° 02' 42.36"E to 78° 02' 50.07"E

LOCATION PLAN

SCALE 1:24,00,000

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

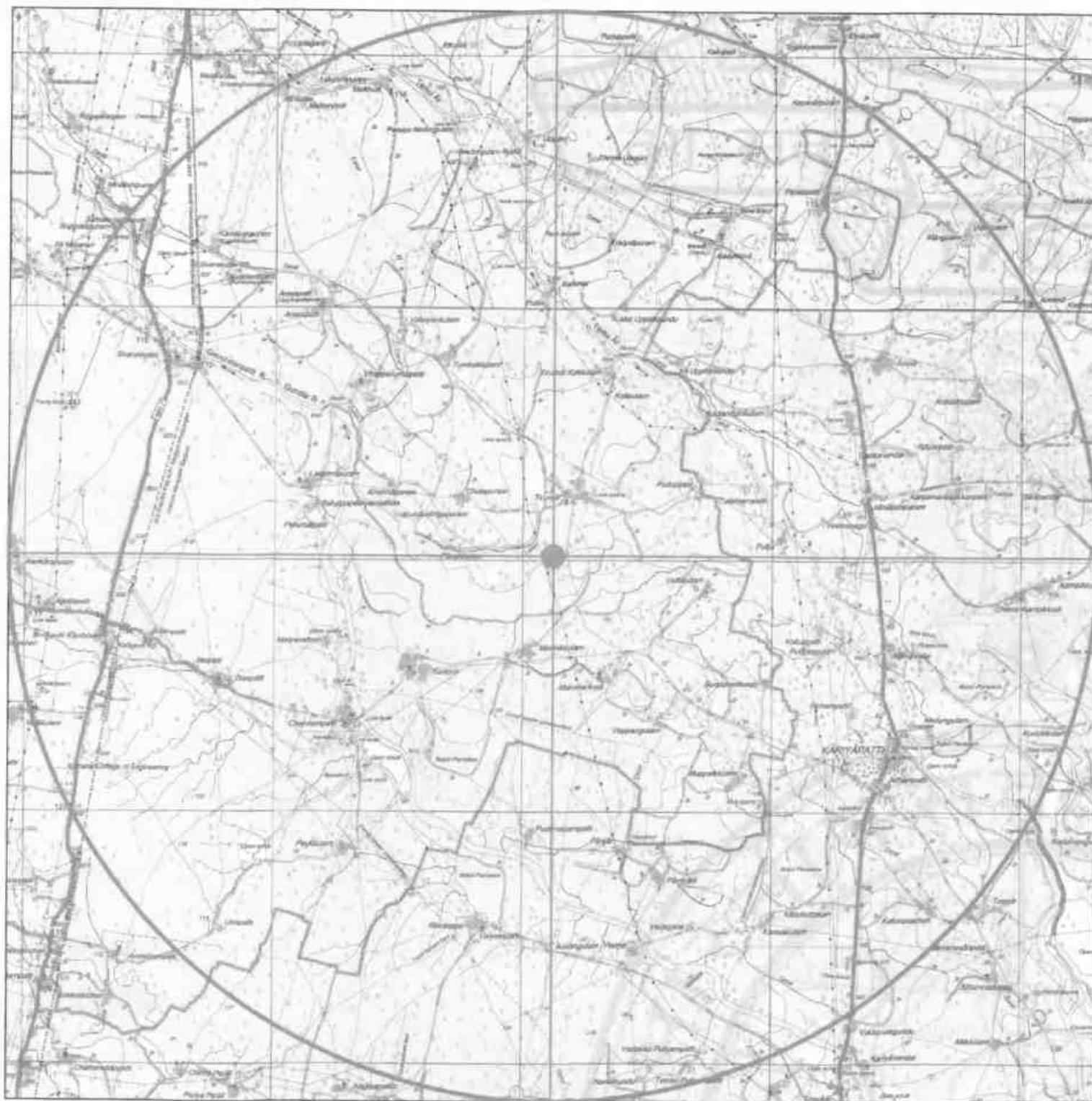
M. Santosh Kumar
M.SANTHOSH KUMAR, M.Sc.,
QUALIFIED PERSON

Under Rule 15(i)(a) and (b) of MCR, 2015



09° 48' 04.04''N

77° 57' 14.57''E



78° 08' 17.84''E

09° 37' 01.71''N

TOPO SHEET NO. : 58 K/02

LATITUDE : 09° 42' 26.88''N to 09° 42' 38.86''N

LONGITUDE : 78° 02' 42.36''E to 78° 02' 50.07''E

10KM RADIUS : 

Q.L.APPL997A AREA: 

PLATE NO:I-A

DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.



LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1.&223/2B.

EXTENT : 4.75.01Ha,

VILLAGE :THIRUMAL,

TALUK : kALLIKUDI,

DISTRICT : MADURAI,

STATE : TAMIL NADU.

INDEX

CONVENTIONAL SYMBOLS

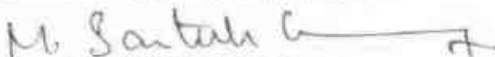
Express highway with toll with bridge with drainage along	
Roads marked according to importance	
Roads double carriageway according to importance	
Unmetalled road Cart track Path track with cross Road cart	
Streams with bed in bed unmetalled Canal	
Canal masonry or masonry with masonry floor	
River dry with water channel with bank & river, Tidal river, Submerged canal Stone bridge, Weir	
Wells lined unlined Tidal well Spring Tankia protected by embankment well or well bank Broken ground	
Railways broad gauge metric gauge with station under cover	
Railways other gauges metric gauge with station stone fr.	
Mineral line or railway line Cutting with level	
Contours with scale in feet Rocky slopes Cliff	
Sand features (Sea, Strand, Mangrove, etc.) (Mangrove)	
Towns or villages marked by black dots	
Hill prominent conical Tower Antenna	
Temples Chhattri Church Mosque Jagan Temple Gopur	
Light house Light house Lighted lighthouse Anchorage	
Wire Wire on poles Green field	
Palms paddy other plants Garden Barren Other trees	
Area cultivated wooded Surveyed line	
Boundary international	
State boundary unenclosed	
State boundary wall or brick fence	
Boundary other surveyed unenclosed	
Height, benchmark station, spot, approximate	1:200 1:200 1:200
Survey mark, bench, survey, level	BM 65-2 65/207
Post office Telegraph office Overseas tele	
Post house or inspection bungalow Circuit house Police station	
Camping ground Forest reserved protected	
Special reserve administrative locality or spot	KK001 NG04
Hospital Dispensary Veterinary Hospital Dispensary	
Aerodrome Helipad Tugboat	
Power line with poles surveyed with poles unsurveyed	

**TOPO SKETCH OF QUARRY
LEASE APPLIED AREA FOR
10Km RADIUS**

SCALE- 1:100000

PREPARED BY :

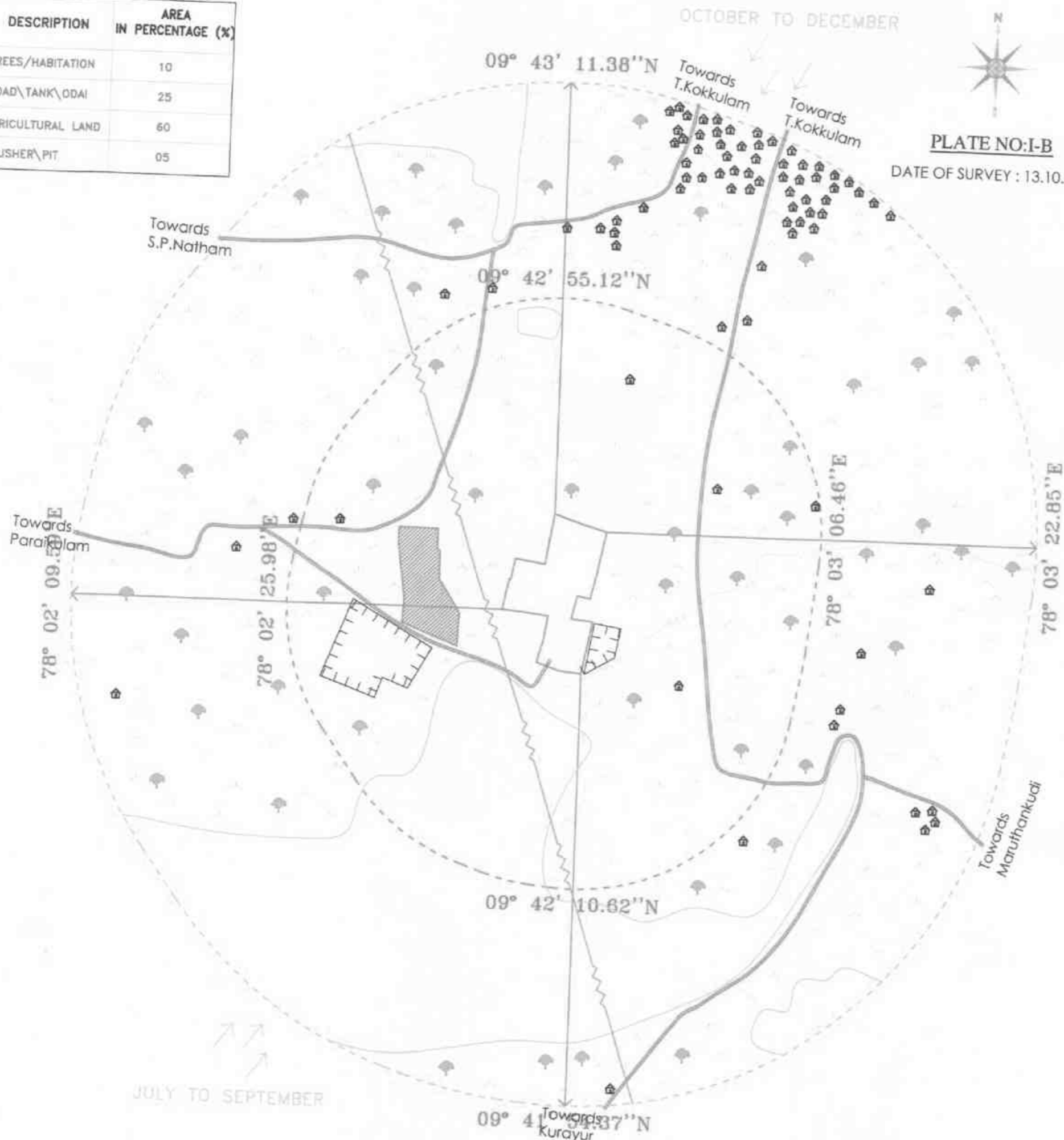
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT


M.SANTHOSHKUMAR, M.Sc.,
QUALIFIED PERSON

Under Rule 15(i)(a) and (b) of MCR, 2016

LAND USE PATTERN

DESCRIPTION	AREA IN PERCENTAGE (%)
TREES/HABITATION	10
ROAD\TANK\ODAI	25
AGRICULTURAL LAND	60
CRUSHER\PIT	05



OCTOBER TO DECEMBER



PLATE NO:I-B

DATE OF SURVEY : 13.10.2023

TOPO SHEET NO. : 58 K/02

LATITUDE : 09° 42' 26.88"N to 09° 42' 38.86"N

LONGITUDE : 78° 02' 42.36"E to 78° 02' 50.07"E

1KM RADIUS :

500M RADIUS

Q.LAPPLIED AREA:



APPLICANT:





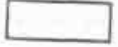



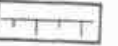


THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1.&223/2B.
EXTENT : 4.75.01Ha,
VILLAGE:THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

- APPROACH ROAD 
- WIND DIRECTION 
- TREES 
- VILLAGE ROAD 
- AGRICULTURE LAND 
- HT LINE 
- CRUSHER PLANT 
- HABITATION 
- QUARRY PIT 
- ODAI 
- TANK 

ENVIRONMENTAL & LANDUSE PLAN(For 1Km Radius)

SCALE 1:10,000

PREPARED BY :

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
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BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

M. Santhosh Kumar
M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Section 11-A



PLATE NO:I-C

DATE OF SURVEY : 13.10.2023

APPLICANT:

THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

LOCATION OF QUARRY

LEASE APPLIED AREA:

S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1.&223/2B,
EXTENT : 4.75.01Ha,
VILLAGE :THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

INDEX

- Q.L.APPLIED BOUNDARY
- APPROACH ROAD
- MAJOR ROAD
- PANCHAYAT ROAD
- SH-154

ROUTE MAP

Not to Scale

PREPARED BY:

THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT

M. Santhosh Kumar

M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(i)(a)and(b)of MCR,2016



S.NO	SFNO'S	AREA IN HA
1	217/2A(P)	0.53.25
2	217/2B	0.17.01
3	217/4	0.69.00
4	221/3(P)	0.34.78
5	221/4A(P)	0.52.81
6	221/4B(P)	0.37.48
7	222/1	0.63.68
8	222/2	0.43.50
9	222/3A	0.46.00
10	222/3B1	0.24.50
11	223/2B	0.33.00
TOTAL		4.75.01

BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	09° 42' 27.65"N	78° 02' 45.16"E
2	09° 42' 29.28"N	78° 02' 45.61"E
3	09° 42' 31.18"N	78° 02' 45.90"E
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23	09° 42' 27.05"N	78° 02' 46.99"E
24	09° 42' 27.31"N	78° 02' 46.16"E

DATUM : UTM-WGS84, ZONE 44 NORTH

PLATE NO - II
DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

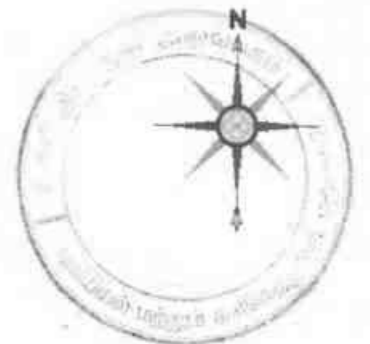
LOCATION OF QUARRY
LEASE APPLIED AREA:
S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1.&223/2B.
EXTENT : 4.75.01Ha,
VILLAGE :THIRUMAL,
TALUK : KALKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

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Q.L. APPLIED AREA BOUNDARY	
7.5m & 50m SAFETY DISTANCE	
TEMPORARY BENCH MARK	
HT LINE	
APPROACH ROAD	
ODAI	
TANK	

QUARRY LEASE & SURFACE PLAN
SCALE 1 : 1000

PREPARED BY :
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT
M. Sathish Kumar
M.SATHISHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(i)(a)and(b)of MCR,2016



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
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DATUM : UTM-WGS84, ZONE 44 NORTH

PLATE NO - III
DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/O.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

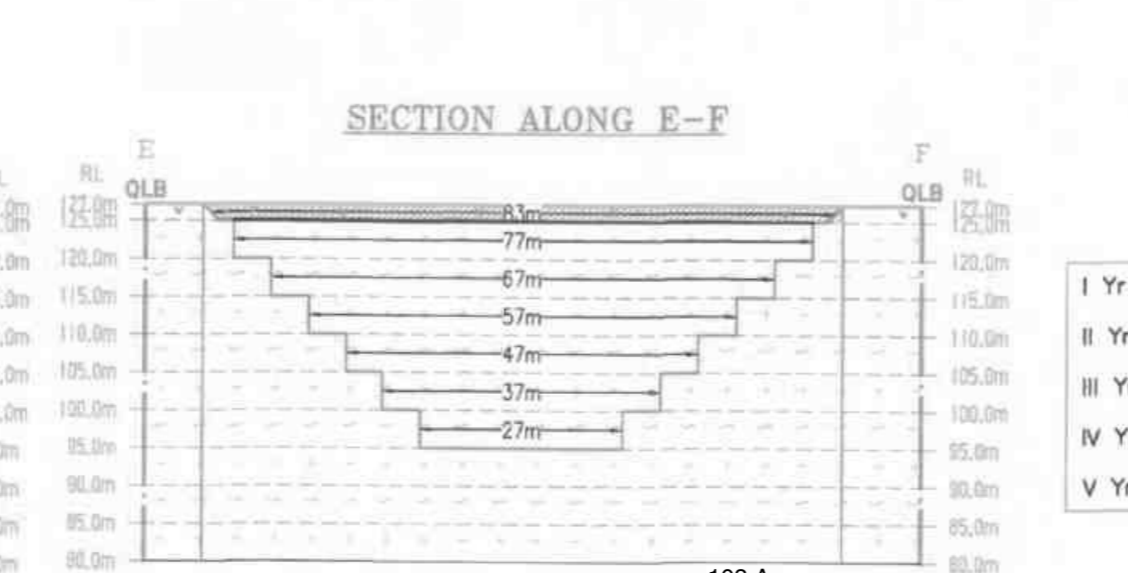
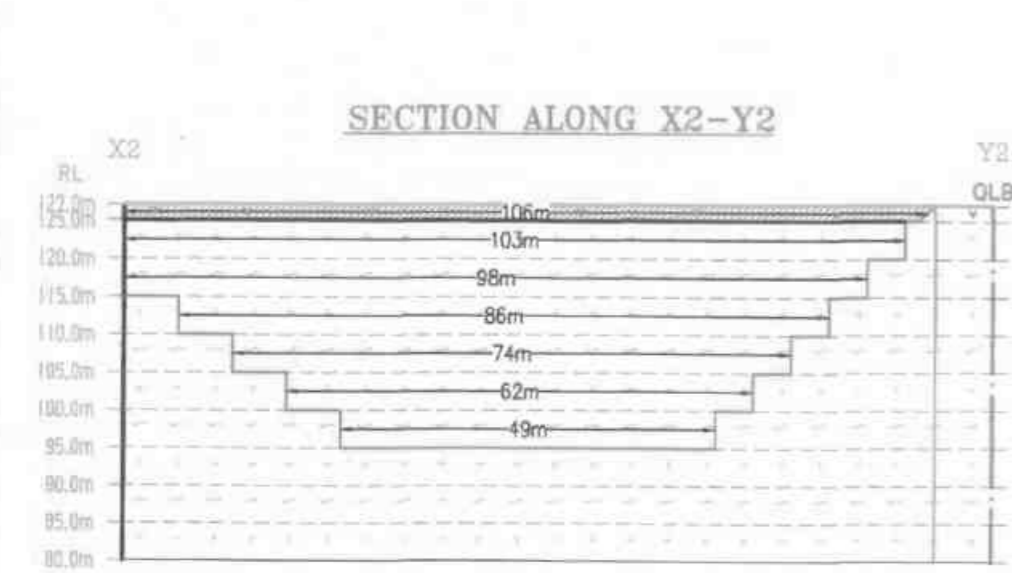
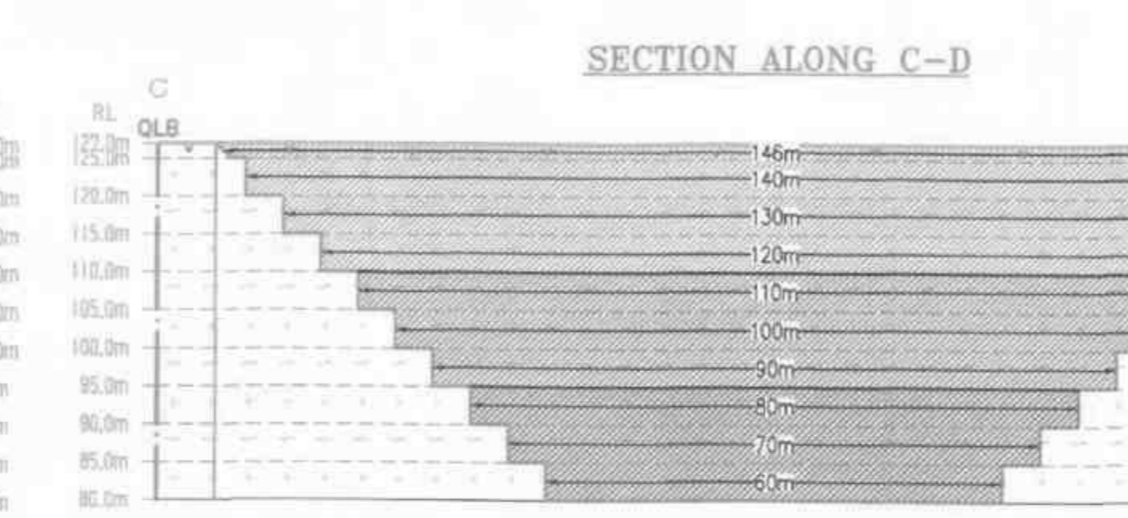
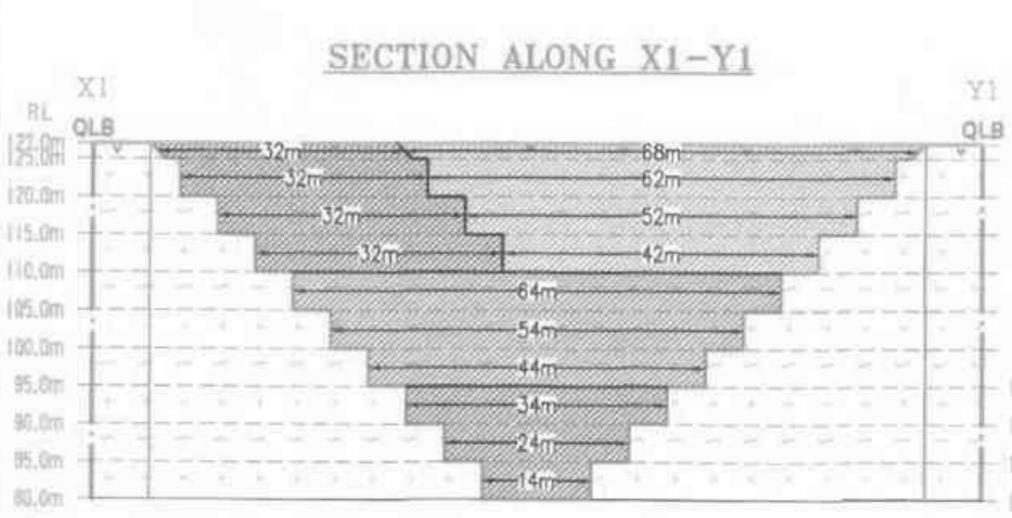
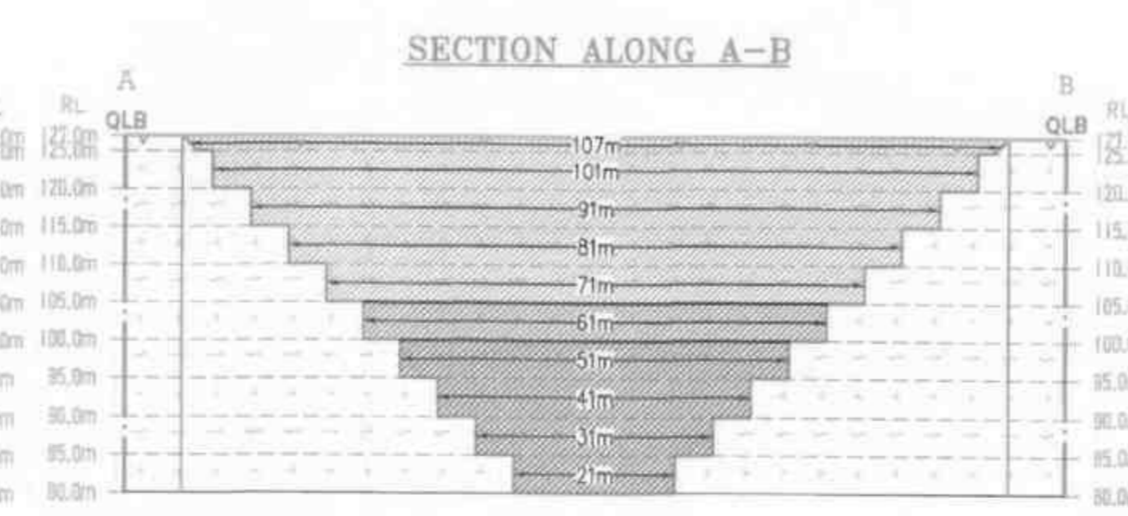
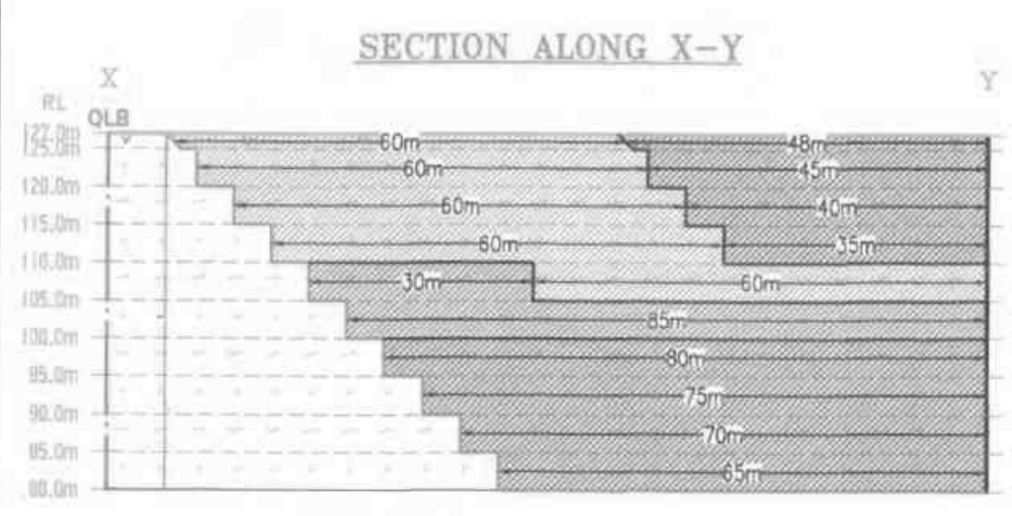
LOCATION OF QUARRY LEASE APPLIED AREA:
S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1,&223/2B,
EXTENT : 4.75.01Ha,
VILLAGE :THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

