

# **DRAFT OF ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENT MANAGEMENT PLAN**

**FOR OBTAINING**

**Prior Environmental Clearance under EIA Notification – 2006**

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

**“B1” CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND/NEW QUARRY**

**CLUSTER EXTENT = 8.45.17 Hectares**

**(1 Proposed quarry +2 Existing quarries)**

**THIRU.P. SASIKUMAR ROUGH STONE & GRAVEL QUARRY CLUSTER**

**Keeranur Village, Kangeyam Taluk, Tiruppur District, Tamil Nadu State.**

**Prepared as per ToR obtained vide Lr.No. SEIAA- TN/F.No.8549/ToR-1139/2020 Dated:08.04.2022.**

## **NAME AND ADDRESS OF THE PROPOSED PROJECT PROPONENT**

<b>Name and Address</b>	<b>Extent &amp; S.F.No.</b>
<b>Thiru.P.Sasikumar, S/o. Palanisamy, No.5/257, Keeranur Village, Kangeyam Taluk, Tiruppur District-638701, Tamil Nadu.</b>	<b>2.00.0 Ha &amp; 442 (Part)</b>

## **ENVIRONMENTAL CONSULTANT**

### **GEO TECHNICAL MINING SOLUTIONS**



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

**Valid till : 29<sup>th</sup> Dec.2023**

## **ENVIRONMENTAL LAB**

**RICHARDSON & CRUDDAS (1972) LIMITED**

**NABL Accredited & Recognised Laboratory,**

**No.1/61, VOC Nagar Main Road, Maduravoyal,**

**Chennai, Tamilnadu.**

For easy representation of proposed and existing quarries in the cluster are given unique codes and identified and studied in this EIA & EMP Report.

### List of Quarries within 500 Meter Radius

PROPOSED QUARRY						
CODE	Name of the Owner	Village	S.F. Nos	Extent	Collector's proceedings No. & Date	Status
P1	P. Sasikumar	Keeranur	442 part	2.00.0 ha	-	ToR obtained vide Letter No: SEIAA-TN/F.No.8549/SEAC/ToR -1139/2020 Dated:08.04.2022
TOTAL				2.00.0 ha		
EXISTING QUARRIES						
CODE	Name of the Owner	Village	S.F. Nos.	Extent	Collector's proceedings No. & Date	Status
E1	P. Sasikumar	Keeranur	449 part, 450	4.44.0 ha	61 /Mines/ 2015 dated 21.9.2016	21.09.2016 to 20.09.2021
E2	S.P.Bala subramania m	Keeranur	603/3 (P), 603/4(P)	2.01.17 ha	125 /Mines/ 2017 dated 1.10.2018	01.10.2018 -30.09.2023
TOTAL				6.45.17 ha		
TOTAL CLUSTER EXTENT				8.45.17 ha		
ABANDONED / EXPIRED QUARRIES						
CODE	Name of the Owner	Village	S.F. Nos.	Extent	Collector's proceedings No. & Date	Status
EX1	AM. Palanisamy	Keeranur	484/1,2	2.41.0 ha	1009 / 2009 / Mines dated 17.3.2010	17.03.2010 - 16.3.2015 expired
EX2	B.Vijaya lakshmi	Keeranur	441/A1 , 441 /A2, 441	2.78.0 ha	166/Mines /2011 DATE 3.7.2012	03.07.2012-02.07.2017 expired
EX3	N. Subramania m	Keeranur	442, 450 (P)	2.15.0 ha	4037 4/2004/X-1 dated 27.09.2004	27.09.2004–26.09.2009 expired

Source: i). DD Letter – Rc.No.1475/2020/Mines/ dated 26.02.2021.

Note:

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

## TERMS OF REFERENCE (ToR) COMPLIANCE

Thiru. P. Sasikumar

**“ToR issued vide Letter No. SEIAA-TN/F.No. 8549/SEAC/ToR-1139/2020, Dated:**

**08.04.2022**

SPECIFIC CONDITIONS		
1.	The Proponent shall include the details of existing quarry operated by same proponent in the EIA report along with compliance report.	The proponent has operated one existing quarry about 4.44.0ha approved EC by SEIAA-TN with mineable reserve quantity of 142250cu.m rough stone and 25764 cu.m of gravel (Lr. No. SEIAA-TN/F.No.5252/1 (all EC.No: 3526/2015 dated: 10.08.2016). The details of existing quarry EC report have been included in EIA report Annexure No.V, Refer: p.no.297.
2.	The Proponent shall carry out the cumulative & comprehensive impact study due to mining operations carried out in the quarry cluster specifically with reference to the environment in terms of air pollution, water pollution, & health impacts, accordingly the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	Cumulative impact study dealing with air pollution, water pollution, & health impacts has been discussed in chapter VII and section 7.4. Refer: pp. 158-166. Based on the cumulative study results, environmental management plan has been prepared and included in chapter X. Refer: pp. 174-189.
3.	The entire Cluster of mine lease area shall be video graphed through Drone and submit the same along with EIA report.	Drone survey images for the entire cluster will be submitted along with the final EIA report.

4	<p>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>a).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>b).Quantity of minerals mined out.</p> <p>c)..Highest production achieved in any one year</p> <p>d)Detail of approved depth of mining.</p> <p>e).Actual depth of the mining achieved earlier</p> <p>f).Name of the person already mined in that leases area.</p> <p>g).If EC and CTO already obtained, the copy of the same shall be submitted.</p> <p>h).Whether the mining was carried out as per the approved mine plan (or EC if issued with stipulated benches.</p>	<p>Not Applicable.</p> <p>This project proposal comes under fresh lease category for quarrying of Rough Stone &amp; Gravel.</p> <p>Precise Area Communication Letter R.C.1475Mines/2020, Dated:23.02.2021.Approved mining plan Enclosed annexure-III Refer p.no.273.</p>
5.	<p>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>Project area is superimposed on Satellite imagery is enclosed in Chapter II and Figure No. 2.2. Refer: p.no.15</p> <p>Project area lease boundary coordinates superimposed on Toposheet details are given in Chapter II and Figure No. 1.3. Refer: p.no. 7</p> <p>Surface Features around the project area covering 10km radius map has</p>



		<p>been included in Chapter II and Figure No. 2.4. Refer: p.no 17</p> <p>Geology map of the project area covering 10km radius map has been included in Chapter II and Figure No. 2.8. Refer: p. no. 23</p> <p>Geomorphology Map of the Study Area covering 10 km radius map has been included in Chapter II and Figure No. 2.9. Refer: p.no. 24</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.	The photographs of fencing and green belt will be submitted along with final EIA report.
7.	The proponent shall furnish the action plan for plantation of 500 Nos of Trees and the same shall be included in EMP report	The details have been provided in the Chapter IV and section 4.6.2.2. Refer: pp.135-137
8	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, and proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	<p>The details of geological reserves and mineable reserves, and planned production capacity have been given in chapter II and Table 2.4. Refer: p.20</p> <p>The proposed working methodology has been discussed in chapter II and sections 2.5. Refer: p.33.</p> <p>The anticipated impacts of the mining operations on the surrounding environment and the proposed mitigation measures for the same have been provided in chapter XI and Table 11.8.</p>

		Refer pp.196-199.
9	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.	As per the provisions of Mines Act'1952 and the MMR, 1961, the manpower required for carrying out the quarrying operations to ensure safety and protect the environment has been discussed in Chapter II and section 2.7.5. Refer: p.39.
10	The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	Details on the nearest surface water bodies such as rivers, tanks, canals, ponds etc. have been given in chapter III and Table 3.3. Refer: p.46.  Detailed hydrogeological studies were conducted for the period of 3 months (March-May,2022) and the results have been discussed in chapter III and section 3.2.5. Refer: pp.58-65.
11	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The details have been provided in chapter III and sections 3.1-3.6. Refer: pp.46-107.  Traffic details have been given in chapter II and section 2.6.2. Refer: pp.34-37.
12	A tree survey study shall be carried out (nos. name of the species, age, diameter etc.,) both	Lease applied area is devoid of major vegetation. Now, it is

	withing the mining leases applied area & 300m buffer zone and its management during mining activity.	proposed to plant about 500 Nos of trees during the Mining plan period for this proposed project. The details of green belt development proposal have been included in Chapter IV and section 4.6.2.2. Refer: pp.135-137.
13.	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Mine closure details have been provided in chapter II and sections 2.4.3-2.4.5. Refer: pp.30-32. Mine closure plan plates have been given in chapter II and Figure 2.12. Refer: pp.28 and Annexure III.
14	The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	The same will be updated in the final EIA report after public hearing meeting.
15.	The recommendation for the issue of “Terms of Reference” is subjected 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.No758/2016, 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).	Agreed & noted.
16.	The purpose of green belt around the project is to capture the fugitive emissions and to attenuate the noise generated, in addition to the improvement in the aesthetics. A wide	The detailed greenbelt development plan has been provided in chapter IV and section 4.6.2.2 Refer: p.135-137.

	<p>range of indigenous plant species should be planted in and around the premise in consultation with the DFO, District/State Agriculture University. The plant species should have thick canopy cover, perennial green nature, native origin and large leaf areas. Medium size trees and small trees alternating with shrubs shall be planted. Miyawaki method of planting, i.e., planting different types of trees at very close intervals may be tried which will give a good green cover. Greenbelt needs to be developed in the periphery of the mines area so that at the closure time the trees would have grown well.</p>	
17.	<p>Taller/one year old Saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted in proper spacing 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</p>	<p>Agreed &amp; noted.</p>
18.	<p>A Disaster management Plan shall be prepared and included in the EIA/EMP Report.</p>	<p>Details regarding disaster management plan have been provided in Chapter VII and Section 7.3. Refer: pp.154-158.</p>
19.	<p>A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.</p>	<p>The details have been provided in chapter VII and section 7.2. Refer: pp.151-154.</p>

20.	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The socio – economic studies were carried out and the result have been discussed in chapter III and section 3.7. Refer: pp.108-114.
21	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.	Agreed and noted.
22	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.	Agreed and noted.
<b>ADDITIONAL CONDITIONS</b>		
1	The project proponent shall submit the details of habitation for 300m radius from the proposed mining lease area from the competent authority.	The village administrative officer's (VAO) 300m radius certificate has been attached in annexure -IV Refer p.no.296, and 300m radius Google earth image included in chapter I Figure No.1.1 Refer p.no..3.
2	As per the MoEF&CC office Memorandum F.No. 22-65/2017-IA.III dated: 30.09.2020,	Agreed and noted

	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.	
3	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.	Agreed and noted
4	The environmental impact assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed bank and suggest measures to maintain natural ecosystem.	The ecological details have been provided in chapter III and section 3.5, Refer pp.82-107.
5	Action should specifically be suggested for sustainable management of the area and restoration of ecosystem for flow of goods and services.	Agreed and noted.
6.	The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.	Agreed and noted.
7.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	All data regarding soil were collected. The matter regarding soil's physico-chemical conditions, soil health, etc., has been discussed in chapter III and section 3.1.6, Refer pp.47-51
8	The Environmental Impact Assessment should study impact on biodiversity, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	This report has included studies of ecology and biodiversity covering vegetation, endemic, vulnerable and endangered indigenous flora and fauna in chapter III section 3.5,

		Refer pp. 82-107. According to the ecological report, there is no endemic, vulnerable and endangered indigenous flora and fauna.
9	The Environmental Impact Assessment should study impact on standing trees and the trees should be numbered.	Agreed and noted.
10.	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	Agreed and noted.
11.	The Environmental Impact Assessment should hold detailed study on EMP with budget for green belt development and mine closure plan including disaster management plan.	The EMP details have been given in chapter IV and Table 4.14 Refer p.no.137. and chapter X and Table 10.11. Refer pp185-188.
12	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock	Agreed and noted.
13	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways.	Not Applicable as there are no protected areas such as Reserve Forests, National Parks, Corridors and Wildlife pathways.
14	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock	Agreed and noted.
15	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	Agreed and noted.
16	The project proponent shall study and furnish the impact on aquatic plants and	Agreed and noted.

	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	
17	The project proponent shall study and furnish the possible pollution due to plastic and micro plastic on the environment. The ecologic and impacts of plastic micro plastic on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported	Plastic Management Action Plan is included in Chapter -VII and section 7.5 Refer: p.no.167.
18	The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.	Agreed and noted.
19	The project proponent shall study on impact of different pathways and migration	Agreed and noted.
<b>STANDARD TERMS OF REFERENCE</b>		
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	Not applicable. This is not a violation category project. This proposal falls under B1 category.
2	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The proposed site for quarrying is a patta land. Document is enclosed along with the approved mining plan in Annexure III.