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- TANK
- STRIKE AND DIP
- GRAVEL
- ROUGH STONE

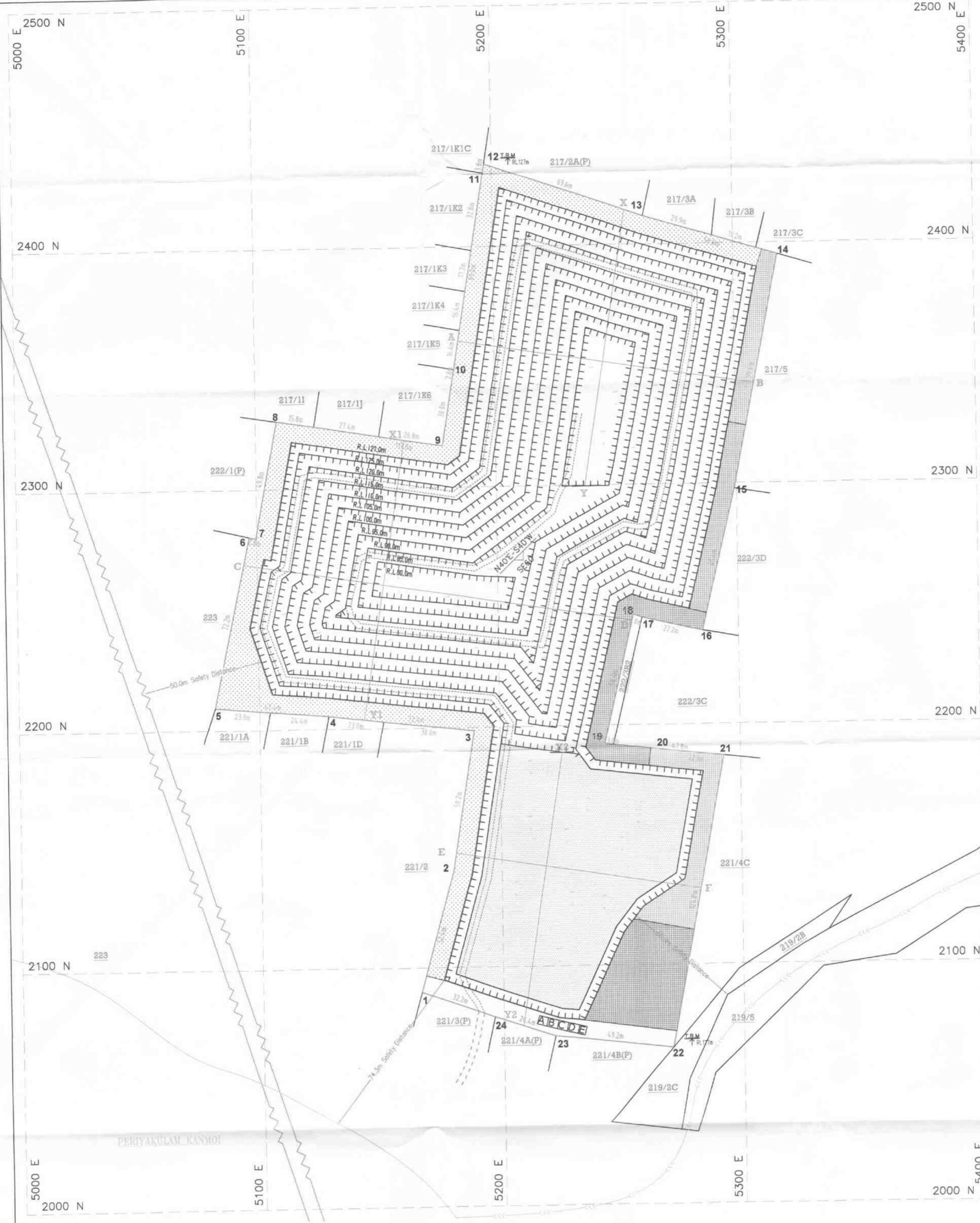
TOPOGRAPHY, GEOLOGICAL PLAN & SECTIONS SHOWING YEARWISE DEVELOPMENT & PRODUCTION PLAN & SCETIONS I-V YEAR
SCALE 1 : 1000

PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP AUTHENTICATED BY STATE GOVERNMENT
M. Sankar
M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(1)(a)and(b)of MCR,2015



- I Yr EXCAVATION
- II Yr EXCAVATION
- III Yr EXCAVATION
- IV Yr EXCAVATION
- V Yr EXCAVATION
- I Yr PLANTATION
- II Yr PLANTATION
- III Yr PLANTATION
- IV Yr PLANTATION
- V Yr PLANTATION

SITE SERVICES (Proposed)
A--OFFICE
B--FIRST AID ROOM
C--STORE
D--REST SHED
E--TOILET



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
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DATUM : UTM-WGS84, ZONE 44 NORTH

PLATE NO - III-A

DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/O.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

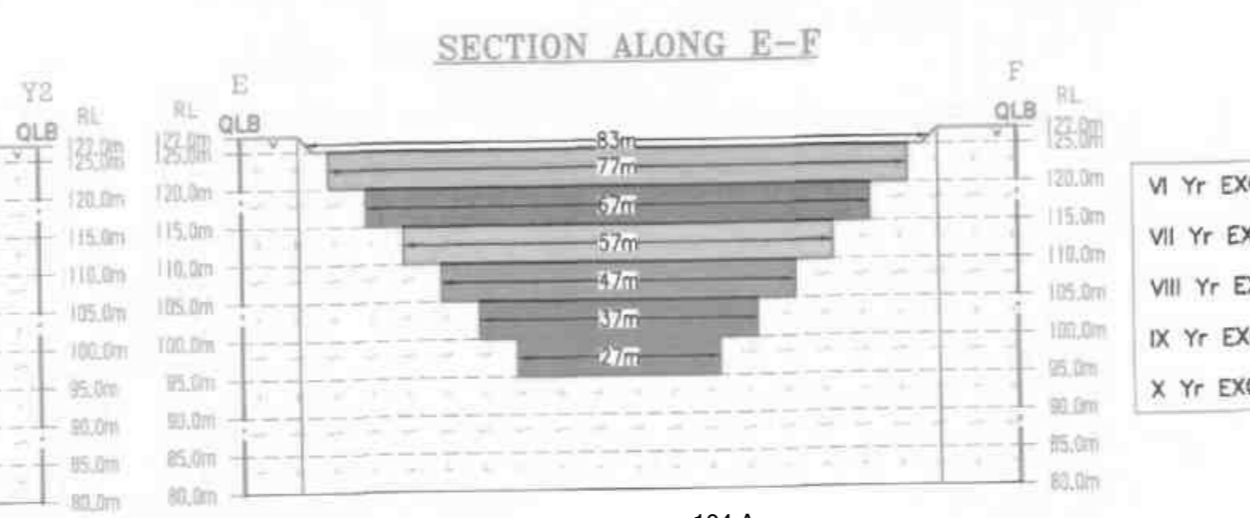
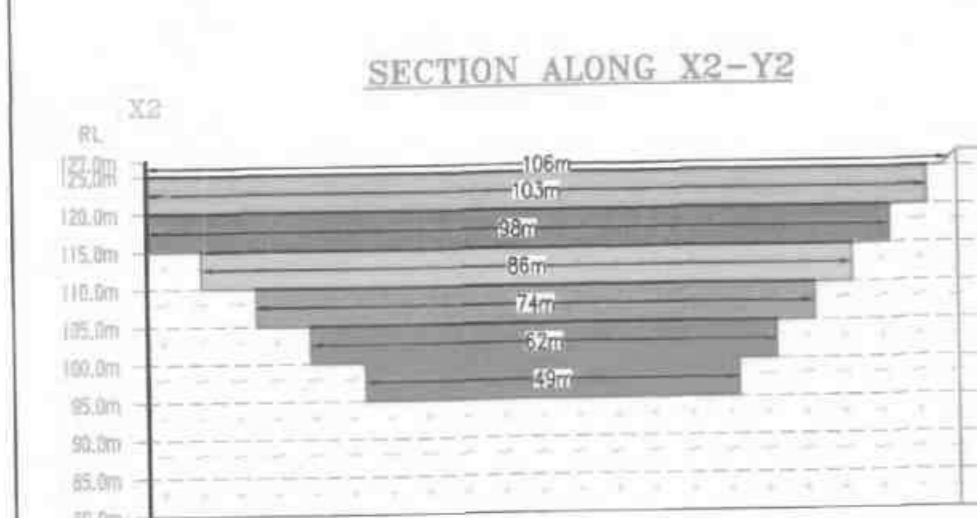
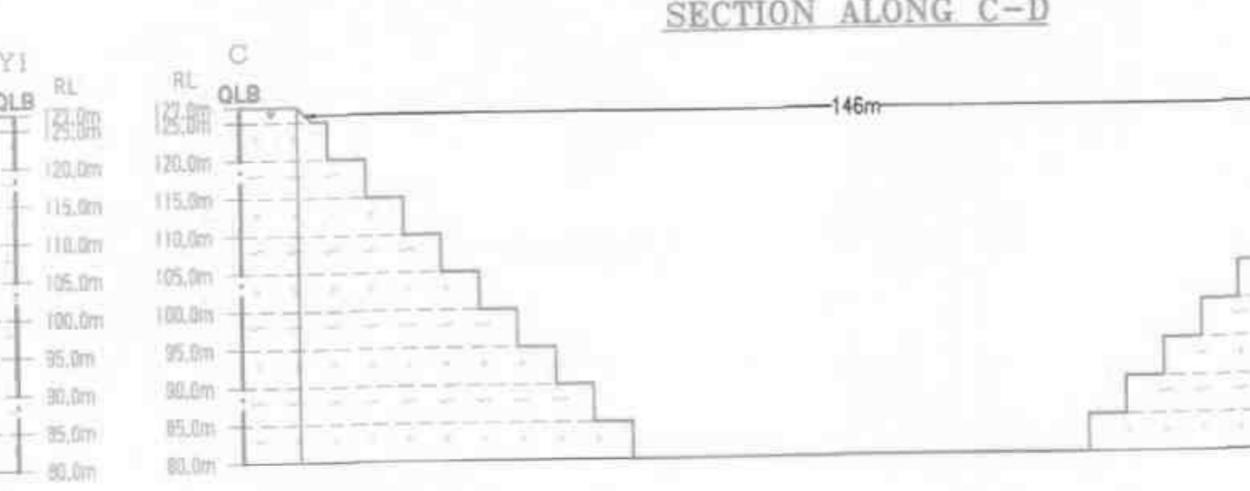
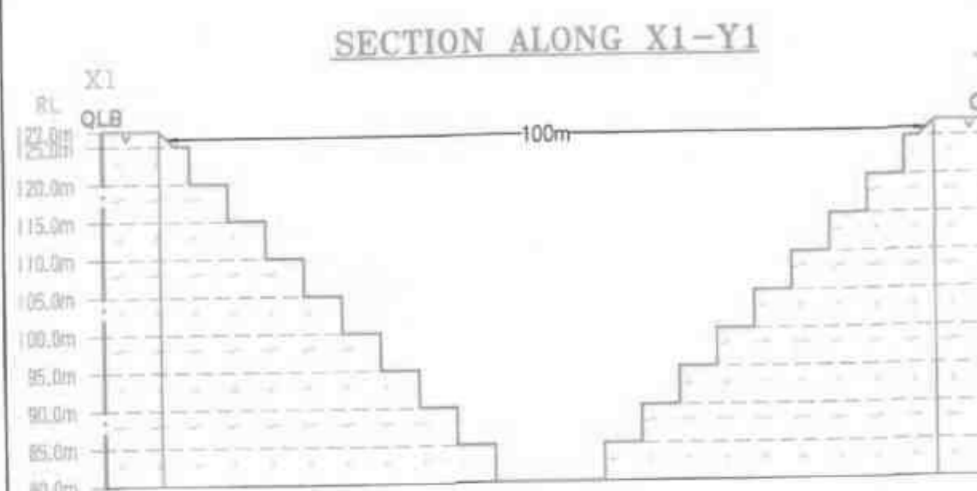
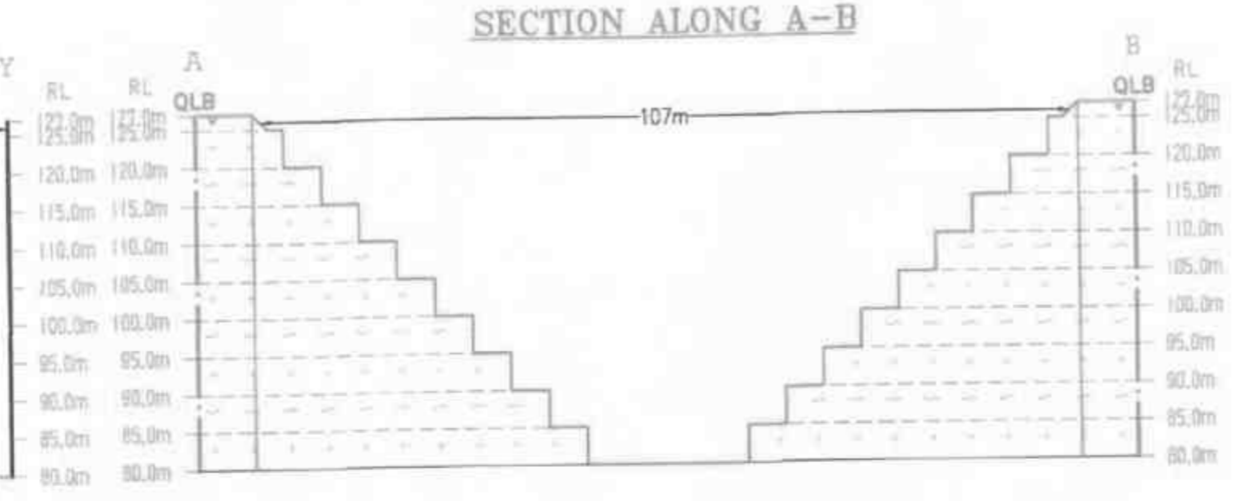
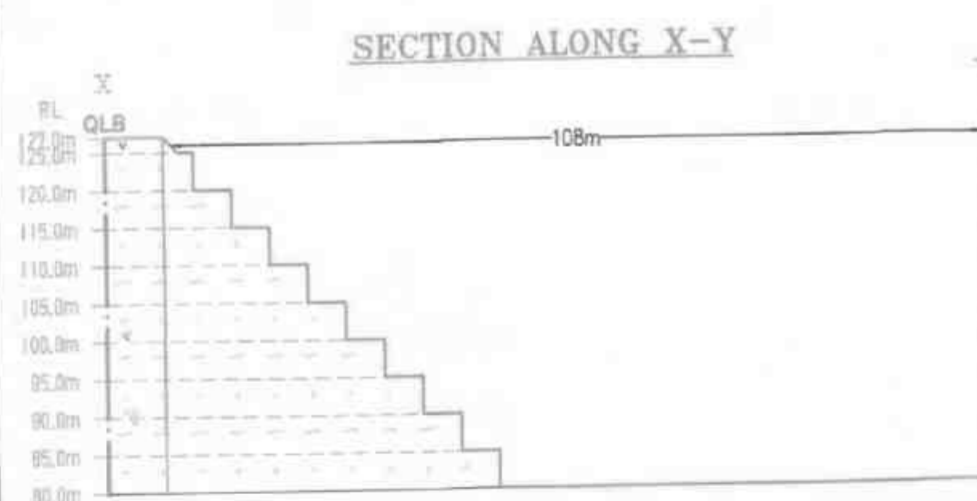
LOCATION OF QUARRY

LEASE APPLIED AREA:
S.F.No :217/2A(P),2B,4,221/3(P),4A(P),
4B(P),222/1(P),2,3,3B1 & 223/2B,
EXTENT : 4.75.01Ha,
VILLAGE:THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
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- ODAI
- TANK
- STRIKE AND DIP
- GRAVEL
- ROUGH STONE
- QUARRY PIT
- QUARRY ROAD

1st Yr Proposed Pit Dimension
XY-AB 108m X 107m X 47m(d)
X1Y1-CD 100m X 146m X 47m(d)
X2Y2-EF 106m X 083m X 02m(d)



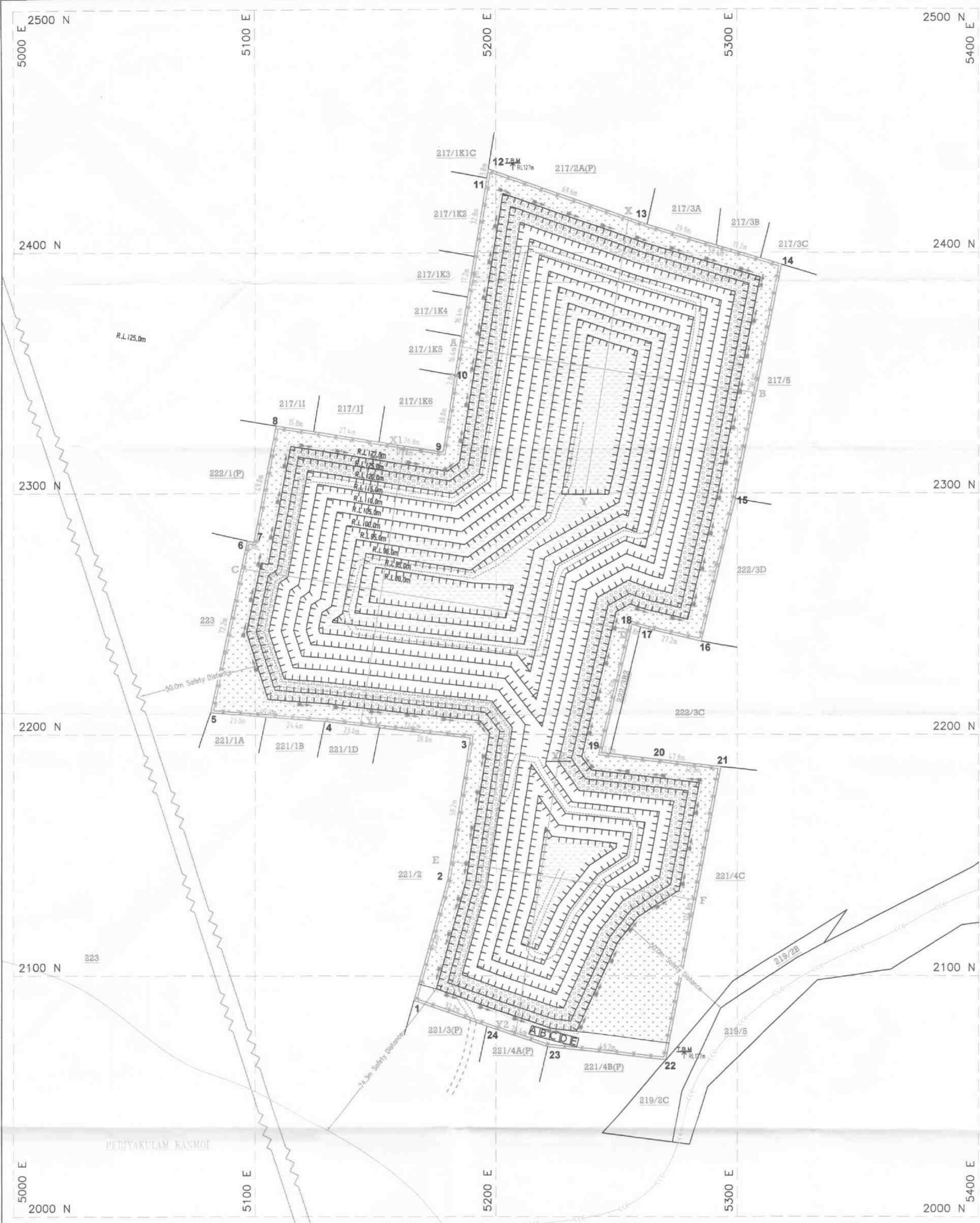
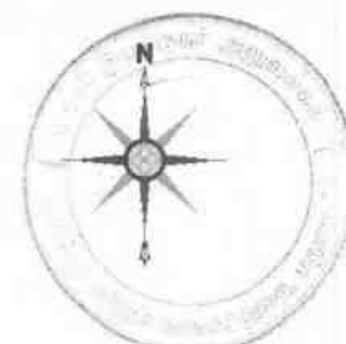
- I-V Yr PLANTATION
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- VII Yr EXCAVATION
- VIII Yr EXCAVATION
- IX Yr EXCAVATION
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- VI Yr PLANTATION
- VII Yr PLANTATION
- VIII Yr PLANTATION
- IX Yr PLANTATION
- X Yr PLANTATION

- SITE SERVICES**
- A-OFFICE
 - B-FIRST AID ROOM
 - C-STORE
 - D-REST SHED
 - E-TOILET

TOPOGRAPHY, GEOLOGICAL PLAN SECTIONS SHOWING YEARWISE DEVELOPMENT & PRODUCTION PLAN & SCETIONS VI-X YEAR SCALE 1:1000

PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS PLATE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE BASED UPON THE LEASE AUTHENTICATED BY STATE GOVERNMENT

M. Sathish
SANTHOSH KUMAR, M.Sc.,
QUALIFIED PERSON
Under Rule 15(1)(a) and (b) of MCR, 2016



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24	09° 42' 27.31"N	78° 02' 46.16"E