3.	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	Noted and agreed.
4.	All corner coordinates of the mine lease area, superimposed on a high-resolution imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of the project area have been provided in chapter II and Table 2.2 & figure 2.2 Refer pp13 & 15.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geology map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Geology map covering 10km radius from the project area has been shown in chapter II and Figure 2.8. Refer p.23 and geomorphology map in Figure 2.9, Refer p.no.24.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The applied area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government.
7.	It should be clearly stated whether the proponent company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt	The proponent has framed Environmental Policy and the same has been discussed in chapter X and section 10.1, Refer p.no.174.

	<p>out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.</p>	
8.	<p>Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.</p>	<p>It is an opencast quarrying operation involving mechanized method. As the rock is a hard, compact and homogeneous body, the height 5m and width of the bench 5m will be maintained as with 90° bench angles.</p> <p>Quarrying activities will be carried out under the supervision of competent persons like Mines Manager, Mines Foreman and Mining Mate.</p> <p>Necessary permissions will be obtained from DGMS after obtaining environmental clearance.</p>
9.	<p>The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine/ lease period.</p>	<p>The study area considered for this study is of 10 km radius and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.</p>

10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in chapter III and Table 3.3 Refer p.no.46. Land use plan of the project area showing pre-operational, operational and post-operational phases are discussed in chapter II.and Table 2.3, Refer p.no,13.
11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	Not Applicable. No dumps have been proposed outside the lease area.
12.	Certificate from the competent authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Not Applicable. There is no forest land involved within the proposed project area and the proposed project area is a patta land. Approved mining plan has been enclosed in Annexure III.

13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the project including deposition of Net Present Value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not Applicable.  The proposed project area does not involve any forest land.
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable.  There are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project, chapter III Refer p.no.86
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is found within the study area. The matter has been discussed in chapter III Refer p.no.86
16	A study should be done to ascertain the impact of the mining project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Not Applicable.  There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in chapter III Refer p.no.105.
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar Site, Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location	Not Applicable.  There are no National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/ Elephant Reserves within 10 km radius from the

	map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	periphery of the project area, chapter III Refer p.no.106
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	<p>A detailed biological study was carried out in both core and buffer zones and the results have been discussed in chapter III Refer p.no.106.</p> <p>There is no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.</p>
19	Proximity to areas declared as 'Critically Polluted' or the project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as	<p>Not Applicable.</p> <p>Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range.</p>

	the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	
20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable. The project doesn't attract the C.R.Z. Notification, 2018.
21	R&R plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programs prepared and submitted accordingly, integrating the sectoral programs of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their	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.

	R&R and socio-economic aspects should be discussed in the report.	
22	<p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December – February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<p>Baseline data were collected for the period of March – May 2022 as per CPCB notification and MoEF &amp; CC Guidelines. Primary baseline data and the results have been included in chapter III and sections 3.0-3.5 pp.40-81.</p>
23	<p>Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly</p>	<p>Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 9.6.1. The model results have been given in chapter IV and section 4.4.1.3, Refer pp.121-127.</p>

	indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing predominant wind direction may also be indicated on the map.	
24	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project, its availability and source have been provided in chapter II and Table 2.15, p.38 and chapter IV & Table 4.1, p.118 under
25	Necessary clearance from the competent authority for drawl of requisite quantity of water for the project should be provided.	Agreed & noted.
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression.  The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season.
27	Impact of the project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in chapter IV and section 4.3, Refer pp. 117-119
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be	Not Applicable.  The ground water table is found at the depth of 50-55 m below ground level.



	<p>provided. In case the working will intersect groundwater table, a detailed hydrogeological study should be undertaken and report furnished. The Report inter-alia shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy should be furnished.</p>	<p>The depth of quarry first five years is 17m.BGL. Therefore, the mining activity will not intersect the ground water table Refer pp 63-65.</p>
29	<p>Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.</p>	<p>Not Applicable. There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated.</p>
30	<p>Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.</p>	<p>The Highest elevation of the project area is 267m AMSL. Ultimate depth of the mine is 42m below ground level (BGL). Depth to the water level in the area is 50-55m BGL.</p>
31	<p>A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed prior to commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be</p>	<p>Greenbelt development plan has been given in chapter IV and section 4.6.2,2 Refer pp.135-137.</p>

	covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	
32	Impact on local transport infrastructure due to the project should be indicated. Projected increase in truck traffic as a result of the project in the present road network (including those outside the project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project proponent shall conduct impact of transportation study as per Indian Road Congress Guidelines.	Traffic density survey was carried out to analyse the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in chapter II and section 2.6.1, Refer pp.34-37
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in chapter II and section.2.6.4 Refer p.no.38.
34	Conceptual post mining land use and reclamation and restoration of mined out areas (with plans and with adequate	Mine closure plan is a part of approved mining plan enclosed in Annexure III.

	number of sections) should be given in the EIA report.	
35	Occupational health impacts of the project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts of the project and preventive measures have been explained in detail in chapter IV and section 4.8, Refer pp.142-143.
36	Public health implications of the project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in chapter VIII and sections 8.5.1 & 8.5.2 Refer pp.171-172.
37	Measures of socio-economic significance and influence to the local community proposed to be provided by the project proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the Socio-Economic environment by offering employment for 24 people directly as discussed in chapter VIII and section 8.1 Refer p.no.170.
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed environment management plan for the project to mitigate the anticipated impacts has been included in chapter X Refer pp.174-189.