DATUM : UTM-WGS84, ZONE 44 NORTH

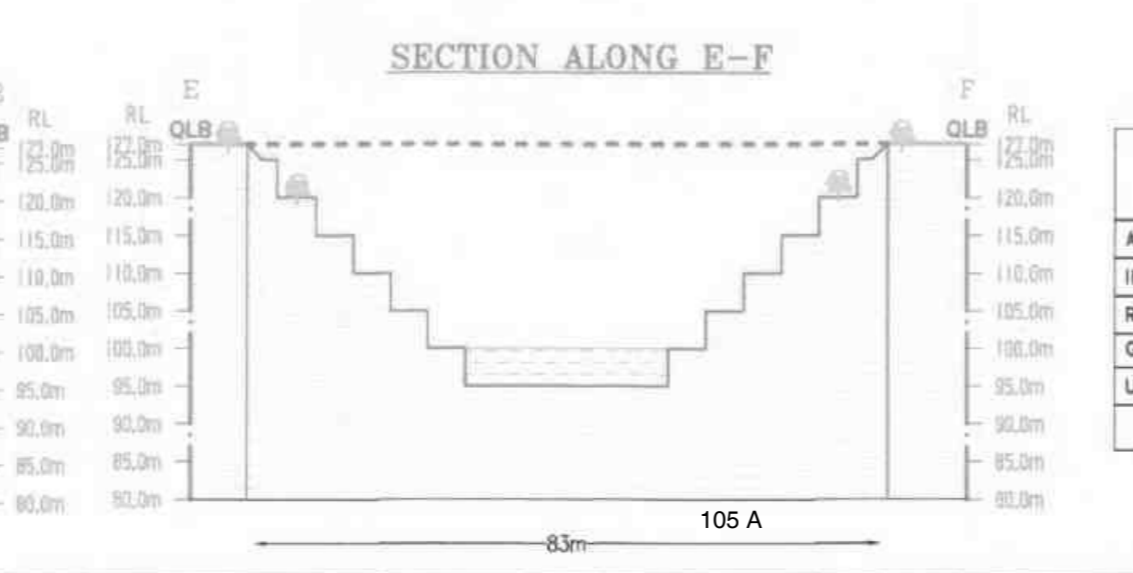
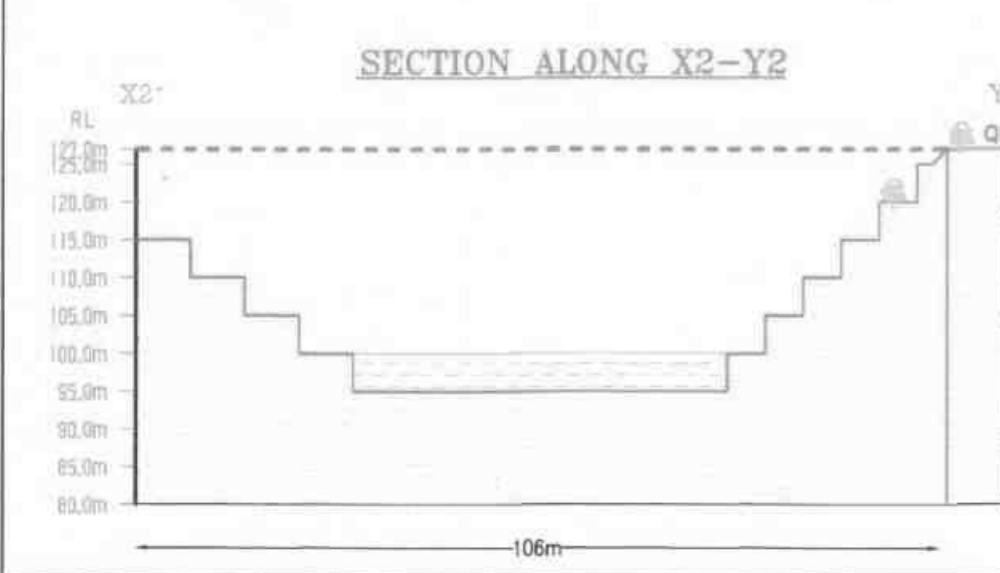
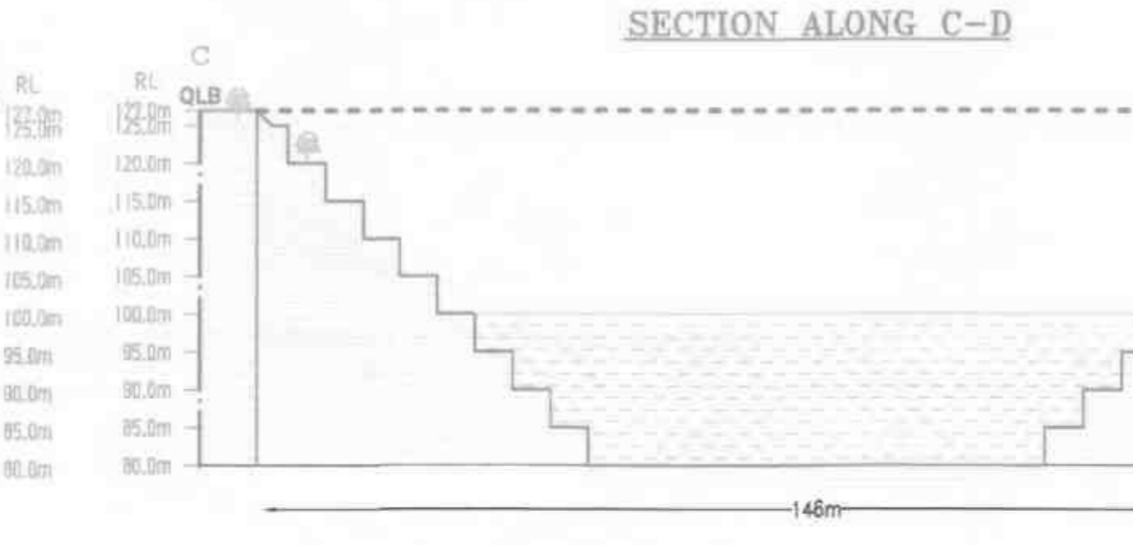
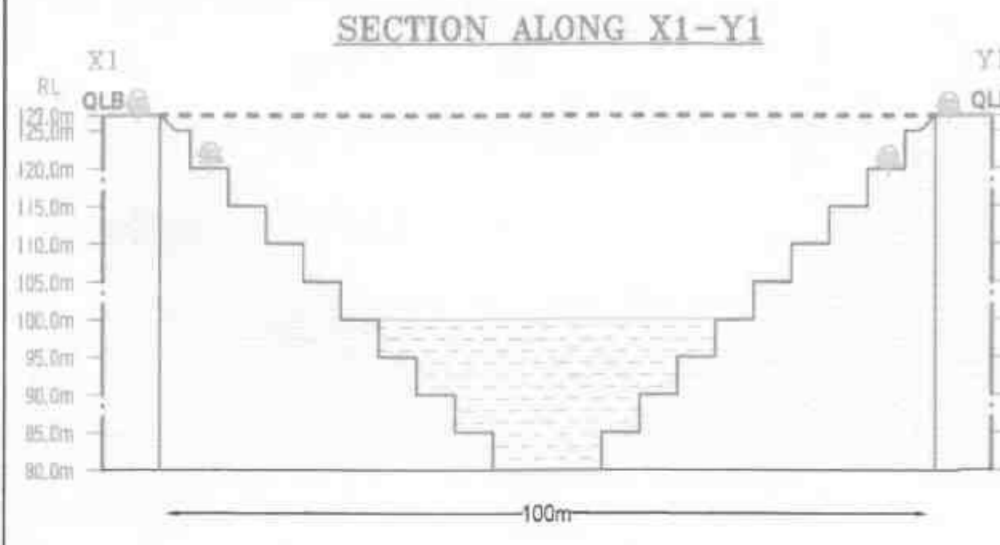
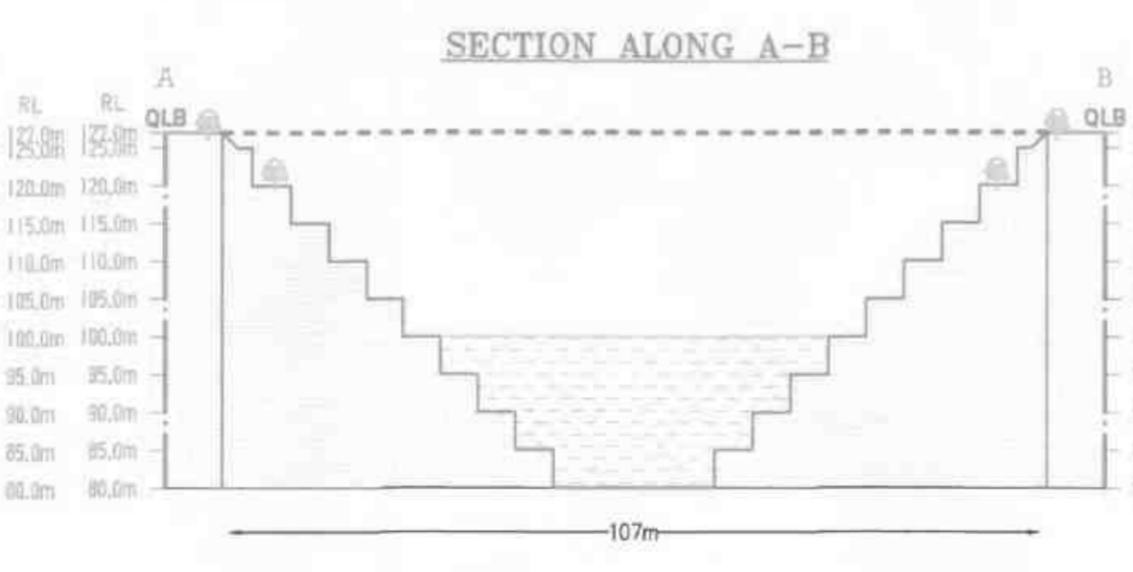
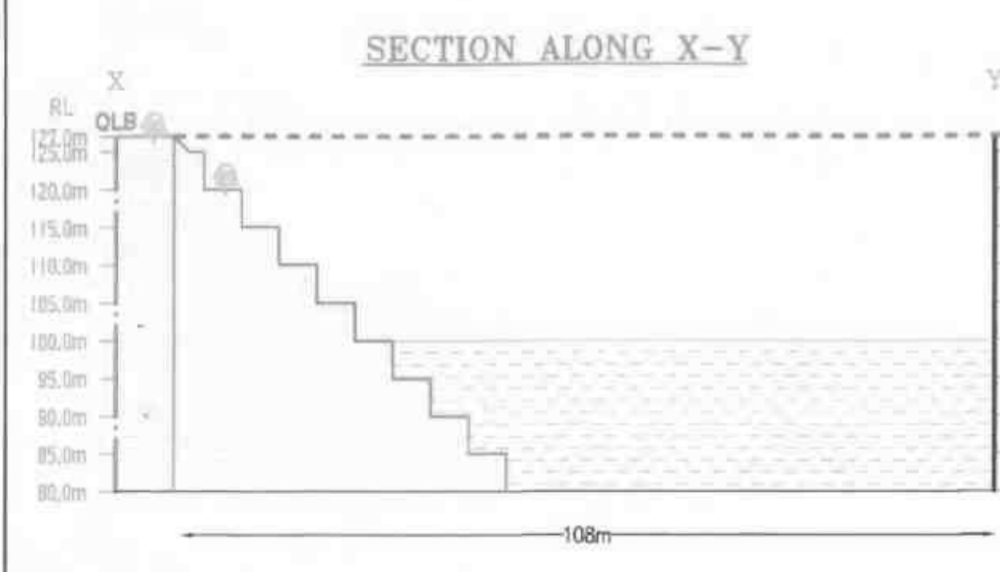
PLATE NO - IV
DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/o.P.DURAIRAJI,
NO.15,MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

LOCATION OF QUARRY
LEASE APPLIED AREA:
S.F.No :217/2A(P),28.4,221/3(P),4A(P),
48(P),222/1(P),2.3,3B1,&223/2B,
EXTENT : 4.75.01Ha,
VILLAGE:THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

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7.5m & 50m SAFETY DISTANCE	
TEMPORARY BENCH MARK	
HT LINE	
APPROACH ROAD	
ODAI	
TANK	
STRIKE AND DIP	
QUARRY PIT	
QUARRY ROAD	
TREES	
EXISTING LANDFORM	
OLD SURFACE LEVEL	
FINISHED SURFACE LEVEL	
RAIN WATER STORAGE	
FENCING	
PROPOSED GARLAND DRAIN	
REHABILITATED LANDFORM	



SITE SERVICES

- A-OFFICE
- B-FIRST AID ROOM
- C-STORE
- D-REST SHED
- E-TOILET

I-V Proposed Plantation

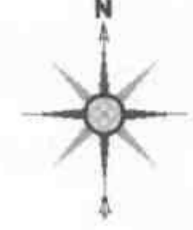
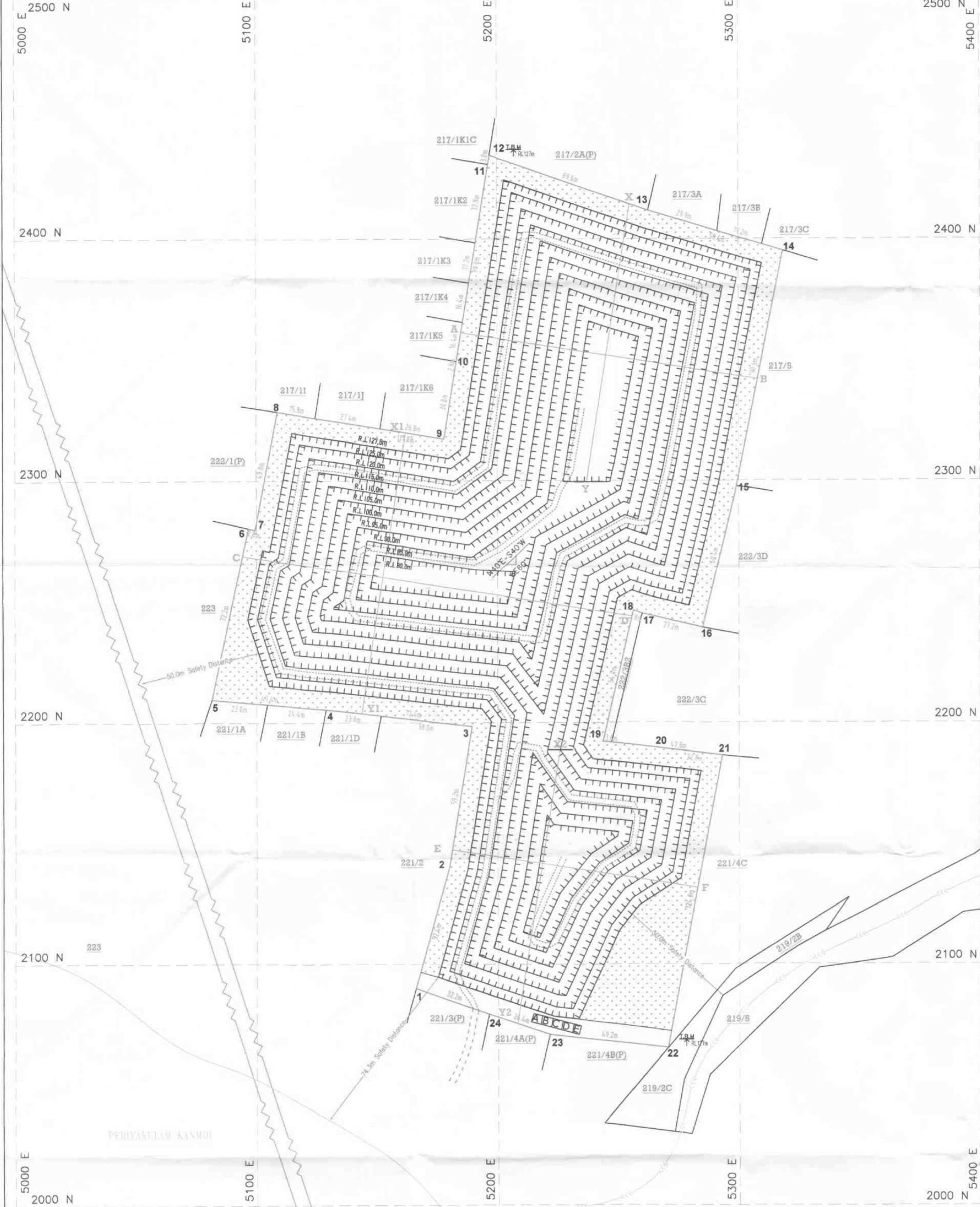
Proposed Pit Dimension
XY-AB 108m X 107m X 47m(d)
X1Y1-CD 100m X 146m X 47m(d)
X2Y2-EF 106m X 83m X 32m(d)

PRESENT & POST LAND USE PATTERN

DESCRIPTION	PRESENT AREA (Ha)	ADDITIONAL AREA REQUIRED DURING THE MINING PLAN(Ha)	AREA AT THE END OF THIS QUARRYING PERIOD (Ha)
AREA UNDER QUARRYING	Nil	3.65.08	3.65.08
INFRASTRUCTURE	Nil	0.01.00	0.01.00
ROADS	Nil	0.02.00	0.02.00
GREEN BELT	Nil	0.49.66	0.93.29
UN-UTILIZED AREA	4.75.01	0.57.27	0.13.64
GRAND TOTAL	4.75.01	4.75.01	4.75.01

PROGRESSIVE QUARRY CLOSURE PLAN & SCETIONS
SCALE 1 : 1000

PREPARED BY :
M. SANTHOSH KUMAR, M.Sc.,
QUALIFIED PERSON
Under Rule 15(X)(a)and(b)of MCR,2016.



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	09° 42' 27.65"N	78° 02' 45.16"E
2	09° 42' 29.28"N	78° 02' 45.61"E
3	09° 42' 31.18"N	78° 02' 45.90"E
4	09° 42' 31.39"N	78° 02' 43.91"E
5	09° 42' 31.51"N	78° 02' 42.36"E
6	09° 42' 33.82"N	78° 02' 42.84"E
7	09° 42' 33.80"N	78° 02' 42.93"E
8	09° 42' 35.38"N	78° 02' 43.22"E
9	09° 42' 35.04"N	78° 02' 45.49"E
10	09° 42' 36.00"N	78° 02' 45.64"E
11	09° 42' 38.74"N	78° 02' 46.06"E
12	09° 42' 38.86"N	78° 02' 46.08"E
13	09° 42' 38.14"N	78° 02' 48.24"E
14	09° 42' 37.61"N	78° 02' 50.07"E
15	09° 42' 34.44"N	78° 02' 49.47"E
16	09° 42' 32.53"N	78° 02' 49.02"E
17	09° 42' 32.71"N	78° 02' 48.20"E
18	09° 42' 32.75"N	78° 02' 48.08"E
19	09° 42' 31.00"N	78° 02' 47.68"E
20	09° 42' 30.91"N	78° 02' 48.56"E
21	09° 42' 30.83"N	78° 02' 49.31"E
22	09° 42' 26.88"N	78° 02' 48.59"E
23	09° 42' 27.05"N	78° 02' 46.99"E
24	09° 42' 27.31"N	78° 02' 46.16"E

DATUM : UTM-WGS84, ZONE 44 NORTH

PLATE NO - V
DATE OF SURVEY : 13.10.2023

APPLICANT:
THIRU.D.SAKTHIVEL
S/O P.DURAIRAJI,
NO.15, MELARATHA STREET,
THIRUPARANKUNDRAM,
MADURAI DISTRICT-625005.

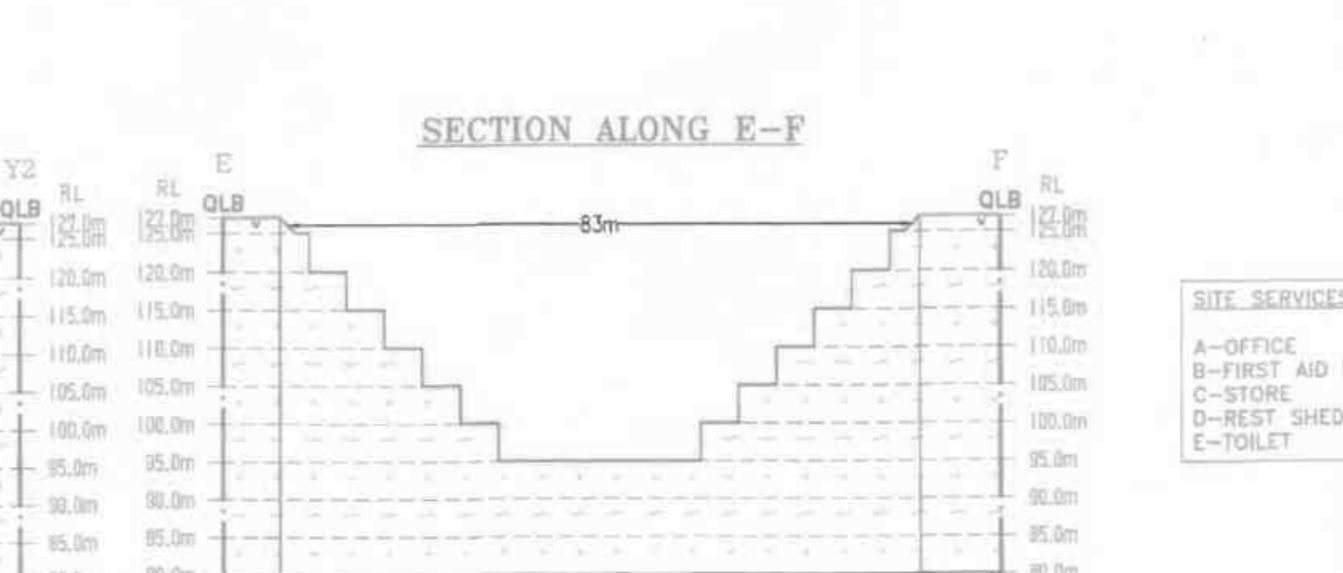
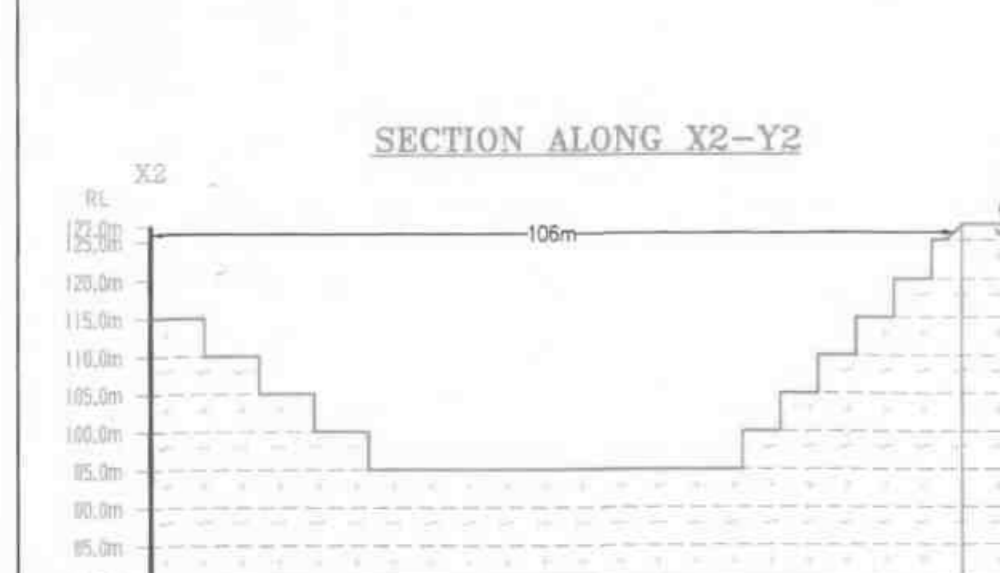
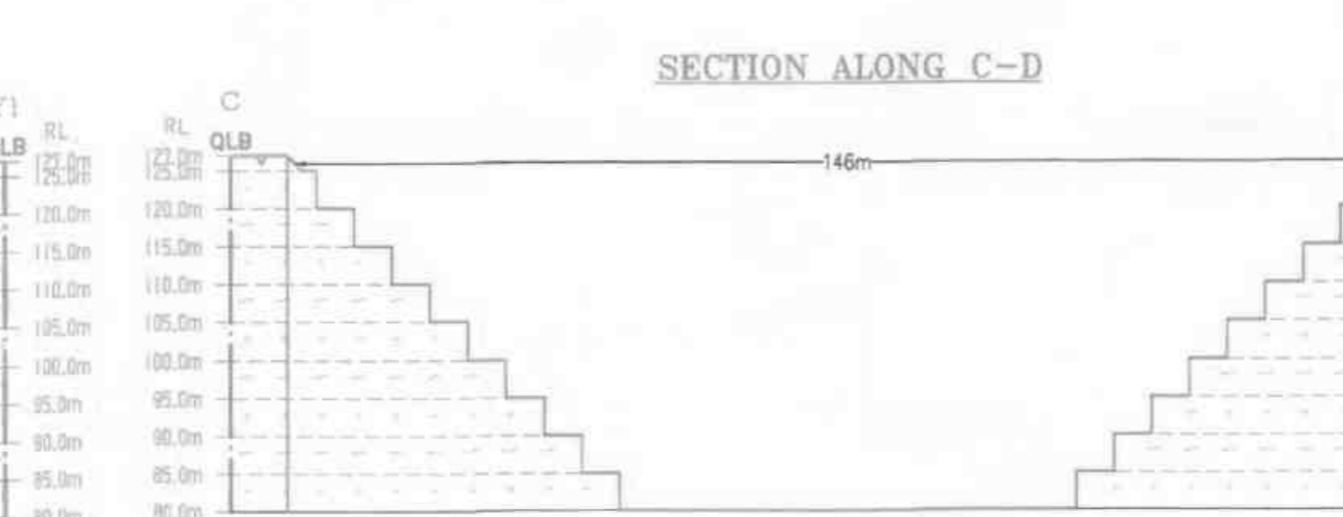
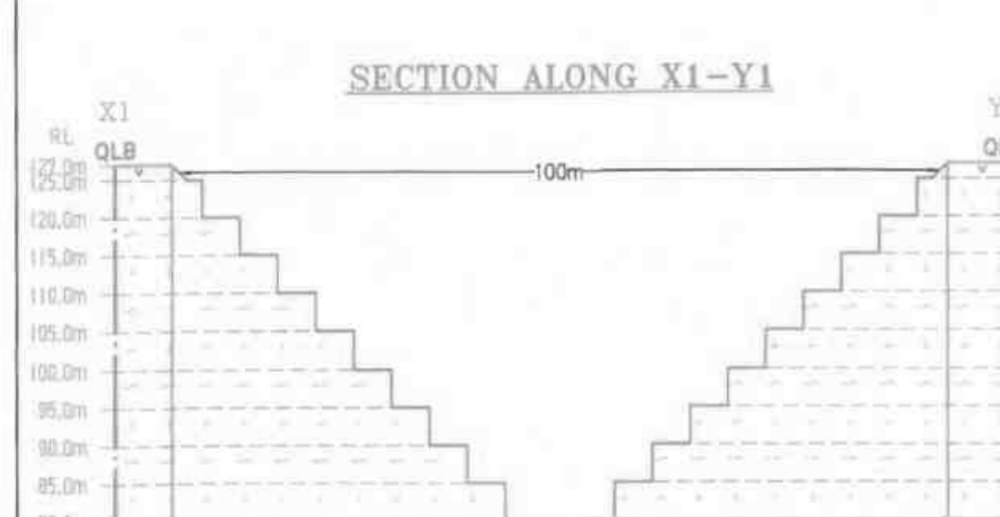
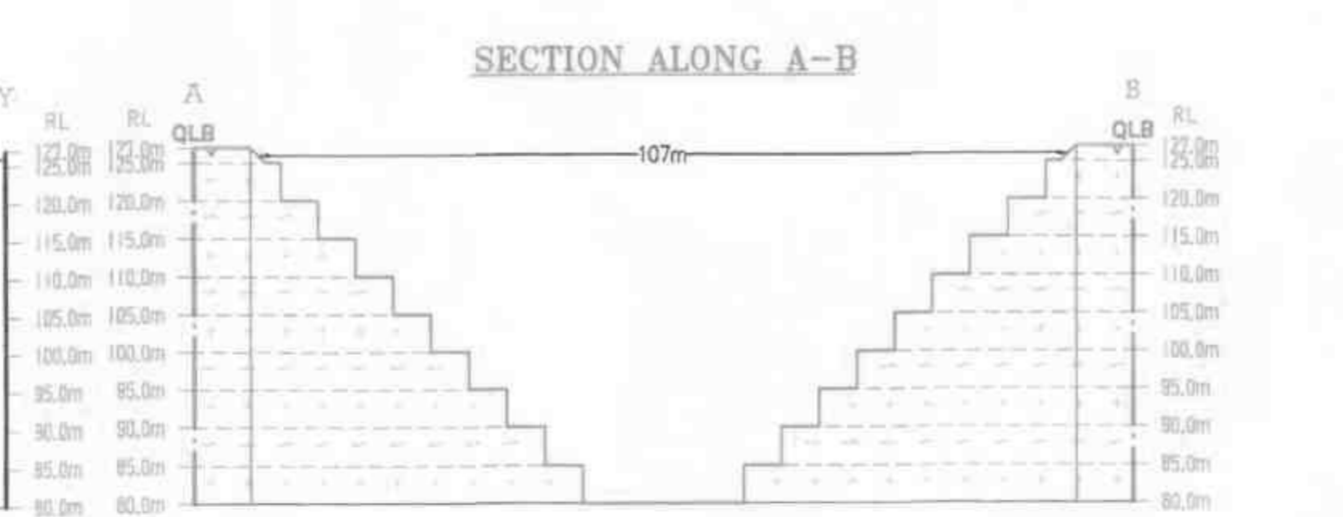
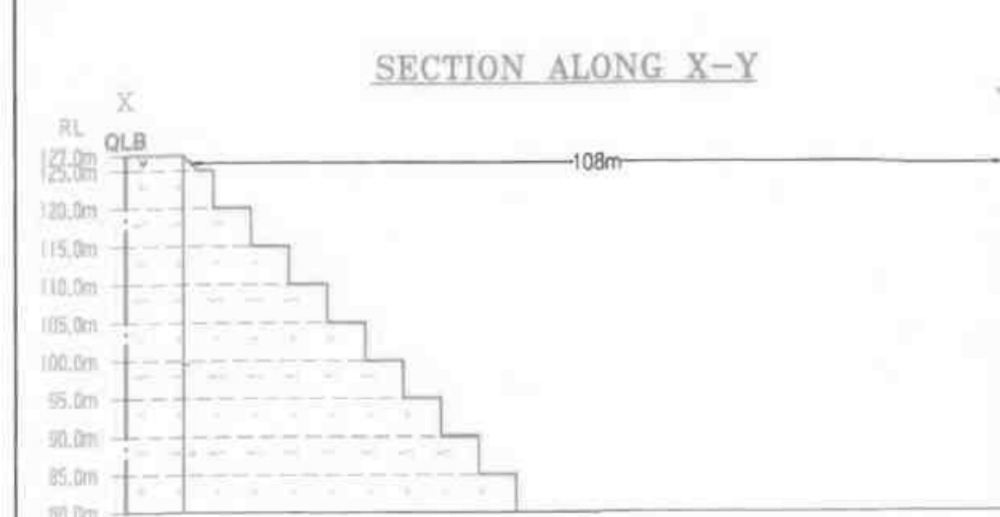
LOCATION OF QUARRY
LEASE APPLIED AREA:
S.F.No : 217/2A(P), 2B, 4, 221/3(P), 4A(P),
4B(P), 222/1(P), 2, 3, 3B1, & 223/2B,
EXTENT : 4.75.01Ha,
VILLAGE : THIRUMAL,
TALUK : KALLIKUDI,
DISTRICT : MADURAI,
STATE : TAMIL NADU.

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7.5m & 50m SAFETY DISTANCE	———
TEMPORARY BENCH MARK	TBM
HT LINE	———
APPROACH ROAD	———
ODAI	———
TANK	———
STRIKE AND DIP	———
GRAVEL	———
ROUGH STONE	———
QUARRY PIT	TTTT
QUARRY ROAD	———

CONCEPTUAL PLAN & SCETIONS
SCALE 1 : 1000

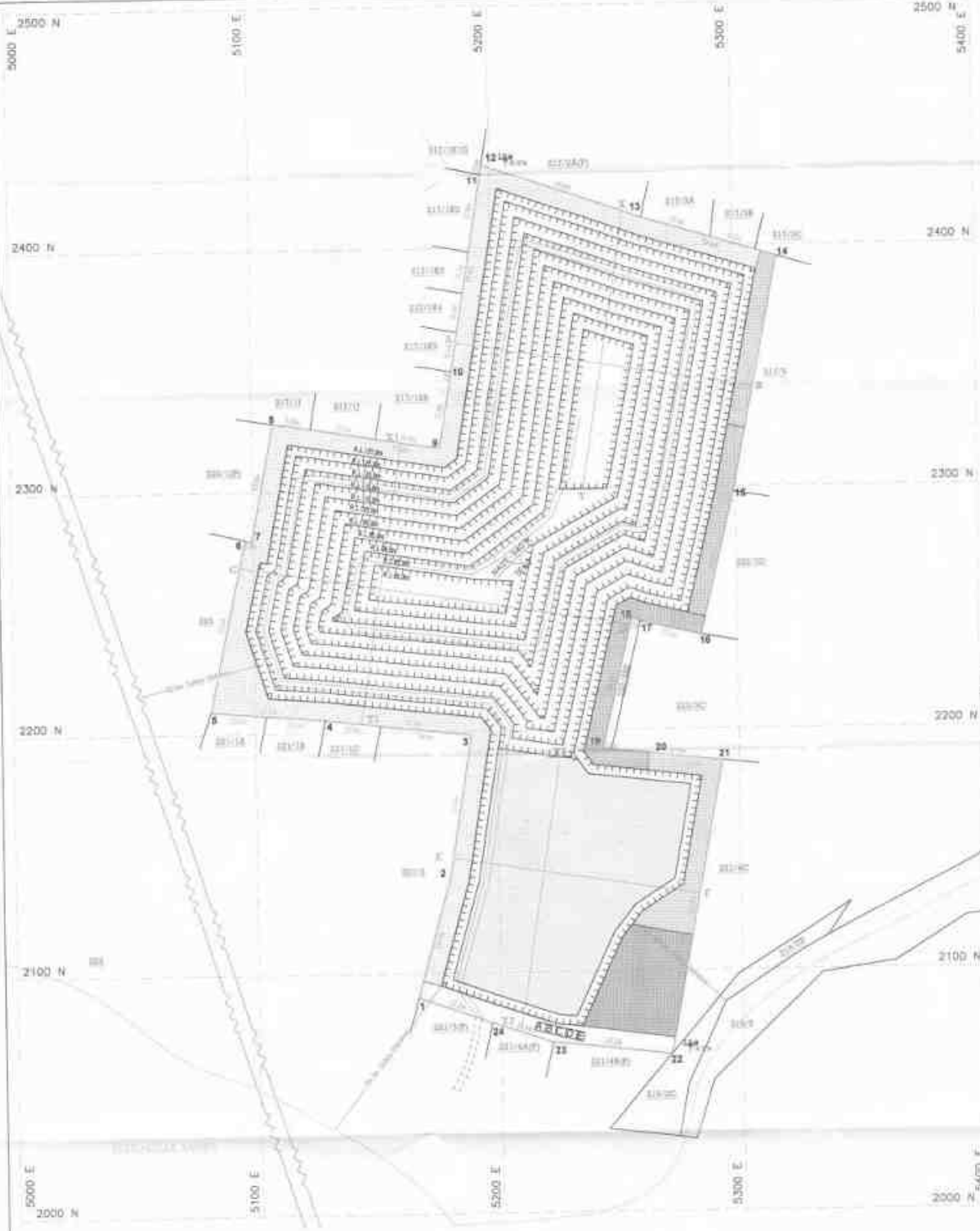
PREPARED BY:
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS
PLATE IS TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE BASED UPON THE LEASE MAP
AUTHENTICATED BY STATE GOVERNMENT
M. Sathish
M.SANTHOSHKUMAR,M.Sc.,
QUALIFIED PERSON
Under Rule 15(i)(a)and(b)of MCR,2016



SITE SERVICES
A-OFFICE
B-FIRST AID ROOM
C-STORE
D-REST SHED
E-TOILET

I-V Proposed Plantation

Ultimate Pit Dimension
XY-AB 108m X 107m X 47m(d)
X1Y1-CD 100m X 146m X 47m(d)
X2Y2-EF 106m X 083m X 32m(d)



BOUNDARY CO-ORDINATES

S.N.	LATITUDE	LONGITUDE
1	08° 42' 27.85"N	78° 02' 48.16"E
2	08° 42' 28.28"N	78° 02' 48.87"E
3	08° 42' 31.18"N	78° 02' 49.80"E
4	08° 42' 31.30"N	78° 02' 49.91"E
5	08° 42' 31.81"N	78° 02' 49.58"E
6	08° 42' 33.62"N	78° 02' 49.87"E
7	08° 42' 33.88"N	78° 02' 49.87"E
8	08° 42' 35.38"N	78° 02' 49.22"E
9	08° 42' 38.04"N	78° 02' 49.47"E
10	08° 42' 38.08"N	78° 02' 49.47"E
11	08° 42' 38.74"N	78° 02' 49.28"E
12	08° 42' 38.88"N	78° 02' 49.38"E
13	08° 42' 38.14"N	78° 02' 49.24"E
14	08° 42' 37.81"N	78° 02' 49.07"E
15	08° 42' 34.44"N	78° 02' 49.47"E
16	08° 42' 32.57"N	78° 02' 49.02"E
17	08° 42' 32.71"N	78° 02' 48.57"E
18	08° 42' 32.75"N	78° 02' 48.08"E
19	08° 42' 31.00"N	78° 02' 47.68"E
20	08° 42' 30.81"N	78° 02' 48.58"E
21	08° 42' 30.83"N	78° 02' 49.31"E
22	08° 42' 28.88"N	78° 02' 48.38"E
23	08° 42' 27.08"N	78° 02' 48.88"E
24	08° 42' 27.31"N	78° 02' 48.18"E

DATE: 10th MARCH, 2024 44 NORTH

PLATE NO. - III-A
DATE OF SURVEY: 13.10.2023

APPLICANT:
SRI P. SUBRAMANIAM,
NO. 18 MELAKATHA STREET,
THIRUPAVANAMUNDARI,
MADRAS DISTRICT - 620002

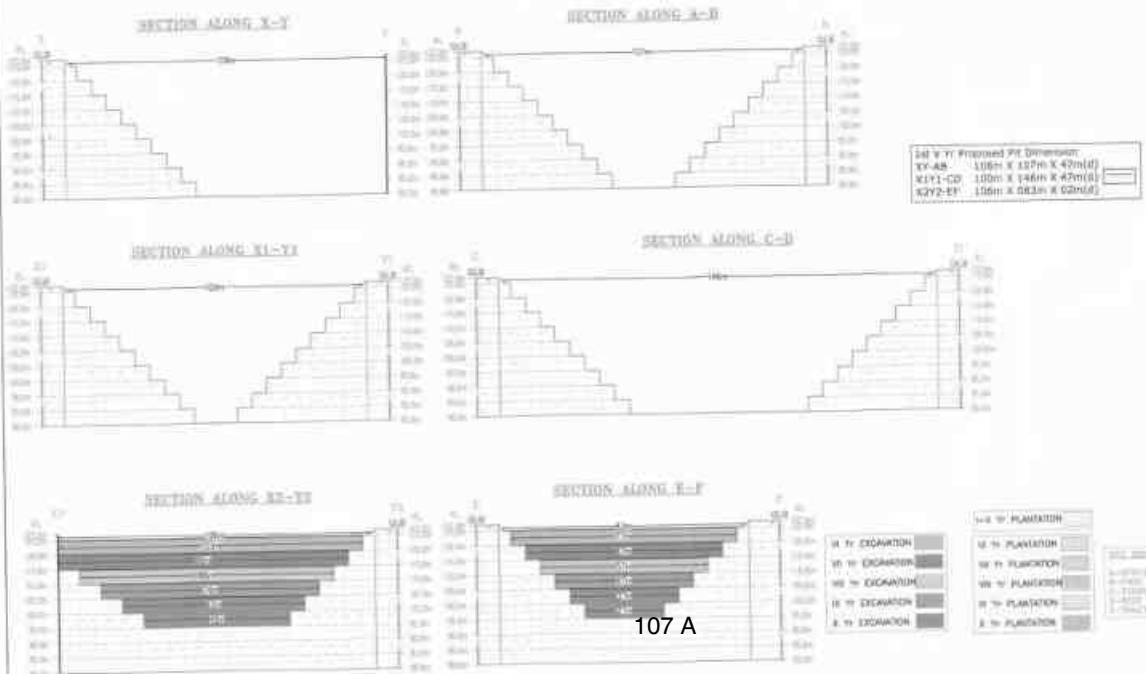
LOCATION OF QUARRY:
LEASE APPLIED AREA:
S/N No: 917/25A/1/24.22/705/AA/1/1
48/1/2221/1/3.3.31.1.2221.22
EXTENT: 1.4712 HA
VILLAGE: THIRUPAVANAM,
TALUK: ANANTHUR,
DISTRICT: MADURAI,
STATE: TAMIL NADU

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- ALL APPLIED AREA BOUNDARY
- 7.5m & 30m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- H/LINE
- APPROACH ROAD
- ODAI
- LAKE
- STRIKE AND DIP
- GRAVEL
- ROUGH STONE
- QUARRY PIT
- QUARRY ROAD

TYPHOGRAPHY, GEOLOGICAL PLAN, SECTIONS SHOWING YEARWISE DEVELOPMENT & PRODUCTION PLAN & SECTIONS VIXA YEAR SCALE 1:1000

PREPARED BY:
M. S. SURESH
Geotechnical Engineer
MADRAS DISTRICT SURVEY DEPARTMENT
10th MARCH, 2024



**HYDRO - GEOLOGICAL STUDIES AT THIRU D.SAKTHIVEL
IN THIRUMAL VILLAGE, KALLIKUDI TALUK,
MADURAI DISTRICT, TAMIL NADU**



Prepared by



**GEO EXPLORATION AND MINING SOLUTIONS,
New No.17, Advaita Ashram Road, Alagapuram, Salem – 636004,
Tamil Nadu, India. Tele fax: 0427 – 2431989.**

E mail: infogeoexplotation@gmail.com.

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1.2. Profiles in the Study Area.	3
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**HYDRO - GEOLOGICAL STUDIES AT THIRU D. SAKTHIVEL ROUGH
STONE & GRAVEL QUARRY IN THIRUMAL VILLAGE,
KALLIKUDI TALUK, MADURAI DISTRICT, TAMIL NADU.**

1 INTRODUCTION

Proprietor of **Thiru. D. Sakthivel** Rough stone and Gravel quarry Over an extent of 4.75.01 hectares of Patta land in S.F. Nos. 217/2A(Part), 217/2B, 217/4, 221/3(Part), 221/4A(Part), 221/4B(Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B of Thirumal village, Kallikudi Taluk, Madurai District, Tamil Nadu state on the hydrological regime of the area, The above area has been studied & investigated for finding out Ground water level and aquifer thickness and water quality in and around mine lease area. The electrical resistivity method, TEM study in Rough stone and gravel quarry and genesis rock with determine the shallow and deeper freshwater aquifer in the proposed mining area in Thirumal Village.

1.1. Scope of Study

In the present study, the main aim of the shallow and deeper aquifer investigation through electrical resistivity VES, Method is used to measure the apparent resistivity of the Study area. The present study is estimating the ground water level in Thirumalvillage, Kallikudi Taluk, Madurai District, Tamil Nadu village proposed leasehold area and their surrounding area. The study area is mostly covered by Water level, type of sand, type of rock and their basement rock characters. The main aim of the study is to determine the water table and flow movement of this Lease and surrounding area **(Fig.1)**.

1.2. Profiles in the Study Area.

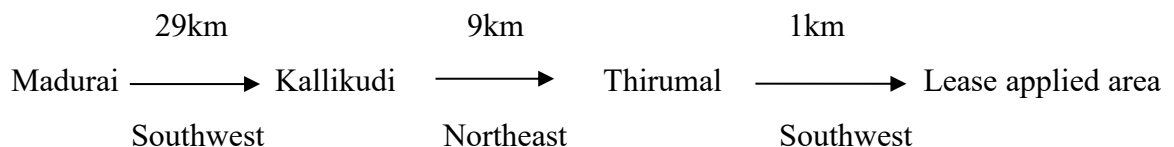
Name of the Lessee	: Thiru. D. Sakthivel
Survey No	: 217/2A (Part), 217/2B, 217/4, 221/3(Part), 221/4A (Part), 221/4B (Part), 222/1(Part), 222/2, 222/3A, 222/3B1 and 223/2B
Extent	: 4.75.01 hectares.
Village	: Thirumal village,
Taluka	: Kallikudi Taluk,
District	: Madurai
State	: Tamil Nadu

1. STUDY AREA DESCRIPTION



Figure.1. Shows proposed mine lease area

The lease applied area is located about 25km Southwest side of Madurai town, 8km Northeast side of Kallikudi town and 1km Southwest side of Thirumal Village.



2.1 Topography of the Lease Area and Its Surrounding Environments:

The lease applied area is exhibiting plain terrain. The area has gentle sloping towards Southeast side and altitude of the area is 127m above from Mean Sea Level. The area is covered by 2m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby existing quarry pit.

The Water level in the surrounding area is 57m below general ground profile which is observed from the nearby bore wells. Average annual rainfall is about 985mm.



Figure 2. Topography and Outcrop in the lease area

3 REGIONAL GEOLOGY OF MADURAI DISTRICT

Madurai with a total area of 3860 sq.km. is one of the trifurcated districts of the erstwhile composite Madurai and is situated between North latitudes $9^{\circ} 30'$ - $10^{\circ} 16'$ and east longitudes $77^{\circ} 15'$ - $78^{\circ} 25'$. It is bound by Theni district in the west, Dindigul district in the north, Karur and Sivaganga districts in the east and by Virudunagar district in the south. It comprises 10 taluks, viz., Madurai East, Madurai West, Thirupparankundram, Usilampatti, Tirumangalam, Madurai South, Madurai North, Vadipatti, Peraiyur and Melur taluks with Madurai City as the district headquarters. Madurai district is covered by granulite facies high grade metamorphic rocks and younger intrusives which fall under the following categories:

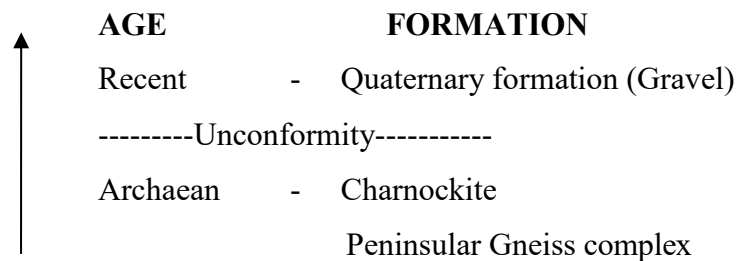
1. Metasedimentary group comprising quartzite, calc gneiss/crystalline limestone, garnet-sillimanite \pm biotite \pm cordierite \pm spinel gneiss, minor garnet-cordierite gneiss and garnetiferous quartzo-feldspathic gneiss (Khondalites and leptynite), magnetite and quartzite.

2. Charnockite Group consisting of acid charnockite and pyroxene granulite.

3. Older Intrusive rocks consisting of amphibolite, pyroxenite and gabbro (mafic ultra mafic).
4. Migmatite group made up of banded hornblende biotite gneiss, grey granitic gneiss, pink granitic gneiss and grey hornblende granite.
5. The younger acid intrusive comprises granite and pegmatite. In the metasedimentary group, rocks of arenaceous, calcareous, and argillaceous composition have undergone metamorphism under the granulite facies. This group includes quartzite, calc gneiss/diopside granulite, marble, garnet-sillimanite gneiss (Khondalite), with occasional bands of garnetiferous quartzo-feldspathic gneiss (leptynite) and garnet cordierite gneiss. These rocks are found as individual bands, enclaves, or tectonic slices within the predominantly charnockite-migmatite region. Quartzite, a significant member of the metasedimentary group, occupies the crests of linear ridges with variable thickness ranging from less than a meter to 150 meters.

Peninsular gneiss forms the oldest rock formations, in which the massive formation of Charnockite lies over with rich accumulation of recent quaternary formation. On regional scale of the Charnockite body is N40°E – S40°W with dipping towards SE 60°.

The general geological sequences of the rocks in this area are given below:



4 HYDROGEOLOGY

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district. The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In general there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100

m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti Timmarasanayakanur, ThiraliPeraiyur tract and Palkalainagar- Nilayur tract in the district. The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May) and 1.86 to 5.74 m bgl during post monsoon period. (Source: CGWB).

5 METHODOLOGY OF STUDY

1. Open well and bore well water level measurement, depth of water level diameter of open well, agriculture land survey.
2. Geophysical survey for deep aquifer in nearby site Rock and soil geology also collected for the aquifer characteristic study
3. Aquifer thickness and quality measurement study in nearby proposed mine site areas of the study area

5.1 Geophysical Investigation

5.1.1 Vertical Electrical resistivity sounding for aquifer study.

The electrical resistivity study is used to determine aquifer and occurred rock in the proposed site. The DDR 3 equipment was used for data collection (**Fig.3**)

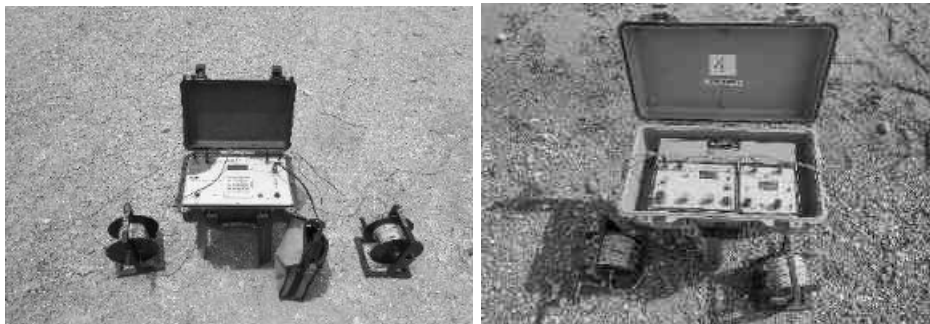


Figure 3. Electrical resistivity survey Instruments.

5.2.2 Basic Principles

The electrical properties of rocks in the upper part of the earth's crust are dependent upon the lithology, porosity, and the degree of pore space saturation and the salinity of the pore water. Saturated rocks have lower resistivity than unsaturated and dry rocks. The higher the porosity of the saturated rock, or the higher the salinity of the saturating fluids, the lower is the resistivity. The presence of clays and conductive minerals also reduces the resistivity of the rock.

The resistivity of earth materials can be studied by measuring the electrical potential distribution produced at the earth's surface by an electric current that is passed through the earth. Current is moved through the subsurface from one current electrode to the other and the potential difference is recorded as the current passes. From this information, resistivity values of various layers are acquired and layer thickness can be identified.

The apparent resistivity values determined are plotted as a log function versus the log of the spacing between the electrodes. These plotted curves identify thickness of layers. If there are multiple layers (more than 2), the acquired data is compared to a master curve to determine layer thickness.

This method is least influenced by lateral in-homogeneities and capable of providing higher depth of investigation.