39	Public hearing points raised and commitment of the project proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP report of the project.	The outcome of public hearing will be updated in the final EIA/EMP report.
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending in any court against this project.
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project cost is Rs. 74,25,000/- CER cost is Rs. 165,000/- In order to implement the environmental protection measures, an amount of Rs.16.24 lakhs as capital cost and Rs.6.15 lakhs as recurring cost is proposed considering present market scenario for the proposed project in chapter X and Table 10.11 Refer p.no.185-188.
42	A Disaster management plan shall be prepared and included in the EIA/EMP report.	Details regarding disaster management plan have been provided in section 7.3, pp.154-158.
43	Benefits of the project if the project is implemented should be spelt out. The benefits of the project shall clearly indicate environmental, social, economic, employment potential, etc.	Benefits of the project details have been given in chapter VIII Refer p.no,170 – 173.
44	<b>Besides the above, the below mentioned general points are also to be followed:</b>	
a)	Executive summary of the EIA/EMP report	Enclosed as a separate booklet.

b)	All documents to be properly referenced with index and continuous page numbering.	All the documents have been properly referenced with index and continuous page numbering.
c)	Where data are presented in the report, especially in tables, the period in which the data were collected and the sources should be indicated.	List of tables and source of the data collected have been mentioned.
d)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project	Baseline monitoring reports are enclosed with this report in chapter III. Original Baseline monitoring reports will be submitted in the final EIA report during appraisal.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	Not Applicable.
f)	The questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	That will be enclosed along with final EIA/EMP report.
g)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009, which are available on the website of this Ministry, should be followed.	Noted & agreed. Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009 have been followed.
h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought,	Not applicable.

	as the ToR may also have to be altered. Post public hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	
i)	As per the circular No. J-11011/618/2010-IA. II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Not applicable.
j)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface & geological plans have been included in chapter II p.no 26-27 and Approved mining plan Annexures III. Progressive closure plan and sections has been included in chapter II p.no. 28 Approved mining plan Annexures III.

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## **CHAPTER I**

### **INTRODUCTION**

#### **1.0 PREAMBLE**

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and is 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.

This EIA report has been prepared by considering cumulative load of 1 proposed and 2 existing rough stone and gravel quarries in the cluster. The total extent of the cluster, calculated as per MoEF & CC Notification vide S.O. 2269(E) dated 1<sup>st</sup> July 2016 is 8.45.17ha in Keeranur Village, Kangayam Taluk, Tiruppur District, and Tamil Nadu State. This EIA report has been prepared in compliance with ToR obtained vide Letter No. SEIAA-TN/F.No.8549/ToR-1139/2020 dated 08.04.2022.

For preparing this EIA report, the baseline data was collected for the period of March to May, 2022. This EIA and EMP report has included the cumulative environmental impact assessment study basing on cumulative impacts arising out of the projects in the cluster, and a detailed Environmental Management Plan (EMP) to minimize the adverse impacts of the mining projects.

#### **1.1 Purpose of the Report**

The Ministry of Environment and Forests, Govt. of India, through its EIA notification S.O. 1533(E) of 14<sup>th</sup> September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14<sup>th</sup> August 2018 has classified Mining Projects under two categories, i.e. A ( $> 100$  ha) and B ( $\leq 100$  ha), as given in 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 is mandatory for all areas falling in Category “B1”, followed by appraisal by SEAC/ SEIAA.



As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 100 ha, the proposed project falls under the category B2 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance.

## 1.2 Identification of Project and Project Proponent

**Table 1.1 Salient Features of the Proposed Project Site**

Name of the Project	Keeranur Rough stone and gravel quarry Project
Name of the Mine Owner	Thiru. P.Sasikumar
S.F. Nos.	442 (Part)
Extent	2.00.0 ha.
Land Type	Patta Land (Non-Forest)
Village Taluk and District	Keeranur Village, Kangayam Taluk, Tiruppur District.

Source: Approved mining plan.

**Table 1.2 Details of Project Proponent**

<b>Name of the Project Proponent</b>	<b>Thiru. P.Sasikumar,</b>
<b>Address</b>	S/o. Palanisamy, No.5/257, Keeranur Village, Kangayam Taluk, Tiruppur District – 638 701, Tamil Nadu.
<b>Mobile</b>	+91 9894544917
<b>Status</b>	Proprietor

Source: Approved mining plan.

## 1.3 Brief Description of the Project

The quarrying operations are to be carried out by opencast mechanized mining method with bench height and width of 5m each by deploying Jack hammer drilling & Slurry explosives during blasting. Hydraulic excavator and tippers are used for loading and transportation. Rock Breakers are deployed to avoid secondary blasting.

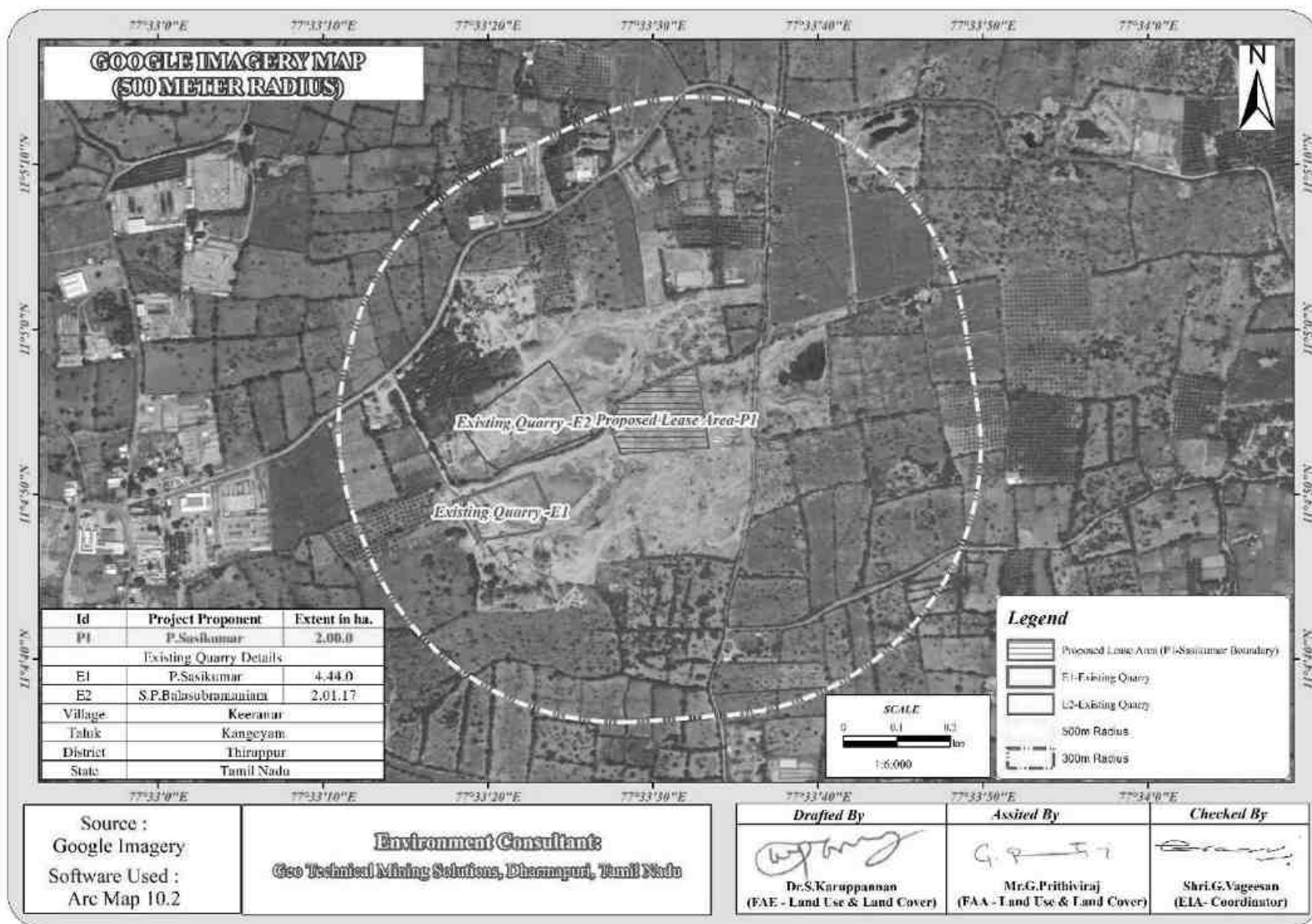


Figure 1.1 Satellite imagery showing cluster of quarries within 500m radius

**Table 1.3 Brief Description of the Project (P1)**

Name of the Quarry	Keeranur rough stone and gravel quarry	
Name of the Mine Owner	Thiru. P.Sasikumar	
S.F. Nos	442 (Part)	
Nature of Land	Patta land	
Toposheet No.	58 E/12	
Latitude between	11°04'52.40"N to 11°04'57.75"N	
Longitude between	77°33'27.41"E to 77°33'33.38"E	
Highest Elevation	267m AMSL	
Maximum Depth of Mining	42m BGL (2m gravel + 40m rough stone)	
Geological Resources	Rough Stone in m <sup>3</sup>	Gravel in m <sup>3</sup>
	7,98,080	39,904
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel in m <sup>3</sup>
	2,87,800	30,888
Proposed Production (up to 16m BGL)	1,44,275/5 years	30888/3 years
Ultimate Pit Dimension	157m (L) x 101m (W) x 42m (D) bgl	
Method of Mining	Opencast mechanized mining method involving drilling and blasting	
Topography	The applied lease area exhibits a plain topography. The area has gentle sloping towards Northeast side.	
Machinery proposed	Jack Hammer	4 Nos.
	Compressor	1 Nos.
	Excavator with Bucket / Rock Breaker	1 Nos.
	Tippers	3Nos.
Blasting Method	Controlled blasting method using shot hole drilling and slurry explosive of 30-35mm diameter is proposed to be used for shattering and heaving effect for removal and winning of rough stone.	
Proposed Manpower Deployment	24 Nos.	
Project Cost	Rs.74,25,000/-	
CER Cost @ 2% of Project Cost	Rs.1,49,000/-	
Nearby Water Bodies	Orathuppalayam Reservoir	3.5km-NW

	Noyyal River	3 km-N
Greenbelt Development Plan	Proposed to plant 300 trees in 2200 Sq.m area along the 7.5 m Safety Zone	
Proposed Water Requirement	4.3 KLD	
Nearest Habitation	960m – SW	

Source: Approved mining plan

### 1.3.1 Location of the Project

- ❖ The proposed quarry project falls in 1 km North-eastern side of Keeranur Village, Kangayam Taluk and Tiruppur District.
- ❖ The Keeranur Village is located about 8 km Northern side of Kangayam Taluk, 24km Southeastern side of Tiruppur District.
- ❖ The area is marked in the Survey of India, Toposheet No 58-E/12. The area lies between the Latitudes of 11°04'52.40"N to 11°04'57.75"N and Longitude between: 77°33'27.41"E to 77°33'33.38"E.