The resistance R of a certain material is directly proportional to its length L and cross-sectional area A, expressed as:

$$R = R_s * L/A \text{ (in Ohm)}$$

Where R_s is known as the specific resistivity (characteristic of the material and independent of its shape or size)

With Ohm's Law,

$$R = dV/I \text{ (Ohm)}$$

Where dV is the potential difference across the resistor and I is the electric current through the resistor. The specific resistivity may be determined by:

$$R_s = (A/L) * (dV/I) \text{ (in Ohm m)}$$

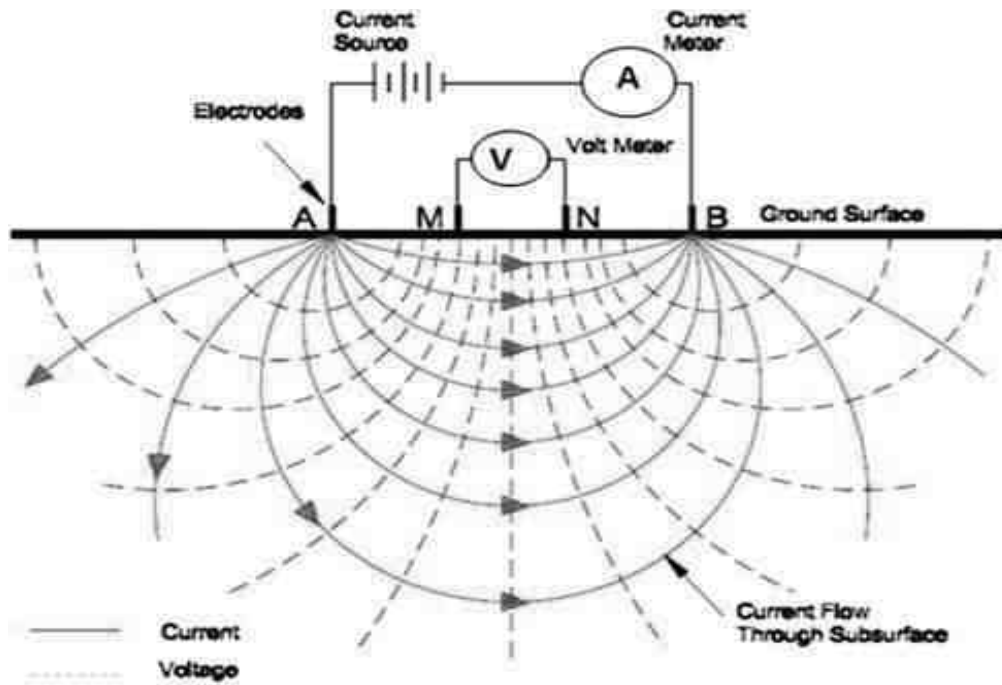


Figure 4. Schematic Diagram of Electrical resistivity principle



Figure 5. Geophysical survey location in the lease area

6. GEOPHYSICAL DATA INTERPRETATION & GRAPH

Table 1 Geophysical data of Station 1

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	21.3	100.37
2	4	1	23.6	4.55	107.21
3	6	1	55.0	2.43	133.60
4	8	1	99.0	1.68	166.25
5	10	1	155.5	1.24	192.83
6	10	5	23.6	5.83	137.37
7	15	5	62.8	2.98	187.24
8	20	5	117.8	1.98	233.26
9	30	5	274.9	1.13	310.63
10	40	5	494.8	0.72	356.26

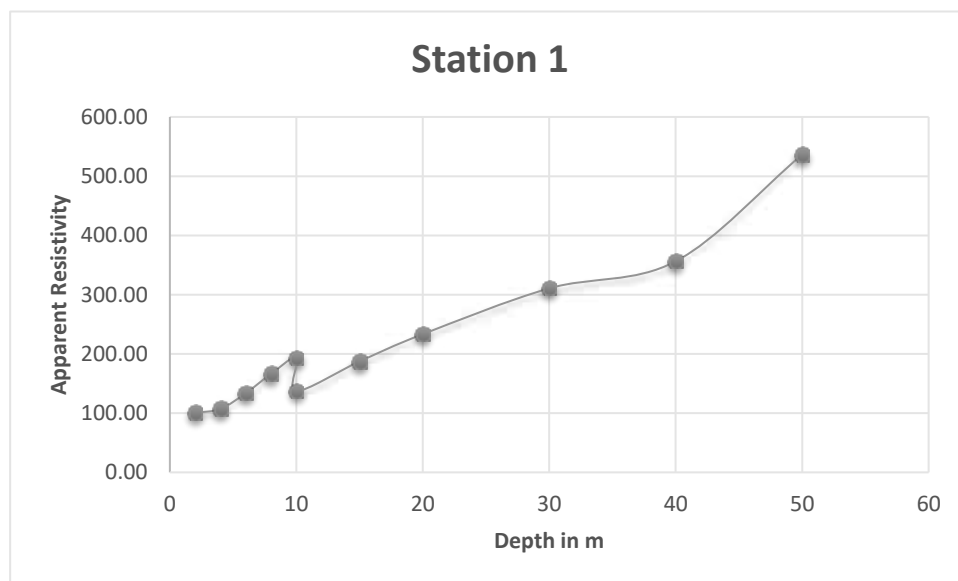


Figure 6 Graphical Representation of Geophysical data Station 1

Table 2 Geophysical data of Station 2

<i>S. No</i>	<i>Ab/2</i>	<i>Mn /2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	31.6	148.91
2	4	1	23.6	11.84	278.97
3	6	1	55.0	6.57	361.21
4	8	1	99.0	4.15	410.69
5	10	1	155.5	2.68	416.76
6	10	5	23.6	12.02	283.22
7	15	5	62.8	6.16	387.05
8	20	5	117.8	3.6	424.12
9	30	5	274.9	1.96	538.78
10	40	5	494.8	1.18	583.87

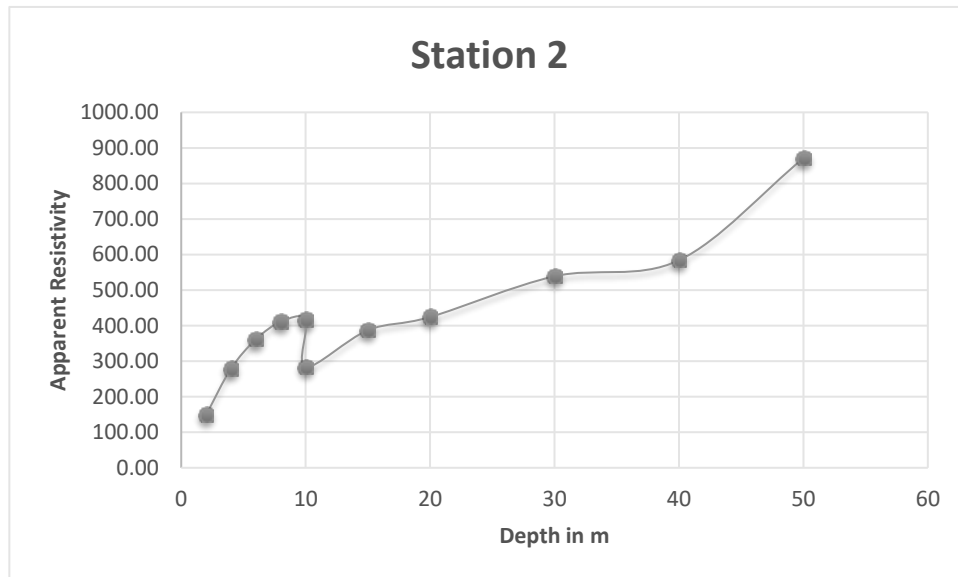


Figure 7 Graphical Representation of Geophysical data Station 2

Table 3 Geophysical data of Station 3

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	44.8	211.12
2	4	1	23.6	13.6	320.44
3	6	1	55.0	5.41	297.43
4	8	1	99.0	3.58	354.28
5	10	1	155.5	2.65	412.10
6	10	5	23.6	11.72	276.15
7	15	5	62.8	6.32	397.10
8	20	5	117.8	3.8	447.68
9	30	5	274.9	1.47	404.09
10	40	5	494.8	0.75	371.10
11	50	5	777.5	0.69	536.51

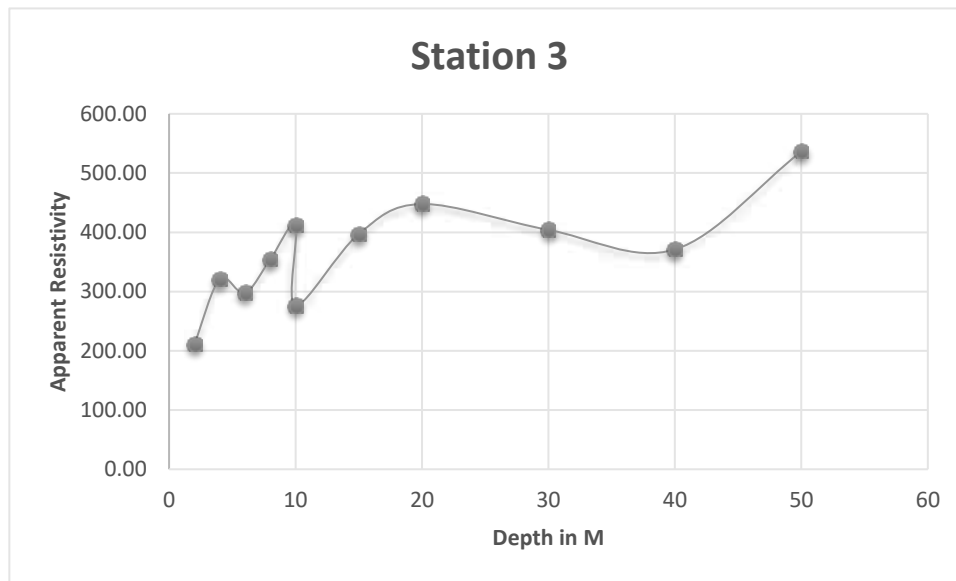


Figure 8 Graphical Representation of Geophysical data Station 3

Table 4 Geophysical data of Station 4

<i>S. No</i>	<i>Ab/2</i>	<i>Mn/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	27.4	129.12
2	4	1	23.6	6.48	152.68
3	6	1	55.0	3.82	210.02
4	8	1	99.0	2.52	249.38
5	10	1	155.5	1.75	272.14
6	10	5	23.6	5.52	130.06
7	15	5	62.8	3.04	191.01
8	20	5	117.8	2.27	267.43
9	30	5	274.9	1.56	428.83
10	40	5	494.8	0.85	420.58
11	50	5	777.5	0.74	575.38

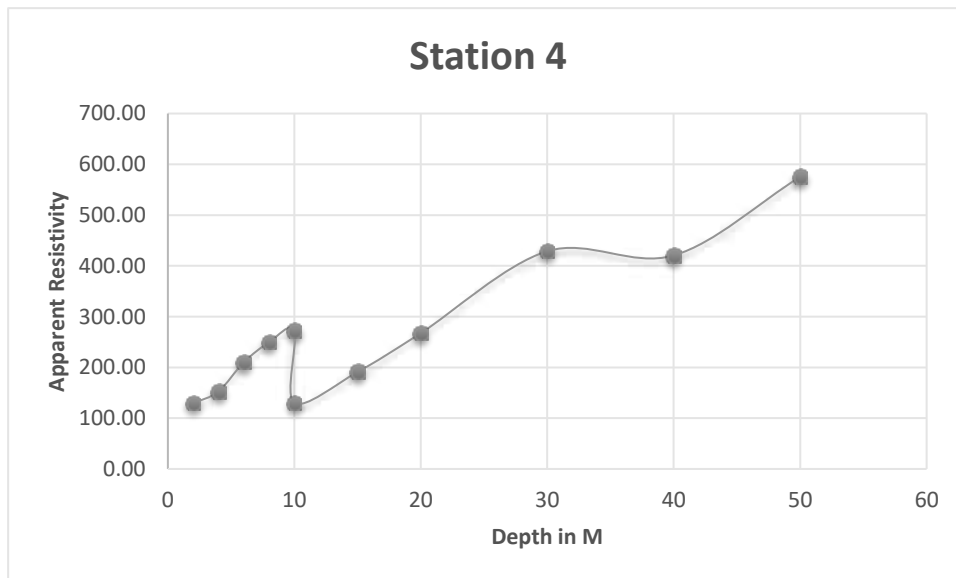


Figure 9 Graphical Representation of Geophysical data Station 4

Table 5 Geophysical data of Station 5

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	45.8	215.83
2	4	1	23.6	8.39	197.69
3	6	1	55.0	3.54	194.62
4	8	1	99.0	2.6	257.30
5	10	1	155.5	1.9	295.47
6	10	5	23.6	8.68	204.52
7	15	5	62.8	4	251.33
8	20	5	117.8	2.45	288.63
9	30	5	274.9	1.44	395.84
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.47	365.45

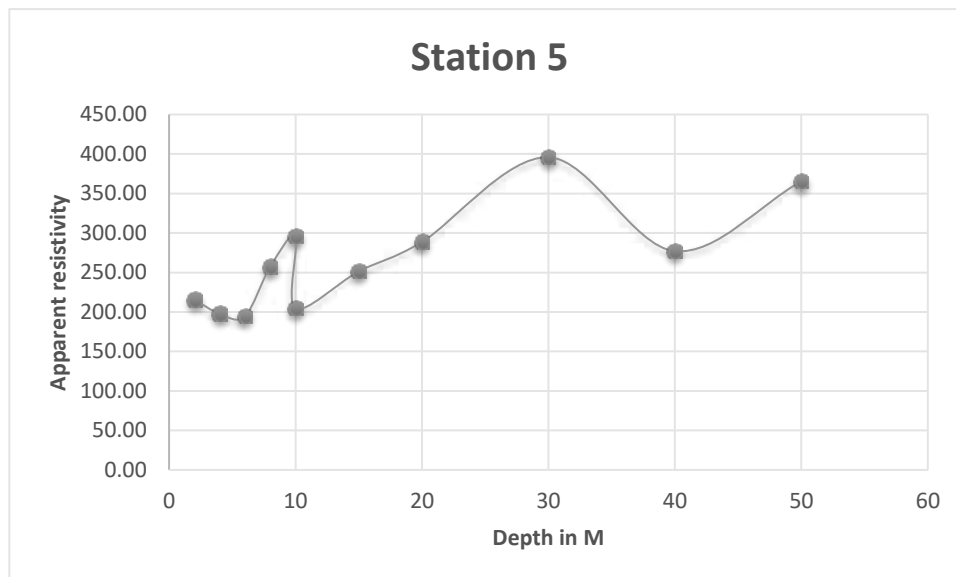


Figure 10 Graphical Representation of Geophysical data Station 5

Table 6 Geophysical data of Station 6

<i>Sr. No.</i>	<i>AB/2</i>	<i>MN/2</i>	<i>K</i>	<i>R</i>	<i>Rho</i>
1	2	1	4.7	29.6	139.49
2	4	1	23.6	5.49	129.36
3	6	1	55.0	2.42	133.05
4	8	1	99.0	1.48	146.46
5	10	1	155.5	1.06	164.84
6	10	5	23.6	4.04	95.19
7	15	5	62.8	1.96	123.15
8	20	5	117.8	1.27	149.62
9	30	5	274.9	0.8	219.91
10	40	5	494.8	0.56	277.09
11	50	5	777.5	0.48	373.22

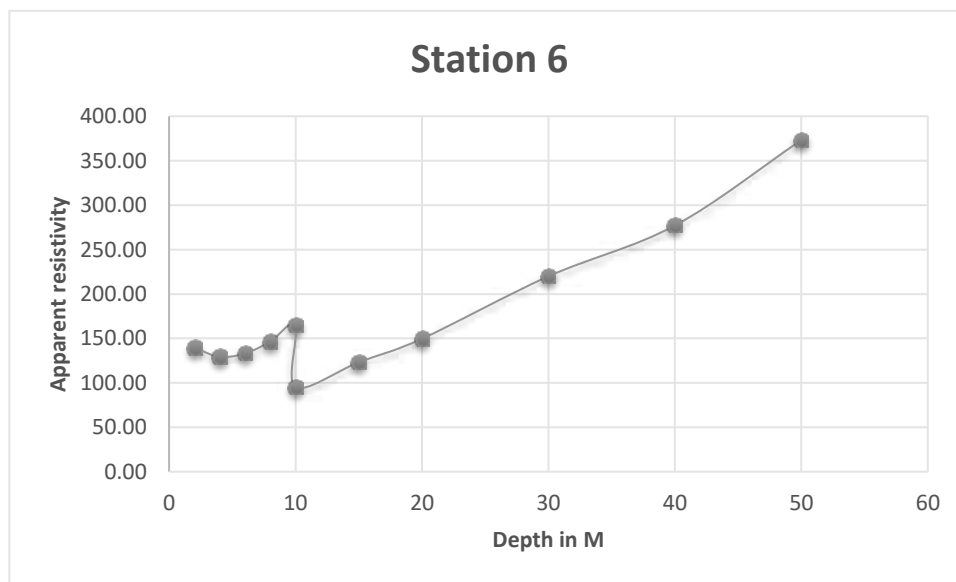


Figure 11 Graphical Representation of Geophysical data Station 6

7. LITHOLOGY MODELLING USING GEOPHYSICAL DATA

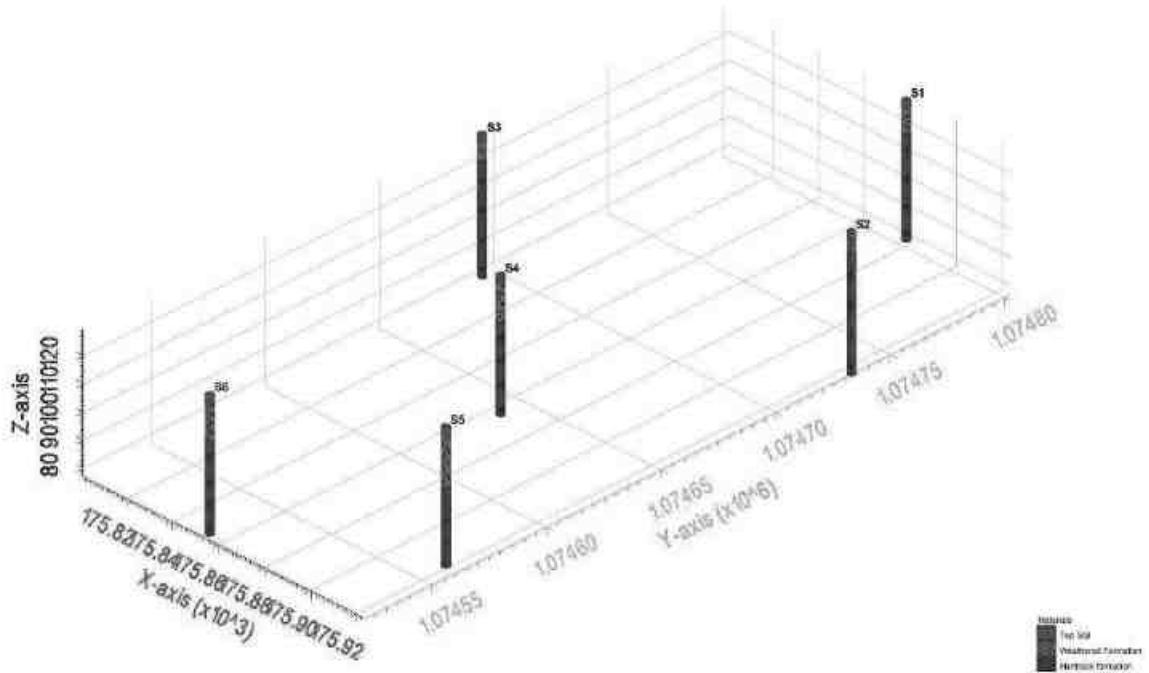


Figure 12 Borehole view of Subsurface Lithology

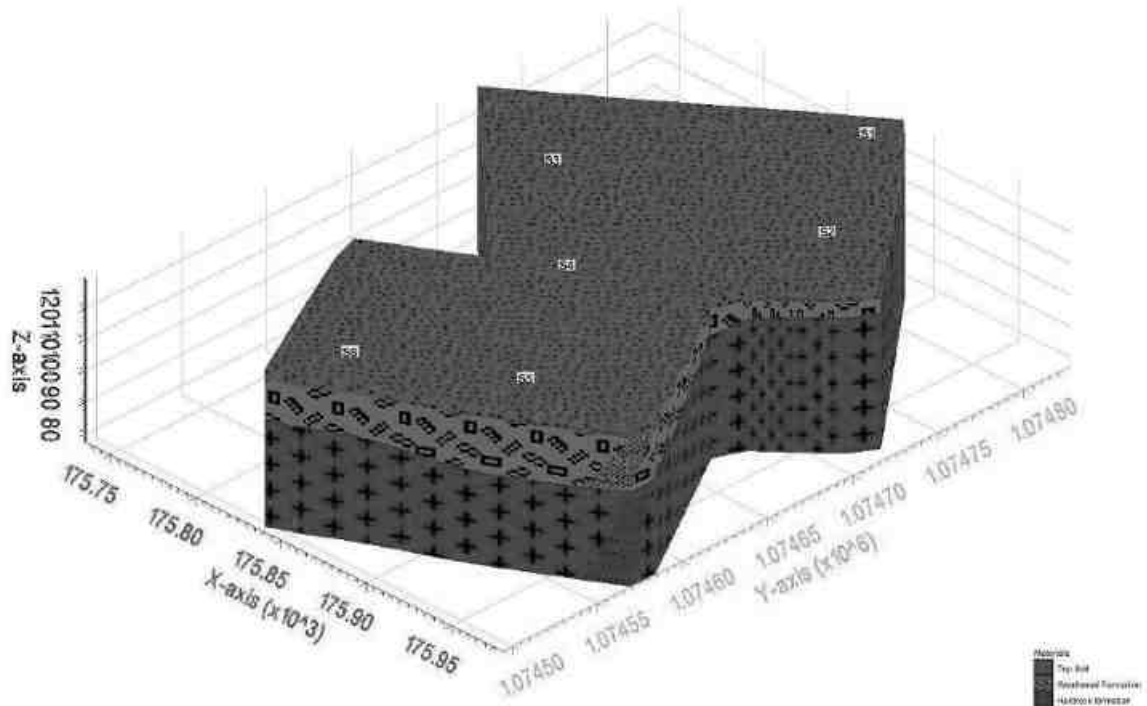
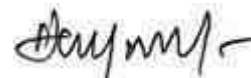


Figure 13 Solid view of Subsurface Lithology

8. CONCLUSION

- ❖ The lease applied area is exhibiting plain terrain. The area has gentle sloping towards Southeast side and altitude of the area is 127m above from Mean Sea Level.
- ❖ The geological study of the given area covered by gravel and rough stone in the entire area. The discharge of the groundwater controlled by the massive charnockite rock.
- ❖ The massive Charnockite formation act as a barrier and restrict the groundwater flow movement in the mine lease area.
- ❖ Based on the geophysical investigation, Vertical Electrical Sounding (VES) were conducted to determine the subsurface water table and rock types up to depth of 50 m.
- ❖ The subsurface formation up to this depth can be categorized as follows,
 - ❖ **0m to 2m (Average) - Top Soil**
 - ❖ **3m to 50m (Average) – weathered & Charnockite Formation (Massive Formation)**
- ❖ In this mine lease area, groundwater occurs at shallow depth, depending on the intensity of weathering and its development is much less compared to gneissic formation. The mine area such no major intersections of water table are expected up to 50m.
- ❖ The aquifer are found within the weathered / fractured metamorphic terrain. Currently the aquifers are located at **55 to 60 meters** below ground level (BGL). However, considering the approved mining plan depth, which is **47 meters** below ground level. It will not impact the groundwater table.
- ❖ From the above study it can be concluded there will be no adverse effect on the hydrological regime, water drainage, environment, and livelihood. Agricultural activity in the region.



Dr. P. Thangaraju, M.Sc., Ph.D.,

Govt. Approved Hydro Geologist
M/s. Geo Exploration and Mining Solutions,
Regd. Office: No. 17, Advaita Ashram Road,
Alagapuram, Salem – 636 004, Tamil Nadu.



GEO EXPLORATION AND MINING SOLUTIONS

*New No.17,
Advaitha Ashram Road,
Alagapuram, Salem - 636 004,
Tamil Nadu, India. Tele fax: 0427 - 2431989.
E mail: infogeoexplotation@gmail.com.*



தமிழ்நாடு தமில்நாடு TAMILNADU

2023
17-11-2023
80/

SSPR TRADERS
RAJAPALAYAM

BE 862260

A.M. முகம்மது ராஜ்மதுல்லா
நகர முத்திரைத்தாள் விற்பனையாளர்
56, அமுதமலை ரோடு, சங்கரன்கோவில்.
உரிமம் எண். : B.I.26480/72

DEED OF AGREEMENT

This Agreement is entered into at Rajapalayam on this 21 November 2023 between Thiru.D.Sakthivel, S/O.Durairaj, 15, Meelarathaveedhi, Thiruparankundram, Madurai District. herein after referred to as party of the FIRST PART, and SSPR Traders, MRS.LAVANYA.R having office at 53/252, Saraswathi Bhavanam, Sankarankovil Road, Rajapalayam herein after referred to as party of the Second part.



The party of the first part is operating quarry work in the area Thirumal Village, Kallikudi Taluk, Madurai District. over and extent of survey number 217/2B (0.17.01), 222/1(P) (0.63.68), 222/2 (0.43.50), 222/3A (0.46.0), 222/3B1 (0.24.50), 222/2B (0.33.0), 217/4 (0.69.0), 221/4A (NORTH SIDE) (0.52.81), 221/4B (Northside) (0.37.48), 217/2A (Southside) (0.53.25) & 221/3 (Northside) (0.34.78) hectares in 4.75.01 as per Tamil Nādu Govt's Order No N.K.N.4270/2023/A. Dated 12-10-2023

Whereas the party of the First Part wants blasting to be done at quarry to excavate the Blue metal stone. The blasting work is so intensive and large that the part of the first part has decided to entrust the work involved to the party of the second part on contract basis is as follows.

The party of the First part will allot the blasting operations in the above said areas to the party of the Second part who is responsible for blasting rocks and also making his own arrangement for the explosives and exploding equipments required for the work. The entire blasting in the above quarry and the possession of the blasting equipment will be handled by the party of the second part having valid explosives License No.E95179, E95317 and Shot Firer licenses issued by the Joint Chief Controller of Explosives, South Circle, Chennai and he hereby undertake the responsibility for the work entrusted.

Payments will be made periodically by the party of the first part for the quantity used, explosives consumed and hours and time of the exploding equipments put into use. Calculations will be made and settlement will be arrived every month. The rates for the items of work will as mutually agreed as marginal cost which includes cost of explosives, transportation cost and other charges for blasting work. This agreement is made for all blasting in the said area.