Source: Survey of India Toposheet 58-E/12

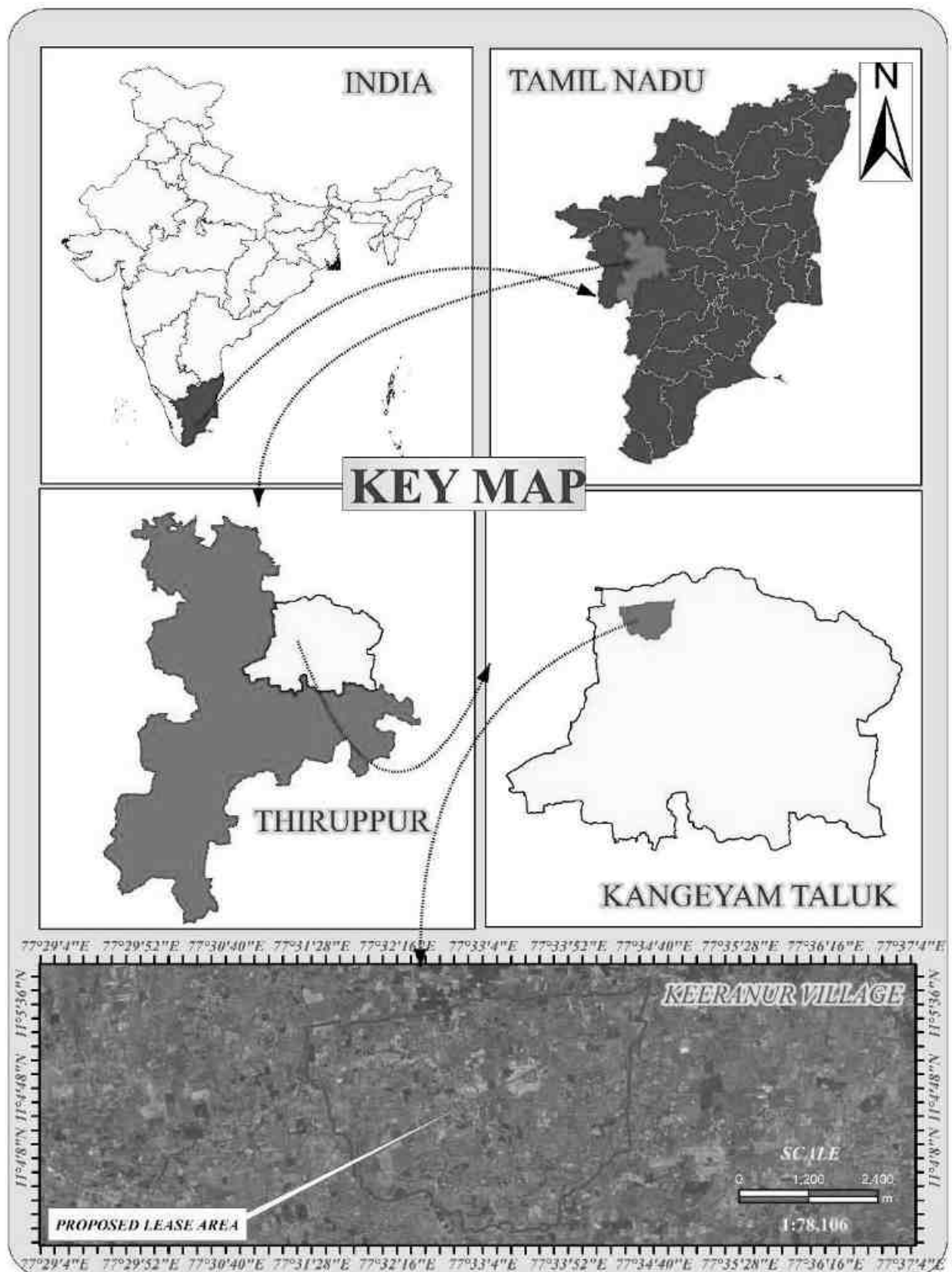


Figure 1.2 Key Map showing the location of the proposed project site



## **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

### **1.4.1 Screening**

- ❖ The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 20.11.2020 and 19.02.2021.
- ❖ Precise Area Communication Letter was issued by the Deputy Director, Tiruppur vide R.C.No.1475/Mines/2020 dated 23.02.2021.
- ❖ The Mining Plan was prepared by Recognized Qualified Person and approved by Deputy Director, Dept. of Geology and Mining, Tiruppur District, vide R.C.No. R.C.1475/ 2020/ Mines dated 26.02.2021.
- ❖ 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 on 04.05.2021.

### **1.4.2 Scoping**

**Proponent: Thiru. P.Sasikumar**

- ❖ The proposal was placed in 253<sup>rd</sup> SEAC meeting held on 11.03.2022 and the committee recommended for issue of ToR.
- ❖ The proposal was considered in 497<sup>th</sup> SEIAA Authority meeting held on 07.04.2022 and issued ToR vide Letter No. SEIAA-TN/F. No. 8549/ToR-1139/2020 dated 08.04.2022.

### **1.4.3 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.

#### **1.4.4 Appraisal**

Appraisal refers to 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. The report has been prepared using the following references:

- ❖ Guidance Manual of Environmental Impact Assessment for Mining of Minerals, Ministry of Environment and Forests, 2010
- ❖ EIA Notification, 14<sup>th</sup> September, 2006
- ❖ ToR Lr No. SEIAA-TN/F.No. 8549/SEAC/ToR-1139/2020 Dated 08.04.2022
- ❖ Approved Mining Plan of Proposed Project.

#### **1.5 Terms of Reference (ToR)**

Compliance to ToR issued vide –

- ❖ ToR Lr No. SEIAA-TN/F.No. 8549/SEAC/ToR-1139/2020 Dated 08.04.2022
- ❖ Are detailed in Page No. I – IX.

#### **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 1<sup>st</sup> June and 1<sup>st</sup> 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. The generic structure of the EIA document should be as under:

1. Introduction
2. Project Description
3. Description of the Environment
4. Anticipated Environmental Impact & Mitigation Measures
5. Analysis of Alternatives (Technology & Site)
6. Environmental Monitoring Program
7. Additional Studies
8. Project Benefits
9. Environmental Cost Benefit Analysis
10. Environmental Management Plan (EMP)
11. Summary & Conclusion
12. Disclosure of Consultants engaged.



## 1.8 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 Period of March, April and May 2022 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**

S.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub>	Continuous 24-hourly samples twice a week for three months at 8 locations. (1 Core & 7 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 samples 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)	8 locations – data monitored once for 24 hours during EIA study (1 core and 7 buffer)
6	Soil Characteristics	Physical and Chemical Parameters	Once at 6 locations during study period(1 core and 5 buffer)
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 hydrogeology 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 requirements of the ToR issued by SEIAA – TN.

### **1.8.1 Regulatory Compliance & Applicable Laws/Regulations from proposed project**

- ❖ 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 Lr No. SEIAA-TN/F.No. 8549/SEAC/ToR-1139/2020 Dated 08.04.2022

## **CHAPTER II**

### **PROJECT DESCRIPTION**

#### **2.0 GENERAL INTRODUCTION**

The Proposed Rough Stone and Gravel Quarry require prior Environmental Clearance. There are One proposed quarry and two existing quarries forming a cluster; calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1<sup>st</sup> July 2016 and the total extent of cluster is 8.45.17 hectares

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 quarries. No major vegetation or trees within the project area except some thorny bushes, the project is site-specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarry.

It is a fresh quarry, the quarrying operation will be carried out by opencast mechanized method involving the 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.

##### **2.1.1 Location Details of the Project**

- ❖ The proposed quarry project falls in Keeranur Village, Kangayam Taluk and Tiruppur District.
- ❖ Keeranur Cluster is located about 1 km North-eastern side of Keeranur Village
- ❖ The Keeranur Village is located about 8 km Northern side of Kangayam Taluk, 24km South-eastern side of Tiruppur District.