The Agreement is valid from the date of execution and validity of quarrying leases granted by the State Government to the party of the First part. The agreement is terminable earlier by mutual consent with a month's notice. The agreement will expire with the expiry of quarry lease.

First Party:

Second Party:

Witnesses:

1. *S. Sabarinal*, 19, Soundra Pandiya, Ungayyathali, Sankarambal
- 2.



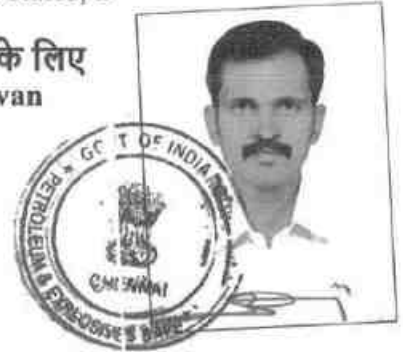
Place: RAJAPALAYAM

Date: 21-11-2023

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

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

अनुज्ञापति संख्या / Licence No. : E/SC/TN/25/1126(E96177)
वार्षिक फीस रूपए / Annual Fee Rs : 2500/-



1. अनुज्ञापति एतदद्वारा जारी की जाती है

Licence is hereby granted to : **D. Sriramji (Occupier : D. Sriramji)**
15-A2/1, INTUC Nagar, Rajapalayam,
District-VIRUDHUNAGAR, State-Tamil Nadu, Pincode-

626117

2. अनुज्ञापतिधारी की प्रास्थिति / Status of licensee : **Individual**
3. सड़क वैन की विशिष्टियाँ / Particulars of the road van:

पंजीकरण संख्या / Registration No.	TN-67/AM-0830
यान का मेक एवं मॉडल / Make and model of vehicle	TATA ACE HT /2012
लदान रहित वजन / Unladen weight	1115 Kg(s)
लदान सहित अधिकतम वजन / Maximum laden weight	1550 Kg(s)
परिवहन के लिए अनुज्ञेय विस्फोटकों की अधिकतम मात्रा Maximum quantity of explosives permitted for transport	400 Kg(s)
इंजिन संख्या / Engine No.	2751D106GXYS0210
चैसिस संख्या / Chassis No.	MAT445056CYG16092
अन्य फिटिंग्स का विवरण / Description of Other Fittings	As per approved drawing attached
वाहन के लिए अनुमत्य विस्फोटकों की मात्रा / Quantity of Explosives permitted to carry	400 Kg(s)

4. अनुज्ञापत परिसर निम्नलिखित आरेखण (आरेखणों) के अनुरूप होना चाहिए / The licensed premises shall conform to the following drawing(s):

आरेखण संख्या / Drawing No : E/SC/TN/25/1126(E96177) दिनांक / dated : 09/08/2016

5. समय समय पर यथा संशोधित विस्फोटक अधिनियम, 1884 और उसके अधीन बनाए गए विस्फोटक नियम, 2008 के उपबन्धों और शर्तों एवं निम्नलिखित अनुलग्नकों के अधीन अनुज्ञापति प्रदान की जाती है।
The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed thereunder and the conditions and the following annexures....

(क) उपर्युक्त क्रम संख्या 4 में यथाकथित सड़क वैन का आरेखण / (a) Drawings of the road van as stated in serial no.4 above.

(ख) अनुज्ञापन प्राधिकारी द्वारा हस्ताक्षरित शर्तें / (b) Conditions signed by the licensing authority.

6. यह अनुज्ञापति तारीख **31 मार्च 2020** तक विधिमान्य रहेगी / This licence shall remain valid till **31st day of March 2020**

यह अनुज्ञापति, अधिनियम या उसके अधीन विरचित नियमों या इस अनुज्ञापति की शर्तों के उल्लंघन,

Vejn

अनुसूची 5 के भाग 4 में सन्दर्भित, जहाँ भी लागू हो, या यदि अनुज्ञप्त परिसर आरेखण या उससे संलग्न उपाबद्धों में दर्शाए गए विवरण के अनुरूप नहीं पाए जाने पर निलम्बित या प्रतिसंहत की जा सकती है।

This licence is liable to be suspended or revoked for any violation of the Act or rules framed there under or the conditions of this licence as set forth under, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and annexure attached hereto.

दिनांक / Date: 09/08/2016

Sd/-
संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives
दक्षिणांचल, चेन्नै | South Circle, Chennai

Transfers :

- Change in Licensee Name/Address/Status dated : 16/02/2017

अनुज्ञाप्ते के नवीनीकरण हेतु पृष्ठंकन / Endorsement for renewal of licence:

नवीनीकरण की तिथि Date of Renewal	वैधता समाप्ति की तिथि Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर Signature of licensing authority
19/05/2020	31/03/2025	Jt. Chief Controller of Explosives, South Circle, Chennai

वैधानिक चेतावनी : विस्फोटकों का लापरवाही से प्रयोग या दुरुपयोग, विधि के अधीन गम्भीर द्वाण्डिक अपराध होगा।
Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.



FAX/SPEED POST



भारत सरकार
Government of India
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
चेन्नई क्षेत्र/Chennai Region



No. CNR/NC/Med- 5 Yrly/52/1289

/ Chennai, Dated the 30/08/2022

To

Shri S. Selvaraj,
S/o Shri Seeninaicker,
No. 01/99, Iluppaiyur Road,
Aladipatti – Post, Aruppukottai – Taluk,
Distt: Virudhunagar (T.N.) – 626 129

MEMORANDUM

With reference to the application dated 11.07.2022 received in this office on 18.07.2022 requesting for endorsement as per Regulation 30(1) of the Metalliferous Mines Regulations, 1961 your **Blaster's Certificate No. 3745, dated 28.04.1999** is returned herewith duly endorsed in respect of Medical Examination done on **11.07.2022.**

Encl: **Blaster's Cert. No. 3745,**
Dated: 28.04.1999

(T.R. Kannan)
Director of Mines Safety,
Chennai Region

अनुज्ञप्ति प्ररूप एत. ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)
(See article 3(a) to (d) of Part 1 of Schedule IV of Explosives Rules, 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1,2,3,4,5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक रखने के लिए
Licence to possess : (c) for use, explosives of class 1, 2,3,4,5,6 or 7 in a magazine



अनुज्ञप्ति सं. (Licence No.): E/SC/TN/22/709(E95179)

वार्षिक फीस रूपए (Annual Fee Rs): 5400/-

1. Licence is hereby granted to

M/s. SSPR Traders (अधिभोगी / Occupier : D.Sriramji), 15-A/2/1 INTUC Nagar Rajapalayam, Town/Village - Rajapalayam, District- VIRUDHUNAGAR, State-Tamil Nadu, Pincode - 626117

को अनुज्ञप्ति अनुदत्त की जाती है।

2. अनुज्ञप्तिधारी की प्रास्थिति | Status of licensee : Partnership Firm

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमाम्य है।
Licence is valid only for the following purpose

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

क्र Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1	Nitrate Mixture	2,0	0	1200 Kg
2	Safety Fuse	6,1	0	5000 Mtrs
3	Detonating Fuse	6,2	0	10000 Mtrs
4	Electric and/or Ordinary Detonators	6,3	0	22000 Nos.

(ख) किसी एक कैलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञप्ति के लिए]
(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3(b) and (c)] :

15 times
as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञप्ति परिसर की पुष्टि होती है।
The licensed premises shall conform to the following drawings:

रेखाचित्र क्र. (Drawing No.) E/SC/TN/22/709(E95179)
दिनांक (Dated) 19/07/2017

6. अनुज्ञप्ति परिसर निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:

Survey No. 100/2A, ग्राम (Town/Village) : D.Kadambankulam Village

जिला (District) VIRUDHUNAGAR

दूरभाष (Phone)

पुलिस थाना (Police Station) : Aviyur

राज्य (State) Tamil Nadu

ई-मेल (E-Mail)

पिनकोड (Pincode)

फैक्स (Fax)

626117

7. अनुज्ञप्ति परिसर में निम्नलिखित सुविधाएं अंतर्भूत हैं।
The licensed premises consist of following facilities.

One Explosives Storage shed, one lobby and a detonator storage shed.

8. अनुज्ञप्ति समय - समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2004 के उपबन्धों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपावधों के अधीन रहते हुए अनुदत्त की जाती है।
The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

- उपरोक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।
Drawings (showing site, constructional and other details) as stated in serial No. 5 above.
- अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तों और अतिरिक्त शर्तों।
Conditions and Additional Conditions of this licence signed by the licensing authority.
- दूरी प्ररूप DE-2 | Distance Form DE-2

9. यह अनुज्ञप्ति तारीख 31 मार्च 2022 तक विधिमाम्य रहेगी। This licence shall remain valid till 31st day of March 2022.

यह अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपवर्णित इस अनुज्ञप्ति की शर्तों का अधिकमण करने या यदि अनुज्ञप्ति परिसर योजना या उससे संलग्न उपबन्ध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिसंदेह की जा सकती है, जहां वह लागू हो।
This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 19/07/2017

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

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 06/03/2018

नवीनीकरण के पृष्ठांकन के लिए स्थान
Space for Endorsement of Renewal

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
05/08/2022	31/03/2027	Jt. Chief Controller of Explosives, South Circle, Chennai

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

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

Digitally signed by ABIN NANDI
Reason: Licence No. : E/SC/TN/22/709
Location: Chennai [E95179]
Date: 2022.08.05 03:01:16 +05:30

(धातु उत्पादक) खान परीक्षा बोर्ड

सी.आई.एम. - 1234R

Board of Metalliferous
Mines Examinations

C.I.M.-1234 R

दस्तावेज सं. 3745
No. of Document



खान अधिनियम, 1952
THE MINES ACT, 1952

विस्फोटकर्ता समर्थता प्रमाण-पत्र
BLASTER'S CERTIFICATE OF COMPETENCY

(धातु उत्पादक खान विनियमावली, 1961 के अधीन)
(Under Metalliferous Mines Regulations, 1961)

(केवल खुल खनियों वाली खानों के लिए)
(Restricted to Metalliferous Mines having open cast workings only)

श्री. मुकु. गांव
..... किला राज्य
को जिनकी जन्मतिथि है अपनी आयु, आरोग्यता, अच्छे आचरण, साक्षरता
और अनुभव के संघ में संतोषजनक प्रमाण दे देने और में तारीख को हुई परीक्षा पास कर
लेने पर धातु उत्पादक खान विनियमावली, 1961 के अधीन विस्फोटकर्ता प्रमाण-पत्र दिया जाता है। यह प्रमाण-पत्र केवल
खुल खनियों वाली खानों तक सीमित है।

Shri. **S. SELVARAJ**
of Village **West Street, P. Reddiapatti** Thana **Sankaran Koil, P. Reddiapatti P.O.**
District **TIRUNELVELI** State **TAMILNADU-627753**
born on **15th April, 1968 (Sixty Eight)** at **Seeninaicker**

having given satisfactory evidence of his age, medical fitness, good conduct, literacy and experience and having passed an
examination held at **Oorgaum Centre, K.G.F** on **01.07.1998** is hereby granted
a **BLASTER'S CERTIFICATE** under the Metalliferous Mines Regulations, 1961 restricted to **Mines having opencast**
workings only.

सचिव

संतत परीक्षा बोर्ड

Secretary,
Board of Mining Examinations

Chairman,
Board of Mining Examinations

11-07-2022 -
Director of Mines Safety, Chennai Region

तारीख
Dated **28/4/1999**

17-09-2017 -
Director of Mines Safety, Chennai Region



बाएँ हाथ के अंगूठे का निशान
Left hand thumb impression

12-11-2012 -
Director of Mines Safety, Chennai Region

प्रमाणित किया जाता है कि उसकी स्वास्थ्य परीक्षा कर ली गई है और वह बहरपन, संदीप दृष्टि या अन्य किसी ऐसी
मानसिक अथवा शारीरिक अशक्तता से मुक्त पाया गया है जो अपने कर्तव्यों को प्रभावी रूप से करने में बाधक हो।

Certified that he was examined and found free from deafness, defective vision or any other infirmity, mental or
physical, likely to interfere with the efficient discharge of his duties. Valid upto **18.01.2019**

- 1. On को
- 2. On को
- 3. On को
- 4. On को
- 5. On को
- 6. On को

**TOPOGRAPHICAL VIEW OF THIRUMAL ROGH STONE &
GRAVEL QUARRY LEASE APPLIED AREA**



Name of the Applicant : **Thiru. D. Sakthivel,**
S/o. Durairaj,
Address : No.15, Melaratha Veethi, Thirupparankundram,
Madurai District,
Tamil Nadu State – 625 005.


Location:

S.F.Nos. : 217/2A(P),2B,4, 221/3(P),4A(P),4B(P), 222/1(P),2,3A,3B1 and
223/2B
Extent : 4.75.01Ha
Village : Thirumal
Taluk : Kallikudi
District : Madurai

Signature of the applicant



(D. Sakthivel)


(Village Administrator) (Office)
Attestation
சுயமல் குளர்
சுயமல் குளர்
சுயமல் குளர்



Thiru.R.VIJAYABASKARAN, ME,M.B.A.,
MEMBER SECRETARY (i/c)

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY – TAMIL NADU

3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.

Phone No.044-24359973

Fax No. 044-24359975

ENVIRONMENTAL CLEARANCE

Lr. No.SEIAA-TN/F.No.6809/1(a)/EC.No:4273/2020 dated:28.07.2020

To

Thiru. D. Sakthivel
No.15, Melaratha Veethi
Thiruparankundram
Madurai District- 625 005

Sir/Madam,

Sub: SEIAA-TN – Proposed for the Rough Stone & Gravel over an Extent of 3.49.22Ha at S.F.No. 14/2F, 14/2G, 14/4E, 14/3B, 14/4B, 14/1B2, 14/3A, 14/4A, 14/2E1 & 14/4C1 in Kurayur Bit-1 Village, Kallikudi Taluk, Madurai District by Thiru. D. Sakthivel - issue of Environmental Clearance – Reg.


Ref: 1. Your Application for Environmental Clearance dated: 08.05.2019
2. Minutes of the 135th SEAC meeting held on 06.09.2019
3. Proponent reply dated 21.01.2020
4. Minutes of the 153rd SEAC meeting held on 04.06.2020
5. Minutes of the 385th SEIAA meeting held on 28.07.2020

Details of Minor Mineral Activity:-

This has reference to your application first cited. The proposal is for obtaining Environmental Clearance for mining/quarrying of minor minerals based on the particulars furnished in your application as shown below.

1	Name of Project Proponent and address	Thiru. D. Sakthivel No.15, Melaratha Veethi
---	---------------------------------------	--




MEMBER SECRETARY
SEIAA-TN

		Thiruparankundram Madurai District- 625 005
2	Location of the Proposed Activity	
	Survey Number	14/2F, 14/2G, 14/4E, 14/3B, 14/4B, 14/1B2, 14/3A, 14/4A, 14/2E1 & 14/4C1
	Latitude and Longitude	09°42'24"N to 09°42'32"N 78°02'29" E to 78°02'37" E
	Village	Kurayur Bit-1
	Taluk	Kallikudi
	District	Madurai
3	Proposed Activity	
	i. Minor mineral	Rough Stone & Gravel
	ii. Mining Lease Area	3.49.22Ha
	iii. Approved quantity	510020cu.m of Rough Stone, 48984cu.m of Gravel & 90960cu.m of weathered rock
	iv. Depth of Mining	41m
	v. Type of mining	Opencast semi mechanized Mining
	vi. Category(B1/B2)	B2
	vii. Precise area communication approved by the District Collector with date	Na.Ka.No.1884/2018-Kanimam, dated: 07.12.2018
	viii. Mining plan approval by Deputy Director of Geology and Mining, Madurai	Rc. No.1884/2018-Mines, dated: 06.03.2019
	ix. Mining period	5 Years
4	Whether Project area attracts any General conditions specified in the EIA notification, 2006 as amended:-	Not attracted. Affidavit furnished.
5	Man Power requirement per day:	25 Employees



[Signature]
MEMBER SECRETARY
SEIAA-TN

6	Utilities	
	i. Source of Water :	Water Vendors & Tankers supply
	ii. Quantity of Water Requirement in KLD:	2.0 KLD
	a. Domestic & Drinking purpose	0.6 KLD
	b. Green Belt & Dust Suppression	1.4 KLD
	iii. Power Requirement:	
	a. Domestic Purpose	TNEB
	b. Industrial purpose	326320 Liters of HSD
7	Cost	
	i. Project Cost	Rs. 77.96 Lakhs
	ii. EMP Cost	Rs. 5.20 Lakhs
8	Validity:	
	This Environmental Clearance is granted for the production of 510020cu.m of Rough Stone, 48984cu.m of Gravel & 90960cu.m of weathered rock for the period of 5 Years from the date of execution of the mining lease.	

The Proponent has furnished affidavit in Hundred Rupees stamp paper attested by the Notary stating that

I, Thiru. D. Sakthivel, No.15, Melaratha Veethi, Thiruparankundram, Madurai District-625 005, solemnly declare and sincerely affirm that:

I have applied for getting Environmental Clearance to SEIAA, Tamil Nadu for mining lease for mining of Rough Stone & Gravel Quarry over an Extent of 3.49.22Ha at S.F.No. 14/2F, 14/2G, 14/4E, 14/3B, 14/4B, 14/1B2, 14/3A, 14/4A, 14/2E1 & 14/4C1 in Kurayur Bit-1 Village, Kallikudi Taluk, Madurai District, Tamil Nadu.

- I. We swear to state and confirm that within 10km area of the mine site, I have applied for Environmental Clearance, none of the following is situated.
 - a. Protected areas notified under the Wild Life (Protection) Act, 1972.
 - b. Critically polluted areas as notified by the Central Pollution Control Board constituted under Water (Prevention and Control of Pollution) Act, 1974.
 - c. Eco – Sensitive areas as notified.
 - d. Interstate boundaries within 10km radius from the boundary of the proposed site.



2. There will not be hindrance or disturbance to the people living no enrouted / nearby our quarry site while transporting the mineral our material and due to quarrying activities.
3. There is no approved habitation within 500m radius from the periphery of our quarry.
4. I swear that afforestation will be carried out during the course of mining operation and maintained.
5. The required insurance will be taken in the name of the labourers working in my quarry site.
6. The existing road from the main road the main road to quarry is in good condition and the same will be maintained and utilized for transportation of Rough stone.
7. I will not engage any child labour in my quarry site and I aware that engaging child labour is punishable under the law.
8. All types of safety / protective equipments will be provided to all the labourers working in my quarry.
9. There is no permanent structures, temples, etc., are located within 500m radius from the periphery of my quarry.

Details of 500M radius Proposed quarry:

The Project Proponent has submitted a copy of the letter obtained from the Assistant Director (i/c), Department of Geology & Mining, Madurai District in his letter Re.No.1884/2018-Mines dated: 01.07.2020 has stated that the details of other quarries (Proposed / Existing / Abandoned Quarries) within a radius 500m from the boundary of the proposed quarry site as follows:

Existing quarries

S.No.	Name of the applicant/ Lessee	Name of the Village & S.F.No.	Extent in Hectre	Lease Period
Nil				

Present proposed quarries

S.No.	Name of the applicant/ Lessee	Name of the Village & S.F.No.	Extent in Hectre	Lease status
1.	Thiru.D.Sakthivel	14/2F, 14/2G, 14/4E, 14/3B, 14/4B, 14/1B2, 14/3A, 14/4A, 14/2E1 & 14/4C1in Kurayur Bit-1	3.49.22	Proposed



		Village		
Abandoned quarries				
S.No.	Name of the applicant/ Lessee	Name of the Village & S.F.No.	Extent in Hectre	Remarks
Nil				

Appraisal by SEAC:-

The project proposal was placed in the 158th SEAC meeting held on 22.06.2020. After the detailed deliberation, the SEAC decided to recommend the proposal for grant of Environmental Clearance to SEIAA subject to the following conditions in addition to normal conditions.

1. The proponent shall strictly adhere to the conditions imposed by the Executive Engineer for this quarry vide his letter dated 09.12.2019.
2. The depth of the mining should be restricted to 41m and the proponent shall not excavated more than 510020cu.m of Rough stone, 48984cu.m of Gravel and 90960cu. m of weathered rocks.
3. Groundwater quality monitoring should be conducted once every six months and the report should be submitted to TNPCB.
4. After mining is completed, proper levelling should be done by the Project proponent & Environmental Management Plan furnished by the Proponent should be strictly followed.
5. The proponent shall provide the fencing around the boundary of the proposed area and shall furnish the photocopies of the same before obtaining the CTO from TNPCB.
6. The Project proponent 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.
7. The operation of the quarry should not affect the agriculture activities & water bodies near the project site.
8. Transportation of the quarried materials shall not cause any hindrance to the Village people/Existing Village road.



9. The Project Proponent shall comply with the mining and other relevant rules and regulations where ever applicable.
10. The proponent shall develop adequate green belt with native species on the periphery of the mine lease area before commencement of the mining activity, in consultation with DFO of the concern district/agriculture university.
11. The quarrying activity shall be stopped if the entire quantity indicated in the Mining plan is quarried even before the expiry of the quarry lease period and the same shall be monitored by the District Authorities.
12. The recommendation for the issue of Environmental Clearance is subject to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in O.A No.186 of 2016 (M.A.No.350/2016), O.A. No.200/2016, O.A.No.580/2016 (M.A.No.1182/2016), O.A.No.102/2017, 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), 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).
13. Prior clearance from Forestry & Wild Life including clearance from committee of the National Board for Wild life as applicable shall be obtained before starting the quarrying operation, if the project site attracts the NBWL clearance.
14. To ensure safety measures along the boundary of the quarry site, security guards are to be posted during the entire period of mining operation.
15. The mine closure plan submitted by the project proponent shall be strictly followed after the lapse of the mine.
16. The amount of Rs. 2.5Lakhs (2% of the total project cost) shall be utilized as CER activities to carry out the development of the Toilet Facilities & Drinking Water Facilities for Thirumal village Government School at Madurai District as reported before obtaining the CTO from TNPCB.
17. The proponent shall provide the fencing all around the mine lease area before commencement of the mining operation.
18. The proponent shall plant tree saplings all around the mine lease area before commencement of the mining operation

Discussion by SEIAA and the Remarks:-




MEMBER SECRETARY
SEIAA-TN

The proposal was placed before the SEIAA in its 385th Meeting held on 28.07.2020. The Authority discussed in detail and decided to issue Environment Clearance subject to following conditions in addition to General condition:

1. **As recommended by the SEAC the depth of the mining should be restricted to 41m and the proponent shall not execute more than 510020m³ of Rough stone, 48984 m³ of Gravel and 90960 m³ cubic meters of weathered rocks.**
2. The proponent shall strictly adhere to the conditions imposed by the Executive Engineer for this quarry vide his letter dated 09.12.2019.
3. Ground water quality monitoring should be conducted once in every Six months and the report should be submitted to TNPCB
4. After mining is completed, proper levelling should be done by the Project proponent & Environmental Management Plan furnished by the Proponent should be strictly followed.
5. The proponent shall provide the fencing around the boundary of the proposed area and shall furnish the photocopies of the same before obtaining the CTO from TNPCB.
6. The Project proponent 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.
7. Proper barrier for reducing the Noise level and to combat the dust pollution shall be established like providing Green Belt along the boundary of the quarrying site, etc. and to prevent dust pollution, suitable working methodology needs to be adopted taking wind direction into consideration.
8. The operation of the quarry should not affect the agriculture activities & water bodies near the project site.
9. Transportation of the quarried materials shall not cause any hindrance to the Village people/Existing Village road.
10. The Project Proponent shall comply with the mining and other relevant rules and regulations where ever applicable.
11. The proponent shall develop adequate green belt with native species on the periphery of the mine lease area before commencement of the mining activity, in consultation with DFO of the concern district/agriculture university.



12. The quarrying activity shall be stopped if the entire quantity indicated in the Mining plan is quarried even before the expiry of the quarry lease period and the same shall be monitored by the District Authorities.
13. The recommendation for the issue of Environmental Clearance is subject to the outcome of the Hon'ble NGT, Principal Bench, New Delhi in 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).
14. Prior clearance from Forestry & Wild Life including clearance from committee of the National Board for Wild life as applicable shall be obtained before starting the quarrying operation, if the project site attracts the NBWL clearance.
15. To ensure safety measures along the boundary of the quarry site, security guards are to be posted during the entire period of mining operation.
16. The mine closure plan submitted by the project proponent shall be strictly followed after the lapse of the mine.
17. The amount of Rs. 2.5Lakhs (2% of the total project cost) shall be utilized as CER activities to carry out the development of the Toilet Facilities & Drinking Water Facilities for Thirumal village Government School at Madurai District as reported before obtaining the CTO from TNPCB.
18. The proponent shall provide the fencing all around the mine lease area before commencement of the mining operation.
19. The proponent shall plant tree saplings all around the mine lease area before commencement of the mining operation.

Part-A: Conditions to be Complied before commencing mining operations:-



1. The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing the public that
 - I. The project has been accorded Environmental Clearance.
 - II. Copies of clearance letters are available with the Tamil Nadu Pollution Control Board.
 - III. Environmental Clearance may also be seen on the website of the SEIAA.
 - IV. The advertisement should be made within 7 days from the date of receipt of the clearance letter and a copy of the same shall be forwarded to the SEIAA.
2. Mining activity should be reviewed by the District Collector after three years and decide for further extension.
3. NOC from the Standing committee of the NBWL shall be obtained, if protected areas are located within 10 Km from the proposed project site.
4. The project proponent shall comply the conditions laid down in the Section V, Rule 36 of Tamil Nadu Minor Minerals Concession Rules 1959.
5. A copy of the Environment Clearance letter shall be sent by the proponent to the concerned Panchayat, Town Panchayat / Panchayat union/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the proponent and also kept at the site, for the general public to see.
6. Quarry lease area should be demarcated on the ground with wire fencing to show the boundary of the lease area on all sides with red flags on every pillar shall be erected before commencement of quarrying.
7. The proponent shall ensure that First Aid Box is available at site.
8. The excavation activity shall not alter the natural drainage pattern of the area.
9. The excavated pit shall be restored by the project proponent for useful purposes.
10. The proponent shall quarry and remove only in the permitted areas as per the approved Mining Plan details.
11. The quarrying operation shall be restricted between 7AM and 5 PM.
12. The proponent shall take necessary measures to ensure that there shall not be any adverse impacts due to quarrying operation on the nearby human habitations, by way of pollution to the environment.



13. A minimum distance of 50mts. from any civil structure shall be kept from the periphery of any excavation area.
14. The mined out pits should be backfilled where warranted and area should be suitably landscaped to prevent environmental degradation. The mine closure plan as furnished in the proposal shall be strictly followed with back filling and tree plantation.
15. Wet drilling method is to be adopted to control dust emissions. Delay detonators and shock tube initiation system for blasting shall be used so as to reduce vibration and dust.
16. Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
17. Blasting shall be carried out after announcing to the public adequate through public address system to avoid any accident.
18. A study has to be conducted to assess the optimum blast parameters and blast design to keep the vibration limits less than prescribed levels and only such design and parameters should be implemented while blasting is done. Periodical monitoring of the vibration at specified location to be conducted and records kept for inspection.
19. The Proponent shall take appropriate measures to ensure that the GLC shall comply with the revised NAAQ norms notified by MoEF& CC, GoI on 16.11.2009.
20. The following measures are to be implemented to reduce Air Pollution during transportation of mineral
 - i. Roads shall be graded to mitigate the dust emission.
 - ii. Water shall be sprinkled at regular interval on the main road and other service roads to suppress dust
21. The following measures are to be implemented to reduce Noise Pollution
 - i. Proper and regular maintenance of vehicles and other equipment
 - ii. Limiting time exposure of workers to excessive noise.
 - iii. The workers employed shall be provided with protection equipment and earmuffs etc.
 - iv. Speed of trucks entering or leaving the mine is to be limited to moderate speed of 25 kmph to prevent undue noise from empty trucks.
 - v. All noise generating machinery the compressor, generator to be enclosed in acoustic enclosure so as to reduce noise in working area.



22. Measures should be taken to comply with the provisions laid under Noise Pollution (Regulation and Control) (Amendment) Rules, 2010, dt: 11.01.2010 issued by the MoEF& CC, GoI to control noise to the prescribed levels.
23. Suitable conservation measures to augment groundwater resources in the area shall be planned and implemented in consultation with Regional Director, CGWB. Suitable measures should be taken for rainwater harvesting.
24. Permission from the competent authority should be obtained for drawl of ground water, if any, required for this project.
25. Topsoil, if any, shall be stacked properly with proper slope with adequate measures and should be used for plantation purpose.
26. The following measures are to be adopted to control erosion of dumps:-
 - i. Retention/ toe walls shall be provided at the foot of the dumps.
 - ii. Worked out slopes are to be stabilized by planting appropriate shrub/ grass species on the slopes.
27. Waste oils, used oils generated from the EM machines, mining operations, if any, shall be disposed as per the Hazardous& other wastes (Management, and Trans Boundary Movement) Rules, 2016 and its amendments thereof to the recyclers authorized by TNPCB.
28. Concealing the factual data or failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
29. Rain water harvesting to collect and utilize the entire water falling in land area should be provided.
30. Rain water getting accumulated in the quarry floor shall not be discharged directly to the nearby stream or water body. If it is to be let into the nearby water body, it has to be discharged into a silt trap on the surface within the lease area and only the overflow after allowing settling of soil be let into the nearby waterways. The silt trap should be of sufficient dimensions to catch all the silt water being pumped out during one season. The silt trap should be cleaned of all the deposited silt at the end of the season and kept ready for taking care of the silt in the next season.




MEMBER SECRETARY
SEIAA-TN

31. The lease holder shall undertake adequate safeguard measures during extraction of material and ensure that due to this activity, the hydro-geological regime of the surrounding area shall not be affected. Regular monitoring of ground water level and quality shall be carried out around the mine lease area during the mining operation. If at any stage, if it is observed that the groundwater table is getting depleted due to the mining activity; necessary corrective measures shall be carried out. District Collector/mining officer shall ensure this.
32. No tree-felling shall be done in the leased area, except only with the permission from competent Authority.
33. To take up environmental monitoring of the proposed quarry site before, during and after the mining activities including vibration study data, water, air & flora/fauna environment, slurry water generated/disposed and method of disposal, involving a reputed academic Institution.
34. It shall be ensured that the total extent of nearby quarries(existing, abandoned and proposed) located within 500 meter radius from the periphery of this quarry is not exceeding 5 hectares within the mining lease period of this application.
35. It shall be ensured that there is no habitation is located within 300 meter radius from the periphery of the quarry site and also ensure that no hindrance will be caused to the people of the habitation located within 300m radius from the periphery of the quarry site.
36. Free Silica test should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.
37. Air sampling at intersection point should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF& CC, GOI.
38. Bunds to be provided at the boundary of the project site.
39. The project proponent shall undertake plantation/afforestation work by planting the native species on all side of the lease area at the rate of 400/Ha. Suitable tall tree saplings should be planted on the bunds and other suitable areas in and around the work place.
40. Floor of excavated pit to be levelled and sides to be sloped with gentle slope (Except for granite quarries) in the mine closure phase.
41. The Project Proponent shall ensure a minimum of 2.5% of the annual turnover will be utilized for the CSR Activity



42. The Project Proponent shall provide solar lighting system to the nearby villages.
43. Earthen bunds and barbed wire fencing around the pits with green belt all along the boundary shall be developed and maintained.
44. Safety equipments to be provided to all the employees.
45. Safety distance of 50m has to be provided in case of railway, reservoir, canal/odai
46. The Assistant/Deputy Director, Department of Geology & mining shall ensure that the proponent has engaged the blaster with valid Blasting license/certificate obtained from the competent authority before execution of mining lease.
47. The proponent shall furnish the Baseline data covering the Air, Water, Noise and land environment quality for the proposed quarry site before execution of mining lease.
48. The proponent shall erect the pillars in accordance with the Rules for depicting GPS details in the earmarked boundary of the quarry site to monitor electronically before execution of mining.
49. The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
50. The proponent has to display the name board at the quarry site showing the details of Proponent, lease period, extent, etc., with respect to the existing activity before execution of mining.
51. Heavy earth machinery equipments if utilized, after getting approval from the competent authority.
52. The Proponent shall ensure that the project activity including blasting, mining transportation etc should in no way have adverse impact to the other forests, such as reserve forests and social forests, tree plantation and bio diversity, surrounding water bodies etc.
53. The proponent shall provide Green Belt development at the rate of not less than 400 trees/Hectare. The tree saplings shall be not less than 3m height.
54. The fugitive emissions should be monitored during the mining activity and should be reported to TNPCB once in a month and the operation of the quarry should no way impact the agriculture activity & water bodies near the project site.
55. All the commitment made by the project proponent in the proposal shall be strictly followed.



56. 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.
57. The Project proponent has to strictly comply the outcome/direction of the Hon'ble NGT, Principle Bench, New Delhi in the O.A No.186 of 2016 (M.A.No.350/2016), O.A. No.200/2016, O.A.No.580/2016 (M.A.No.1182/2016), O.A.No.102/2017, 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), 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).
58. All the condition imposed by the District Collector, Madurai Na.Ka.No.1884/2018-Kanimam, dated: 07.12.2018 should be strictly followed.
59. The EMP Cost shall be deposited in a nationalized bank by opening separate account and head wise expense statement shall be furnished to TNPCB with a copy to SEIAA annually.
60. The proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.
61. If there is any change in the production or lease area application for amendment has to be submitted to SEIAA for further approval.
62. A detailed post-COVID health management plan for workers as per ICMR and MHA guidelines or the State Govt. guideline may be followed.

Part B: General Conditions:

1. EC is given only on the factual records, documents and the commitment furnished in non judicial stamp paper by the proponent.
2. The Proponent shall obtain the Consent from the TNPC Board before commencing the activity.
3. No change in mining technology and scope of working should be made without prior approval of the SEIAA, Tamil Nadu.




MEMBER SECRETARY
SEIAA-TN

4. No change in the calendar plan including excavation, quantum of mineral (minor mineral) should be made.
5. Effective safeguard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.
6. Effective safeguards shall be adopted against health risks on account of breeding of vectors in the water bodies created due to excavation of earth.
7. A berm shall be left from the boundary of adjoining field having a width equal to at least half the depth of proposed excavation.
8. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.
9. Vehicular emissions shall be kept under control and be regularly monitored. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.
10. Access and haul roads to the quarrying area should be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.
11. All Personnel shall be provided with protective respiratory devices including safety shoes, masks, gloves etc. Supervisory people should be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.
12. Periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly. The workers shall be provided with personnel protective measures such as masks, gloves, boots etc.
13. Workers/labourers shall be provided with facilities for drinking water and sanitation facility for Female and Male separately.
14. The project proponent shall ensure that child labour is not employed in the project as per the sworn affidavit furnished.



15. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Chennai.
16. The Environmental Clearance does not absolve the applicant/proponent of his obligation/requirement to obtain other statutory and administrative clearances from other statutory and administrative authorities.
17. This Environmental Clearance does not imply that the other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would be considering the project on merits and be taking decisions independently of the Environmental Clearance
18. The SEIAA, Tamil Nadu may alter/modify the above conditions or stipulate any further conditions in the interest of environment protection.
19. The SEIAA, Tamil Nadu may cancel the Environmental Clearance granted to this project under the provisions of EIA Notification, 2006, at any stage of the validity of this Environmental Clearance, if it is found or if it comes to the knowledge of this SEIAA, TN that the project proponent has deliberately concealed and/or submitted false or misleading information or inadequate data for obtaining the Environmental Clearance.
20. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.
21. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments, Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006, Wildlife Protection Act, 1972, Forest Conservation Act, 1980, Biodiversity Conservation Act, 2016, the Biological Diversity Act, 2002 and Biological diversity Rules, 2004 and Rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter.



22. Any other conditions stipulated by other Statutory/Government authorities shall be complied.
23. Any appeal against this Environmental Clearance shall lie with the Hon'ble National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
24. The Environmental Clearance is issued based on the documents furnished by the project proponent. In case any documents found to be incorrect/not in order at a later date the Environmental Clearance issued to the project will be deemed to be revoked/ cancelled.




MEMBER SECRETARY
SEIAA-TN

Copy to:

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Additional Chief Secretary to Government, Environment and Forests Department, Tamil Nadu.
3. The Additional Chief Secretary, Industries Department, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1st& 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai – 34.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. The Chairman, TNPC Board, 76, Mount Salai, Guindy, Chennai-32
7. The District Collector, Madurai District
8. The Commissioner of Geology and Mines, Guindy, Chennai-32
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Spare.



TEST REPORT

Report No	EHS360/TR/2024-25/001	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 1 – Project Area- 09°42'38.19"N 78° 2'46.12"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	46.9	23.5	7.9	21.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	47.7	22.1	7.7	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	45.5	23.4	6.8	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	46.4	23.9	6.5	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	45.3	24.1	6.8	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	46.0	23.5	7.6	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	45.5	24.8	6.8	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	46.8	23.5	7.6	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	45.9	24.3	6.7	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	45.2	23.6	7.6	21.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	46.4	24.1	6.5	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	46.2	23.8	5.7	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	46.6	22.8	6.8	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	45.0	22.1	5.3	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	45.3	23.6	5.7	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	46.7	23.8	6.8	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	45.0	24.5	6.6	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	46.9	24.3	6.7	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	45.7	23.1	6.5	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	45.6	23.8	8.3	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	46.5	23.6	7.2	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	45.3	24.1	6.4	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	46.2	23.5	8.4	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	45.6	24.2	7.8	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	45.7	23.5	6.5	20.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	45.1	23.7	7.7	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<80	<80	<100	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/001	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/001
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 1 – Project Area- 09°42'38.19"N 78° 2'46.12"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	64.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	62.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	65.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	64.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/002	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Near Project Area- 9°42'20.74"N 78° 2'59.19"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	43.8	20.5	7.6	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	44.9	20.7	6.9	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	44.4	20.6	7.1	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	43.6	20.5	5.5	21.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	44.1	21.3	6.7	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	43.2	21.4	6.2	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	44.6	21.6	6.1	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	43.7	21.8	7.4	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	42.3	21.9	6.8	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	43.5	22.2	6.6	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	42.7	22.4	7.2	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	43.5	19.8	7.4	24.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	42.9	20.7	6.3	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	43.7	20.8	7.9	22.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	43.6	21.6	6.1	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	44.1	21.7	7.5	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.8	21.3	6.6	23.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	45.0	21.8	7.1	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	45.9	20.3	6.6	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	45.3	20.7	7.0	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	44.7	20.5	7.7	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	44.9	20.6	5.5	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	44.5	20.9	5.7	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	43.1	21.7	5.8	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	42.5	21.3	6.3	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	42.7	21.7	6.2	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<100	<400

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/002	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/002
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 2 – Near Project Area- 9°42'20.74"N 78° 2'59.19"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	63.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	63.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	63.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	63.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	63.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	63.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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[Signature]



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/003	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 -Tirumal- 9°43'5.41"N 78° 3'12.32"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	41.7	19.8	6.5	20.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	42.3	19.1	6.9	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	40.1	18.9	6.6	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	43.9	19.5	6.1	21.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	42.7	18.4	6.3	20.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	43.2	19.7	6.7	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	41.4	19.1	6.4	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	41.6	18.5	6.3	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	42.3	18.2	6.8	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	42.7	19.2	6.2	21.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	42.3	19.7	6.9	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	40.5	18.6	6.4	20.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	42.1	17.9	6.1	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	40.9	19.7	6.5	20.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	41.1	19.1	6.9	20.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	42.7	18.5	7.1	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	41.3	18.0	6.5	20.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	41.8	19.7	6.3	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	41.1	19.2	6.7	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	42.9	18.6	6.5	21.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	42.0	17.9	6.9	21.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	42.2	17.2	6.1	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	40.4	19.5	6.3	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	40.7	18.9	6.7	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	41.5	19.9	6.9	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	41.2	19.7	7.2	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<100	<400

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/003	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/003
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ3 –Tirumal- 9°43'5.41"N 78° 3'12.32"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	68.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	67.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	67.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	67.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	68.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	68.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	68.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	66.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	66.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	66.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	67.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	67.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	66.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	66.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	66.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	66.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	66.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	66.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	68.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	68.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

[Signature]

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/004	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Chennampatti- 9°40'53.84"N 78° 0'47.55"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	43.7	19.3	6.1	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	43.6	19.6	6.8	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	44.9	19.8	6.0	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	44.1	19.9	6.2	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	43.0	19.5	6.8	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	42.7	18.2	6.1	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	42.3	19.7	6.4	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	42.9	19.8	6.2	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	43.1	18.1	6.4	19.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	43.3	18.3	6.0	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	42.7	19.8	6.7	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	41.4	18.6	6.3	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	43.9	18.4	6.8	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.7	19.7	6.8	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	43.3	19.1	6.3	20.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	42.7	18.3	6.4	19.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.1	18.5	6.9	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	43.5	18.8	6.7	19.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	42.0	18.9	6.3	20.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	42.3	18.3	6.7	19.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	43.7	18.5	6.5	19.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	43.6	19.0	6.9	21.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	44.4	18.2	6.3	20.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	43.3	19.6	6.7	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	41.9	19.2	6.8	19.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	42.7	19.6	6.2	19.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<100	<400

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/004	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/004
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ4 – Chennampatti- 9°40'53.84"N 78° 0'47.55"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	60.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	60.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	61.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	60.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	61.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	61.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	61.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	61.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	63.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	62.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	62.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	62.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	61.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	61.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	60.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	60.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	62.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	60.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

[Signature]

Authorised Signatory

[Signature]

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/005	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 – Arasapatti- 9°45'9.39"N 78° 0'35.32"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	43.5	20.5	7.5	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	44.3	21.3	7.3	21.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	42.1	20.4	7.9	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	43.9	19.6	7.2	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	42.4	19.2	6.8	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	43.7	20.1	6.4	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	43.3	21.6	7.2	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	42.7	20.8	7.7	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	42.9	20.3	7.3	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	43.0	21.4	7.9	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	43.8	20.6	6.1	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	43.1	21.6	6.4	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	43.6	20.6	7.9	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.8	20.5	7.3	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	42.3	21.4	7.8	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	43.7	19.8	6.2	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.1	19.1	6.9	23.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	42.8	19.6	7.4	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.5	19.8	7.8	23.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	42.3	19.7	7.5	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	43.1	19.6	7.9	23.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	42.9	19.2	8.2	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	42.1	20.1	7.8	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	43.7	21.3	7.9	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	42.1	21.4	7.1	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	42.6	21.8	7.8	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<100	<400

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/005	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/005
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ5 – Arasapatti- 9°45'9.39"N 78° 0'35.32"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	68.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	68.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	68.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	68.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	68.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	69.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	69.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	69.6	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	69.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	67.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	67.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	66.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	66.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	66.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	66.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	66.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	67.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	67.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	68.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	68.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****



Verified by

[Signature]

Authorised Signatory

[Signature]
Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/006	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 – Pullur- 9°42'42.52"N78° 5'5.45"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	41.5	19.6	7.6	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	41.9	19.9	7.5	22.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	42.6	20.1	7.1	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	42.2	19.5	7.2	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	41.6	19.3	6.8	21.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	42.1	20.1	6.6	22.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	41.9	21.2	6.2	21.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	40.1	20.8	6.8	20.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	40.6	19.3	6.3	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	41.6	18.9	6.9	19.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	42.8	18.5	8.2	21.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	40.5	18.1	8.4	18.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	40.3	18.5	8.6	18.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	42.6	18.3	8.2	19.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	43.5	19.5	7.6	20.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	42.6	19.2	7.9	21.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.4	18.6	6.2	22.3	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	42.8	18.7	6.1	22.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.3	19.6	6.9	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	42.9	19.1	7.5	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	43.5	18.7	8.2	23.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	43.9	18.2	8.8	23.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	42.6	18.3	7.6	22.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	42.1	18.9	7.5	22.5	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	42.5	18.5	7.8	22.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	43.2	19.1	7.3	22.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<100	<400

Note: BDL: Below Detection Limit ; DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by




Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/006	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/006
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ 6 – Pullur- 9°42'42.52"N78° 5'5.45"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	65.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	68.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	67.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	68.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	65.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	63.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	67.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	67.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	67.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	67.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	68.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	68.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	67.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	67.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	67.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/007	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ7 – Pampatti- 9°39'16.42"N78° 3'52.37"E		

Date	Period. hrs	PM10(µg/m3)	PM2.5(µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	NH3 (µg/m3)	CO (mg/ m3)
04.03.2024	7:00-7:00	44.8	20.8	6.2	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
05.03.2024	7:15-7:15	46.0	20.2	7.8	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
11.03.2024	7:00-7:00	45.3	18.2	6.0	26.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
12.03.2024	7:15-7:15	45.9	18.5	6.7	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
18.03.2024	7:00-7:00	43.2	19.3	7.4	24.7	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
19.03.2024	7:15-7:15	43.0	18.2	7.1	24.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
25.03.2024	7:00-7:00	44.6	19.8	8.0	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
26.03.2024	7:15-7:15	45.6	19.3	6.2	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
01.04.2024	7:00-7:00	43.2	18.5	6.6	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
02.04.2024	7:15-7:15	44.8	19.6	7.0	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
08.04.2024	7:00-7:00	44.0	19.6	7.9	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
09.04.2024	7:15-7:15	45.6	18.3	6.3	26.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
15.04.2024	7:00-7:00	46.0	17.9	6.8	24.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
16.04.2024	7:15-7:15	45.1	18.5	6.0	24.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
22.04.2024	7:00-7:00	44.8	19.6	7.2	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
23.04.2024	7:15-7:15	44.2	18.9	7.8	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
29.04.2024	7:00-7:00	43.8	19.6	6.5	26.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
30.04.2024	7:15-7:15	43.0	20.1	6.1	25.4	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
06.05.2024	7:00-7:00	43.9	21.5	7.8	24.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
07.05.2024	7:15-7:15	44.6	20.6	7.2	25.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
13.05.2024	7:00-7:00	46.0	20.1	6.8	25.9	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
14.05.2024	7:15-7:15	45.8	19.8	6.3	26.0	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
20.05.2024	7:00-7:00	45.1	18.9	7.0	24.6	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
21.05.2024	7:15-7:15	43.8	19.6	7.4	25.2	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
27.05.2024	7:00-7:00	43.2	20.1	7.9	24.1	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
28.05.2024	7:15-7:15	44.2	20.4	6.7	25.8	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:1.14)
NAAQ* Standard		<100	<100	<60	<80	<80	<400	<4

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

Page 1 of 1

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Authorised Signatory

A S K

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/007	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 5182	Sample Drawn by	Laboratory
Sample Name	Air	Sample Code	EHS360/007
Sample Description	Ambient Air Quality Monitoring	Sample Condition	Good
Sampling Location	AAQ7 – Pampatti- 9°39'16.42"N78° 3'52.37"E		

Date	Period. hrs	SPM ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	C6H6 ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)
04.03.2024	7:00-7:00	62.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
05.03.2024	7:15-7:15	62.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
11.03.2024	7:00-7:00	62.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
12.03.2024	7:15-7:15	64.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
18.03.2024	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
19.03.2024	7:15-7:15	65.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
25.03.2024	7:00-7:00	64.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
26.03.2024	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
01.04.2024	7:00-7:00	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
02.04.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
08.04.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
09.04.2024	7:15-7:15	63.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
15.04.2024	7:00-7:00	65.5	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
16.04.2024	7:15-7:15	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
22.04.2024	7:00-7:00	64.1	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
23.04.2024	7:15-7:15	62.0	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
29.04.2024	7:00-7:00	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
30.04.2024	7:15-7:15	65.4	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
06.05.2024	7:00-7:00	66.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
07.05.2024	7:15-7:15	64.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
13.05.2024	7:00-7:00	64.7	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
14.05.2024	7:15-7:15	65.2	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
20.05.2024	7:00-7:00	65.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
21.05.2024	7:15-7:15	64.3	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
27.05.2024	7:00-7:00	64.8	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
28.05.2024	7:15-7:15	64.9	BDL (DL:0.1)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:0.1)	BDL (DL:0.1)
NAAQ* Standard		<200	<200	<100	<60	<80	<80

Note: BDL: Below Detection Limit ;DL: Detection Limit

Remarks: The values observed for the pollutants given above are within the CPCB standards.