- ❖ The area is marked in the Survey of India, Toposheet No 58E/12. The area lies between the Latitudes from 11°04'52.40"N to 11°04'57.75"N and Longitudes from 77°33'27.41"E to 77°33'33.38"E.
- ❖ The maximum altitude of the project area is 267m AMSL
- ❖ 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-67) Coimbatore – Trichy – 9km-SE (SH-96) Erode – Kangayam – 2km-SE
Nearest Village	Ponnakkani – 2.7km-East
Nearest Town	Kangayam-8km-South
Nearest Railway	Vijayamangalam -13km-NW
Nearest Airport	Coimbatore - 65.0 km – Southwest
Seaport	Cochin-188km-SW

Source: Survey of India Toposheet & Google Earth image

**Table 2.2 Boundary Geo-Coordinates of Proposed Project**

Quarry Lease Boundary Corner Pillar No.	Latitude	Longitude
1	11°04'52.40" N	77°33'28.06" E
2	11°04'54.02" N	77°33'27.41" E
3	11°04'55.19" N	77°33'27.87" E
4	11°04'55.40" N	77°33'27.74" E
5	11°04'57.75" N	77°33'32.62" E
6	11°04'52.79" N	77°33'33.38" E

Source: Approved Mining Plan

## 2.2 Project Area

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

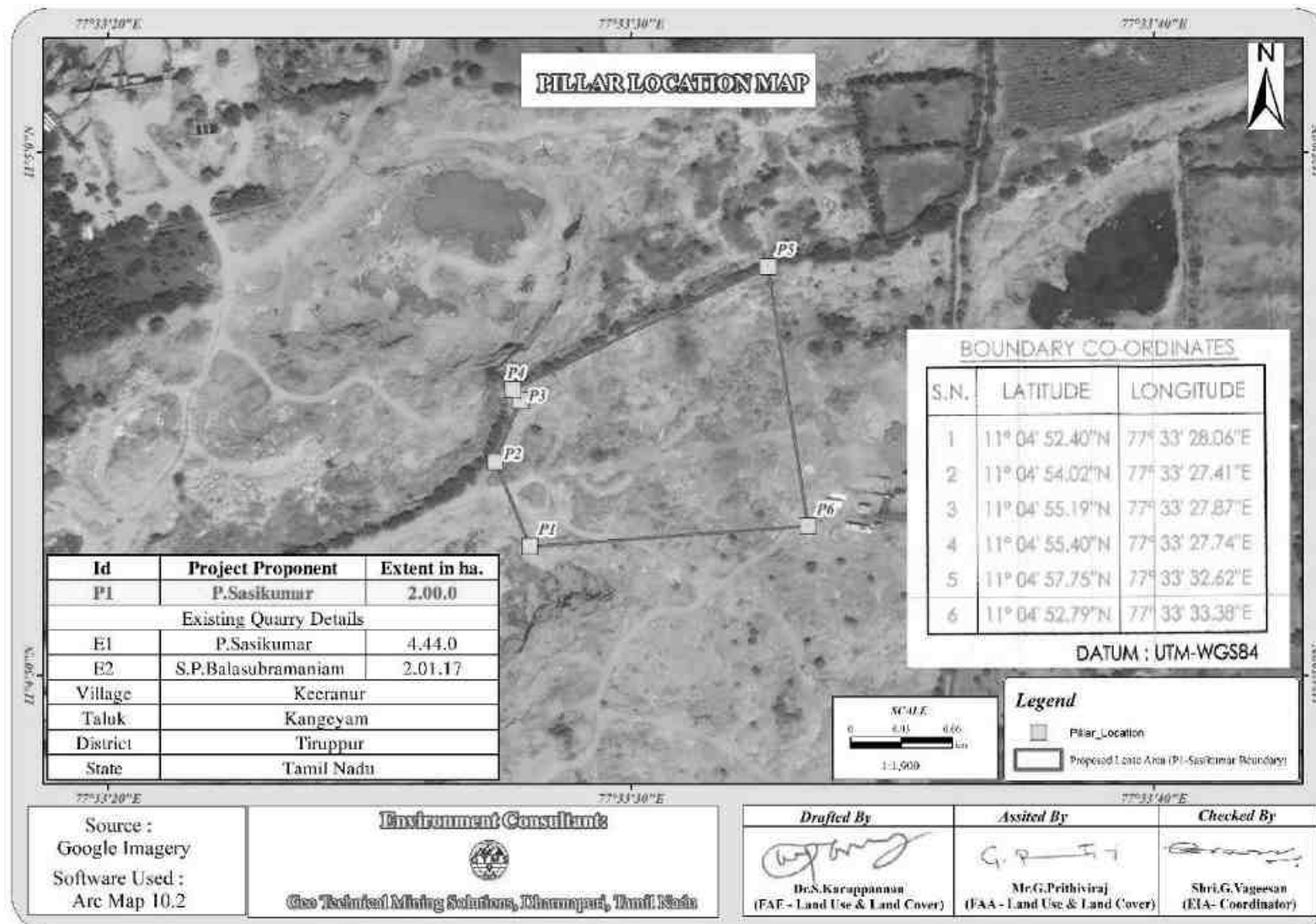
**Table 2.3 Land Use Pattern of the Proposed Project**

LAND USE PATTERN		
Description	Present area in (Hect.)	Area at the end of life of quarry (Hect.)
Area under quarry	Nil	1.60.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.22.0
Un – utilized area	2.00.0	0.15.0
<b>Total</b>	2.00.0	2.00.0