*****End of Report*****

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[Signature]



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

- Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 008	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 008
Sample Description	Ambient Noise	Sample Collected Date	28.05.2024

Location	N1 – Core Zone- 9°42'35.07"N 78° 2'43.39"E			N2 – Near Project Area-9°42'20.29"N 78° 2'59.38"E				
Parameter	Min	Max	Min	Max	Min	Max		
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)		
06:00-07:00	32.5	45.9	32.5	45.9	32.5	45.9		
07:00-08:00	38.4	47.3	38.4	47.3	38.4	47.3		
08:00-09:00	36.5	42.9	36.5	42.9	36.5	42.9		
09:00-10:00	32.6	45.1	32.6	45.1	32.6	45.1		
10:00-11:00	38.4	41.3	38.4	41.3	38.4	41.3		
11:00-12:00	36.5	44.8	36.5	44.8	36.5	44.8		
12:00-13:00	35.9	42.3	35.9	42.3	35.9	42.3		
13:00-14:00	36.3	44.7	36.3	44.7	36.3	44.7		
14:00-15:00	36.7	48.2	36.7	48.2	36.7	48.2		
15:00-16:00	35.7	44.2	35.7	44.2	35.7	44.2		
16:00-17:00	36.8	41.3	36.8	41.3	36.8	41.3		
17:00-18:00	35.4	43.5	35.4	43.5	35.4	43.5		
18:00-19:00	39.4	47.2	39.4	47.2	39.4	47.2		
19:00-20:00	37.6	44.9	37.6	44.9	37.6	44.9		
20:00-21:00	38.2	41.5	38.2	41.5	38.2	41.5		
21:00-22:00	35.4	40.9	35.4	40.9	35.4	40.9		
22:00-23:00	36.5	44.2	36.5	44.2	36.5	44.2		
23:00-00:00	35.2	43.5	35.2	43.5	35.2	43.5		
00:00-01:00	32.9	41.8	32.9	41.8	32.9	41.8		
01:00-02:00	34.1	44.5	34.1	44.5	34.1	44.5		
02:00-03:00	32.6	39.4	32.6	39.4	32.6	39.4		
03:00-04:00	35.6	40.5	35.6	40.5	35.6	40.5		
04:00-05:00	35.4	42.7	35.4	42.7	35.4	42.7		
05:00-06:00	32.5	38.4	32.5	38.4	32.5	38.4		
Result	Day Means		41.9		Day Means		41.9	
	Night Means		39.3		Night Means		39.3	

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 009	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 009
Sample Description	Ambient Noise	Sample Collected Date	28.05.2024

Location	N3 – Tirumal - 9°43'6.95"N 78° 3'7.97"E			N4 – Chennampattir - 9°40'53.66"N 78° 0'47.56"E		
Parameter	Min	Max	Min	Max	Min	Max
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	32.9	40.6	32.9	40.6	32.9	40.6
07:00-08:00	31.4	35.2	31.4	35.2	31.4	35.2
08:00-09:00	36.7	40.6	36.7	40.6	36.7	40.6
09:00-10:00	36.2	42.1	36.2	42.1	36.2	42.1
10:00-11:00	33.9	45.2	33.9	45.2	33.9	45.2
11:00-12:00	35.4	44.6	35.4	44.6	35.4	44.6
12:00-13:00	36.8	41.5	36.8	41.5	36.8	41.5
13:00-14:00	32.4	39.2	32.4	39.2	32.4	39.2
14:00-15:00	33.5	42.8	33.5	42.8	33.5	42.8
15:00-16:00	35.7	44.2	35.7	44.2	35.7	44.2
16:00-17:00	34.1	43.7	34.1	43.7	34.1	43.7
17:00-18:00	33.7	41.9	33.7	41.9	33.7	41.9
18:00-19:00	32.8	40.5	32.8	40.5	32.8	40.5
19:00-20:00	35.5	44.2	35.5	44.2	35.5	44.2
20:00-21:00	36.7	45.4	36.7	45.4	36.7	45.4
21:00-22:00	35.4	43.9	35.4	43.9	35.4	43.9
22:00-23:00	32.9	40.4	32.9	40.4	32.9	40.4
23:00-00:00	33.6	41.8	33.6	41.8	33.6	41.8
00:00-01:00	34.8	41.3	34.8	41.3	34.8	41.3
01:00-02:00	31.2	39.5	31.2	39.5	31.2	39.5
02:00-03:00	32.7	40.4	32.7	40.4	32.7	40.4
03:00-04:00	31.9	38.2	31.9	38.2	31.9	38.2
04:00-05:00	32.5	40.7	32.5	40.7	32.5	40.7
05:00-06:00	31.7	38.5	31.7	38.5	31.7	38.5
Result	Day Means		39.9	Day Means		39.9
	Night Means		37.8	Night Means		37.8

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by

Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 010	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 010
Sample Description	Ambient Noise	Sample Collected Date	28.05.2024

Location	N5 – Arasapatti– 9°45'9.89"N 78° 0'36.20"E			N6 – Pullur– 9°42'42.22"N 78° 5'5.37"E		
Parameter	Min	Max	Min	Max	Min	Max
Time	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
06:00-07:00	31.7	39.5	31.7	39.5	31.7	39.5
07:00-08:00	32.9	41.3	32.9	41.3	32.9	41.3
08:00-09:00	32.5	40.7	32.5	40.7	32.5	40.7
09:00-10:00	36.2	45.5	36.2	45.5	36.2	45.5
10:00-11:00	35.4	46.7	35.4	46.7	35.4	46.7
11:00-12:00	32.7	40.5	32.7	40.5	32.7	40.5
12:00-13:00	35.8	43.2	35.8	43.2	35.8	43.2
13:00-14:00	32.5	41.3	32.5	41.3	32.5	41.3
14:00-15:00	33.6	41.4	33.6	41.4	33.6	41.4
15:00-16:00	34.6	42.5	34.6	42.5	34.6	42.5
16:00-17:00	36.2	44.8	36.2	44.8	36.2	44.8
17:00-18:00	36.8	45.1	36.8	45.1	36.8	45.1
18:00-19:00	34.8	43.6	34.8	43.6	34.8	43.6
19:00-20:00	33.2	41.4	33.2	41.4	33.2	41.4
20:00-21:00	31.8	38.3	31.8	38.3	31.8	38.3
21:00-22:00	32.8	40.1	32.8	40.1	32.8	40.1
22:00-23:00	33.5	41.3	33.5	41.3	33.5	41.3
23:00-00:00	32.9	40.7	32.9	40.7	32.9	40.7
00:00-01:00	31.2	39.2	31.2	39.2	31.2	39.2
01:00-02:00	33.6	41.5	33.6	41.5	33.6	41.5
02:00-03:00	31.5	39.2	31.5	39.2	31.5	39.2
03:00-04:00	32.5	40.4	32.5	40.4	32.5	40.4
04:00-05:00	31.8	38.2	31.8	38.2	31.8	38.2
05:00-06:00	32.4	40.3	32.4	40.3	32.4	40.3
Result	Day Means		39.8	Day Means		39.8
	Night Means		37.6	Night Means		37.6

Note: CPCB Norms Industrial Area Day Time:75 dB(A); Night Time:70 dB(A)
The Noise level in the above location exists within the permissible limits of CPCB.

*****End of Report*****



Verified by

[Signature]

Authorised Signatory

[Signature]
Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

TC-9583

Report No	EHS360/TR/2024-25/ 011	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	IS 9989	Sample Drawn by	Laboratory
Sample Name	Noise Level Monitoring	Sample Code	EHS360/ 011
Sample Description	Ambient Noise	Sample Collected Date	28.05.2024

Location	N7 - Pampatti - 9°39'17.70"N 78° 3'52.40"E		
Parameter	Min	Min	Min
Time	dB(A)	dB(A)	dB(A)
06:00-07:00	32.8	32.8	32.8
07:00-08:00	31.6	31.6	31.6
08:00-09:00	32.4	32.4	32.4
09:00-10:00	33.9	33.9	33.9
10:00-11:00	33.2	33.2	33.2
11:00-12:00	36.2	36.2	36.2
12:00-13:00	35.1	35.1	35.1
13:00-14:00	33.9	33.9	33.9
14:00-15:00	37.4	37.4	37.4
15:00-16:00	35.3	35.3	35.3
16:00-17:00	32.6	32.6	32.6
17:00-18:00	34.2	34.2	34.2
18:00-19:00	36.2	36.2	36.2
19:00-20:00	35.9	35.9	35.9
20:00-21:00	31.8	31.8	31.8
21:00-22:00	32.5	32.5	32.5
22:00-23:00	33.6	33.6	33.6
23:00-00:00	31.5	31.5	31.5
00:00-01:00	33.5	33.5	33.5
01:00-02:00	34.3	34.3	34.3
02:00-03:00	32.6	32.6	32.6
03:00-04:00	31.2	31.2	31.2
04:00-05:00	33.9	33.9	33.9
05:00-06:00	31.5	31.5	31.5
Result	Day Means		Day Means
	Night Means		Night Means

*****End of Report*****

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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 012	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B,Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 012
Sample Description	Soil 1	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Project Area		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.76
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	786.2 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	48.1 %
04	Bulk Density	By Cylindrical Method	1.01 g/cm ³
05	Porosity	By Gravimetric Method	46.6 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018 APHA 23 rd Edn 2019 4500 Cl B IS 2720 Part 27 : 1977 (Reaff:2015) IS 10158 : 1982 (Reaff: 2019)	46.7 mg/kg
07	Magnesium as Mg		35 mg/kg
08	Chloride as Cl		58.3 mg/kg
09	Soluble Sulphate as SO ₄		0.0011 %
10	Total Phosphorus as P		4.1 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	402.3 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.77 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.03 %

*****End of Report*****

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Authorised Signatory

Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 012	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 012
Sample Description	Soil 1	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Project Area		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	32.5 %
	Sand		30.9 %
	Silt		36.6 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	15.5 mg/kg
16	Zinc as Zn		3.2 mg/kg
17	Boron as B		2.61 mg/kg
18	Potassium as K		28 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		1.06
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		2.1 mg/kg
23	Iron as Fe		3.05 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****

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Authorised Signatory

[Signature]

Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 013	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 2	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil - 2 - Tirumal		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.56
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	387.6 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	46.6 %
04	Bulk Density	By Cylindrical Method	1.04 g/cm ³
05	Porosity	By Gravimetric Method	47.8 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	50 mg/kg
07	Magnesium as Mg		44.3 mg/kg
08	Chloride as Cl		21.2 mg/kg
09	Soluble Sulphate as SO ₄		0.0018 %
10	Total Phosphorus as P		2.5 mg/kg
11	Total Nitrogen as N	APHA 23 rd Edn 2019 4500 Cl B	440 mg/kg
12	Organic Matter	IS 2720 Part 27 : 1977 (Reaff:2015)	2.10 %
13	Organic Carbon	IS 10158 : 1982 (Reaff: 2019)	1.22 %

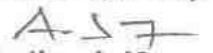
*****End of Report*****

Page 1 of 1

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2022-23/ 013	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 013
Sample Description	Soil 2	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 2 – Tirumal		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	33.5 %
	Sand		32.4 %
	Silt		34.1 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	23.3 mg/kg
16	Zinc as Zn		5.01 mg/kg
17	Boron as B		6.62 mg/kg
18	Potassium as K		15.3 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		2.55
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.09 mg/kg
23	Iron as Fe		2.02 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****



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Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

TC-9583

Report No	EHS360/TR/2024-25/ 014	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 3	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 3 Chennampatti		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.49
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	405 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	47.3 %
04	Bulk Density	By Cylindrical Method	1.06 g/cm ³
05	Porosity	By Gravimetric Method	46.6 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018	46.5 mg/kg
07	Magnesium as Mg		32.2 mg/kg
08	Chloride as Cl		44 mg/kg
09	Soluble Sulphate as SO ₄		0.0021 %
10	Total Phosphorus as P		2.05 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	420 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.05 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.19 %

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 014	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 014
Sample Description	Soil 3	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 3 Chennampatti		

S.No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	29.1 %
	Sand		33.0 %
	Silt		37.9 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	23.3 mg/kg
16	Zinc as Zn		3.01 mg/kg
17	Boron as B		4.02 mg/kg
18	Potassium as K		5.55 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		3.06
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.05 mg/kg
23	Iron as Fe		1.34 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2022-23/ 015	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 4	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 4 – Arasapatti		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.68
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	466 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	45.3. %
04	Bulk Density	By Cylindrical Method	1.01 g/cm ³
05	Porosity	By Gravimetric Method	46.8 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018 APHA 23 rd Edn 2019 4500 Cl B IS 2720 Part 27 : 1977 (Reaff:2015) IS 10158 : 1982 (Reaff: 2019)	70 mg/kg
07	Magnesium as Mg		45.2 mg/kg
08	Chloride as Cl		46.8 mg/kg
09	Soluble Sulphate as SO ₄		0.0023 %
10	Total Phosphorus as P		4.35 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	410 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.67 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.55 %

*****End of Report*****



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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 015	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 015
Sample Description	Soil 4	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil - 4 - Arasapatti		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	35.5 %
	Sand		34.2 %
	Silt		30.3 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	18.8 mg/kg
16	Zinc as Zn		4.4 mg/kg
17	Boron as B		2.01 mg/kg
18	Potassium as K		26 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		3.68
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		2.05 mg/kg
23	Iron as Fe		4.01 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

*****End of Report*****



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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 016	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 5	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 5 – Pullur		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.02
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	357 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	45.5 %
04	Bulk Density	By Cylindrical Method	1.06 g/cm ³
05	Porosity	By Gravimetric Method	47.1 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018 APHA 23 rd Edn 2019 4500 Cl B IS 2720 Part 27 : 1977 (Reaff:2015) IS 10158 : 1982 (Reaff: 2019)	66 mg/kg
07	Magnesium as Mg		40.2 mg/kg
08	Chloride as Cl		28.8 mg/kg
09	Soluble Sulphate as SO ₄		0.0021 %
10	Total Phosphorus as P		3.05 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	576.4 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.65 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.54 %

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 016	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 016
Sample Description	Soil 5	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 5 – Pullur		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	32.9 %
	Sand		31.0 %
	Silt		36.1 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	23 mg/kg
16	Zinc as Zn		2.14 mg/kg
17	Boron as B		4.3 mg/kg
18	Potassium as K		15 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		3.21
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		2.13 mg/kg
23	Iron as Fe		7.16 mg/kg
24	Cation Exchange Capacity		USEPA 9080 – 1986

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 017	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 017
Sample Description	Soil 6	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 6 Pampatti		

S. No	Test Parameters	Protocols	Results
01	pH @ 25°C	IS 2720 Part 26 - 1987 (Reaff:2016)	8.44
02	Conductivity @ 25°C	IS 14767 - 2000 (Reaff : 2016)	459 µmhos/cm
03	Water Holding Capacity	By Gravimetric Method	46.56 %
04	Bulk Density	By Cylindrical Method	1.05 g/cm ³
05	Porosity	By Gravimetric Method	48.12 %
06	Calcium as Ca	Food and Agriculture organization of the united Nation Rome 2007 : 2018 APHA 23 rd Edn 2019 4500 Cl B IS 2720 Part 27 : 1977 (Reaff:2015) IS 10158 : 1982 (Reaff: 2019)	62.4 mg/kg
07	Magnesium as Mg		26.6 mg/kg
08	Chloride as Cl		22.7 mg/kg
09	Soluble Sulphate as SO ₄		0.0015 %
10	Total Phosphorus as P		7.01 mg/kg
11	Total Nitrogen as N	IS 14684 : 1999 (Reaff:2019)	401.2 mg/kg
12	Organic Matter	IS : 2720 Part 22: 1972 (Reaff: 2015)	2.26 %
13	Organic Carbon	IS : 2720 Part 22: 1972 (Reaff: 2015)	1.31 %

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Name : Santhosh Kumar A
Designation : Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 018	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Soil	Sample Code	EHS360/ 018
Sample Description	Soil 6	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 KG	Sample Received On	29.05.2024
Sample Condition	Good	Test Commenced On	29.05.2024
Sampling Location	Soil – 6 Pampatti		

S. No	Test Parameters	Protocols	Results
14	Texture :		
	Clay	Gravimetric Method	30.1 %
	Sand		32.6 %
	Silt		37.3 %
15	Manganese as Mn	USEPA 3050 B – 1996 & USEPA 6010 C - 2000	28.2 mg/kg
16	Zinc as Zn		5.15 mg/kg
17	Boron as B		1.04 mg/kg
18	Potassium as K		16.4 mg/kg
19	Cadmium as Cd		BDL (DL : 1.0 mg/kg)
20	Total Chromium as Cr		5.05
21	Copper as Cu		BDL (DL : 1.0 mg/kg)
22	Lead as Pb		1.05 mg/kg
23	Iron as Fe		2.02 mg/kg
24	Cation Exchange Capacity	USEPA 9080 – 1986	33 meq/100g of soil

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Name : Santhosh Kumar A
Designation : Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 019	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kurayur Tank		

S.No.	Parameters	Test Method	RESULTS
Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.55
4	Conductivity @ 25°C	IS 3025 Part 14:2013	990 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	4.5 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	584 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	195.86 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	34.5 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	26.7 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	187 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	136 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	71.4 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.31 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.25 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	7.12 mg/l

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/019	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/019
Sample Description	Surface Water (SW-1)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kurayur Tank		
S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	9.7 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	50 mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.4 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	2.31 mg/l
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	22.3 mg/l
	Discipline: Biological	Group: Water	
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	510 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	140 MPN/100ml

*****End of Report*****



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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 020	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/020
Sample Description	Surface Water (SW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kamandala Stream Sivarakottai		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical		
1	Colour	IS 3025 Part 4:1983	5 Hazen
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.43
4	Conductivity @ 25°C	IS 3025 Part 14:2013	917 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	3.1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	541 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	190.20 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	32.4 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	26.6 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	170 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	110 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	43.1 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.17 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.29 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	5.9 mg/l

*****End of Report*****

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 020	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/020
Sample Description	Surface Water (SW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kamandala Stream Sivarakottai		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	BOD @ 27°C for 3 days	IS 3025 Part 44:1993 (Reaff:2019)	7.7 mg/l
32	Chemical Oxygen Demand	IS 3025 Part 58:2006 (Reaff:2017)	30 mg/l
33	Dissolved Oxygen	IS 3025 Part 38:1989 (Reaff:2019)	5.2 mg/l
34	Barium as Ba	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL:0.05 mg/l)
35	Ammonia (as total ammonia-N)	IS 3025 Part 34-1988 (Reaff. 2019)	1.02 mg/l
36	Sulphide as H ₂ S	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:0.01 mg/l)
37	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
38	Total Arsenic as As	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
39	Total Suspended Solids	IS 3025 Part 17 -1984 (Reaff:2017)	14.4 mg/l
	Discipline: Biological	Group: Water	
40	Total Coliform	APHA 23 rd Edn. 2017:9221B	470 MPN/100ml
41	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	110 MPN/100ml

*****End of Report*****



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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2022-23/ 021	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/021
Sample Description	Ground Water (WW-1)	Sample Collected Date	28.05.2024
Qty. of Sample	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Near Project Area		

S.No.	Parameters	Test Method	RESULTS
Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.31
4	Conductivity @ 25°C	IS 3025 Part 14:2013	959 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	566 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	195.03 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	36.8 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	25.1 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	180.4 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	124 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	55.7 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.22 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.20 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	4.4 g/l

*****End of Report*****

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Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2022-23/ 021	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/021
Sample Description	Ground Water (WW-1)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Near Project Area		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	200 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

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 Name: Santhosh Kumar A
 Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 022	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Chennampatti		

S.No	Parameters	Test Method	RESULTS
Discipline: Chemical			
1	Colour	IS 3025 Part 4:1983	5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.88
4	Conductivity @ 25°C	IS 3025 Part 14:2013	824 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	1.0 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	486 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	157.71 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	28.6 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	21 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	150 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	97.5 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	63.7 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.18 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.16 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	5.5 mg/l

*****End of Report*****



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Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 022	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/022
Sample Description	Ground Water (WW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Semmpalayam		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	114 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****



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Authorised Signatory

[Signature]

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

TC-9583

Report No	EHS360/TR/2024-25/ 023	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (BW-1)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Near Project Area		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical		
1	Colour	IS 3025 Part 4:1983	5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983	7.61
4	Conductivity @ 25°C	IS 3025 Part 14:2013	993 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984	1.0 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984	586 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009	198.51 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991	32.1 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994	28.8 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986	180 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988	131 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986	75 mg/l
13	Iron as Fe	IS 3025 Part 53:2003	0.29 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.22 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988	5.3 mg/l

*****End of Report*****



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Authorised Signatory

[Signature]
Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 023	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/023
Sample Description	Ground Water (BW-1)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Near Project Area		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	150 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****

Page 1 of 1

Verified by



Authorised Signatory

A S K

Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.

TEST REPORT

Report No	EHS360/TR/2024-25/ 024	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kadampadi		

S.No.	Parameters	Test Method	RESULTS
	Discipline: Chemical		
1	Colour	IS 3025 Part 4:1983 (Reaff:2017)	5
2	Odour	IS 3025 Part 5:2018	Agreeable
3	pH at 25°C	IS 3025 Part 11:1983 (Reaff:2017)	8.01
4	Conductivity @ 25°C	IS 3025 Part 14:2013 (Reaff:2019)	1040 µmhos/cm
5	Turbidity	IS 3025 Part 10:1984 (Reaff:2017)	1 NTU
6	Total Dissolved Solids	IS 3025 Part 16:1984 (Reaff:2017)	613 mg/l
7	Total Hardness as CaCO ₃	IS 3025 Part 21:2009 (Reaff:2019)	218.40 mg/l
8	Calcium as Ca	IS 3025 Part 40:1991 (Reaff:2019)	38.1 mg/l
9	Magnesium as Mg	IS 3025 Part 46:1994 (Reaff:2019)	30.0 mg/l
10	Total Alkalinity as CaCO ₃	IS 3025 Part 23:1986 (Reaff:2019)	215 mg/l
11	Chloride as Cl	IS 3025 Part 32:1988 (Reaff:2019)	135 mg/l
12	Sulphate as SO ₄	IS 3025 Part 24:1986 (Reaff:2019)	65.5 mg/l
13	Iron as Fe	IS 3025 Part 53:2003 (Reaff:2019)	0.34 mg/l
14	Residual Free Chlorine	IS 3025 Part 26:1986 (Reaff:2019)	BDL (DL:0.1 mg/l)
15	Fluoride as F	APHA 23 rd Edn. 2017:4500 F,D	0.25 mg/l
16	Nitrate as NO ₃	IS 3025 Part 34:1988 (Reaff:2019)	6.2 mg/l

*****End of Report*****



Verified by



Authorised Signatory

Name: Santhosh Kumar A
Designation: Quality Manager

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TEST REPORT

Report No	EHS360/TR/2024-25/ 024	Report Date	04.06.2024
Site Location	THIRU. D. SAKTHIVEL ROUGH STONE AND GRAVEL QUARRY S.F. Nos.: 217/2A(P),2B,4, 221/3(P),4A(P), 4B(P), 222/1(P),2,3A,3B1 & 223/2B, Thirumal Village, Kallikudi Taluk, Madurai District, Tamil Nadu		
Sampling Method	SOP Method	Sample Drawn by	Laboratory
Sample Name	Water	Sample Code	EHS360/024
Sample Description	Ground Water (BW-2)	Sample Collected Date	28.05.2024
Qty. of Sample Received	2 Litres	Sample Received On	29.05.2024
Sample Condition	Fit for Analysis	Test Commenced On	29.05.2024
Sampling Location	Kadampadi		

S.No.	Parameters	Test Method	RESULTS
17	Copper as Cu	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.01 mg/l)
18	Manganese as Mn	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
19	Mercury as Hg	USEPA 200.8	BDL (DL:0.0005 mg/l)
20	Cadmium as Cd	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.001 mg/l)
21	Selenium as Se	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
22	Aluminium as Al	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
23	Lead as Pb	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.005 mg/l)
24	Zinc as Zn	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
25	Total Chromium as Cr	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.02 mg/l)
26	Boron as B	IS 3025 Part 65:2014 (Reaff:2019)	BDL(DL : 0.05 mg/l)
27	Mineral Oil	IS 3025 Part 39-1991 (Reaff. 2019)	BDL(DL : 0.01 mg/l)
28	Phenolic compounds as C ₆ H ₅ OH	IS 3025 Part 43-1992(Reaff: 2019)	BDL (DL:0.0005 mg/l)
29	Anionic Detergents (as MBAS)	IS 13428 – 2005 (Reaff:2019) (Annex K)	BDL (DL:0.01 mg/l)
30	Cyanide as CN	IS 3025 Part 27-1986 (Reaff. 2019)	BDL (DL:0.01 mg/l)
31	Barium as Ba	IS 3025 Part 44:1993 (Reaff:2019)	BDL(DL:0.05 mg/l)
32	Ammonia (as total ammonia-N)	IS 3025 Part 58:2006 (Reaff:2017)	BDL (DL:0.01 mg/l)
33	Sulphide as H ₂ S	IS 3025 Part 38:1989 (Reaff:2019)	BDL (DL:0.01 mg/l)
34	Molybdenum as Mo	IS 3025 Part 65:2014 (Reaff:2019)	BDL (DL:0.02 mg/l)
35	Total Arsenic as As	IS 3025 Part 34-1988 (Reaff. 2019)	BDL (DL:0.005 mg/l)
36	Total Suspended Solids	IS 3025 Part 29-1986 (Reaff: 2019)	BDL (DL:1.0 mg/l)
	Discipline: Biological	Group: Water	
37	Total Coliform	APHA 23 rd Edn. 2017:9221B	180 MPN/100ml
38	<i>Escherichia coli</i>	APHA 23 rd Edn. 2017:9221F	< 1.8 MPN/100ml

*****End of Report*****



Verified by

[Signature]

Authorised Signatory

[Signature]
Name: Santhosh Kumar A
Designation: Quality Manager

Note: 1. The test results are only to the sample submitted for test. 2. Any correction of the test report in full or part shall invalidate the report. 3. Sample will be retained for 15 days from the date of reporting except in case of regulatory samples or specifically instructed by client. 4. Perishable samples will be discarded immediately after reporting. 5. Under no circumstance's lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issued of test report.



National Accreditation Board for Education and Training



Certificate of Accreditation

Geo Exploration & Mining Solutions, Salem

No. 17, Advaita Ashram Road, Fairlands, Salem – 636 004, Tamilnadu, India.

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 opencast only	1	1 (a) (i)	A
2	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
3	Building and construction projects	38	8(a)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Jan 06, 2023 and posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2684 dated Feb 20, 2023. The accreditation needs to be renewed before the expiry date by Geo Exploration & Mining Solutions, Salem following due process of assessment.

Sr. Director, NABET
Dated: Feb 20, 2023

Certificate No.
NABET/EIA/2225/RA 0276

Valid up to
August 06, 2025

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