Source: Approved mining plan



**Figure 2.1 Photographs of the project site taken from different directions**



**Figure 2.2 Google image showing the proposed project site lease boundary with geo- coordinates of pillar**

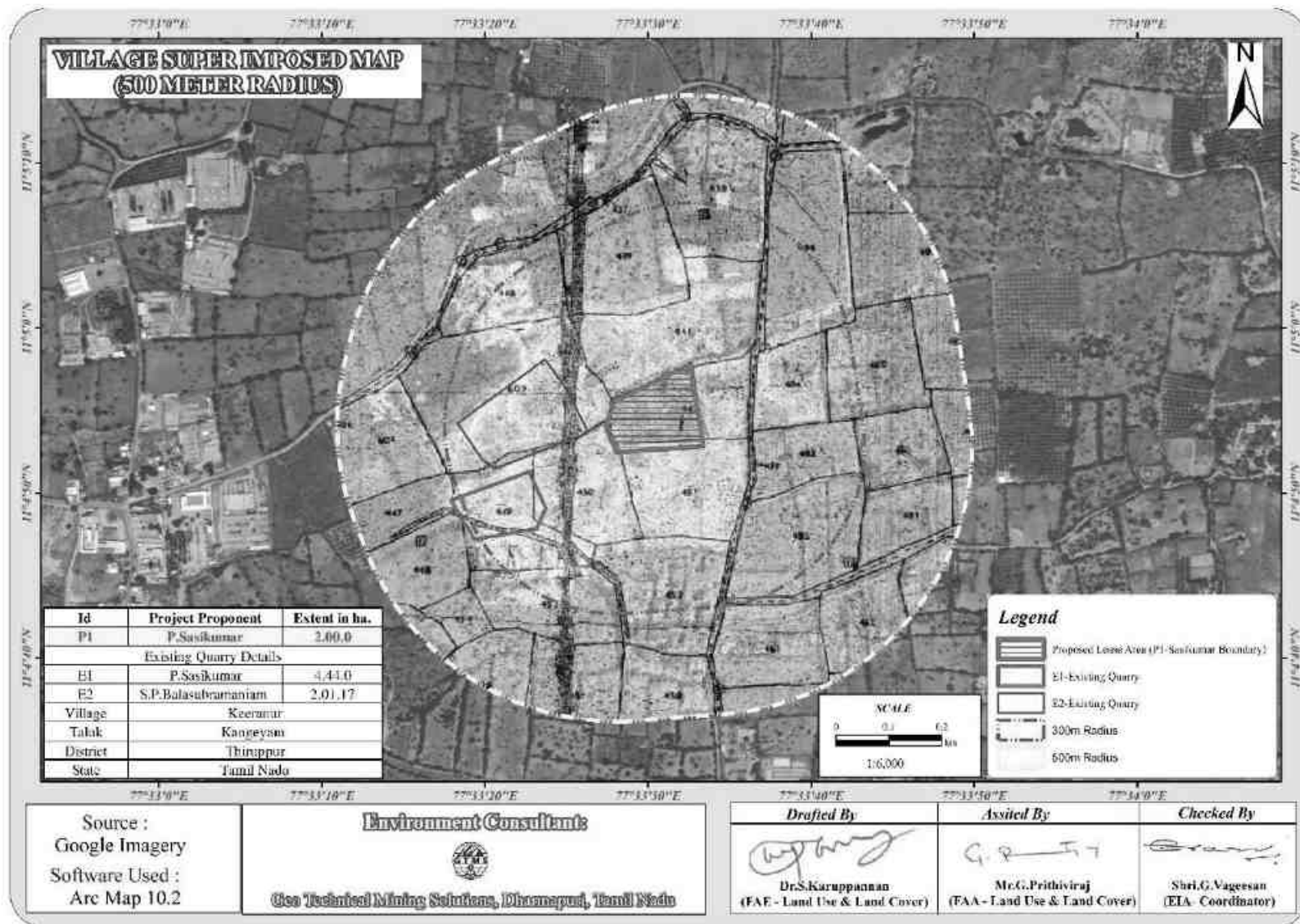


Figure 2.3 Village map superimposed on the google earth image

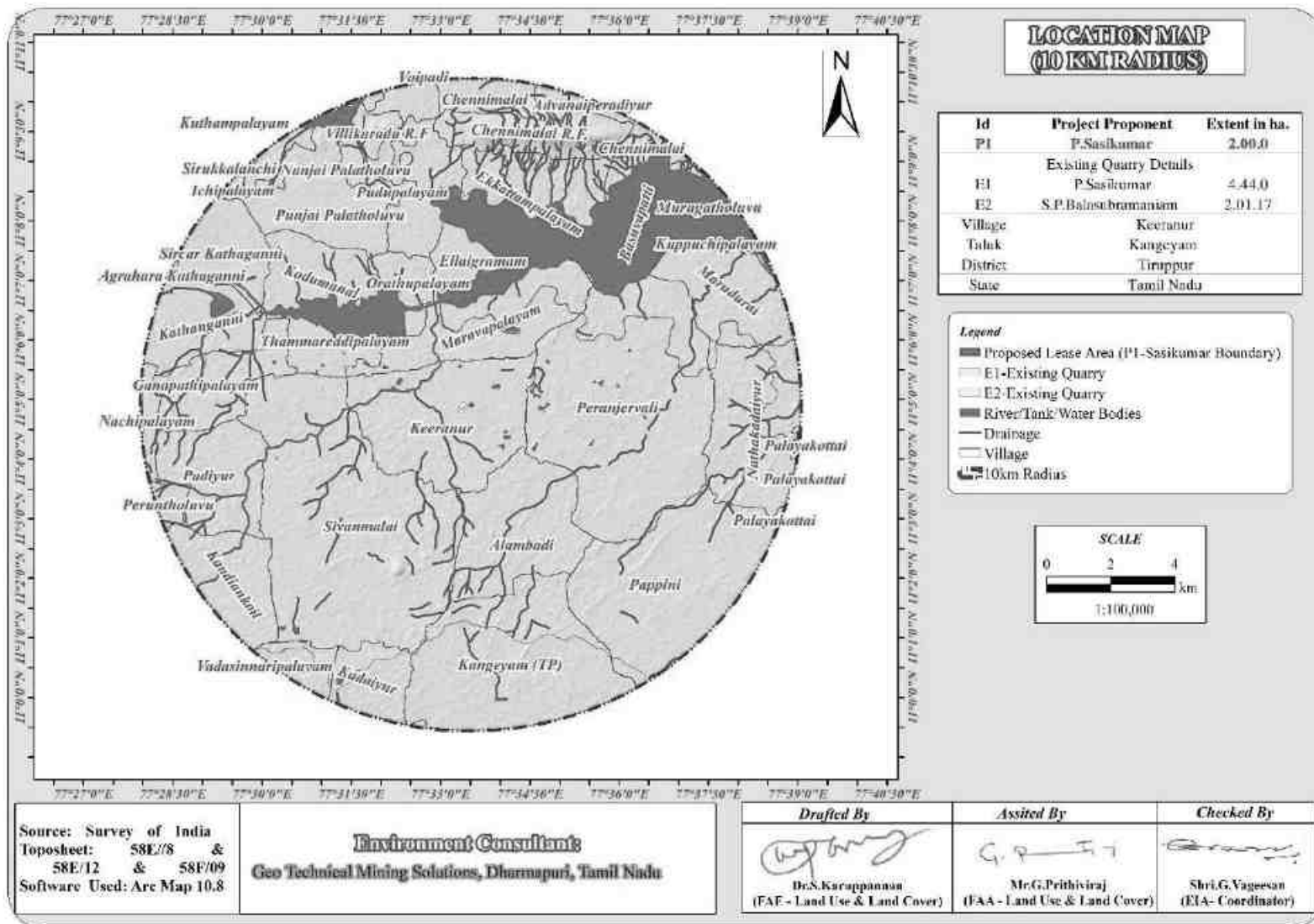


Figure 2.4 Location map showing surface features around 10 km radius from the proposed project site



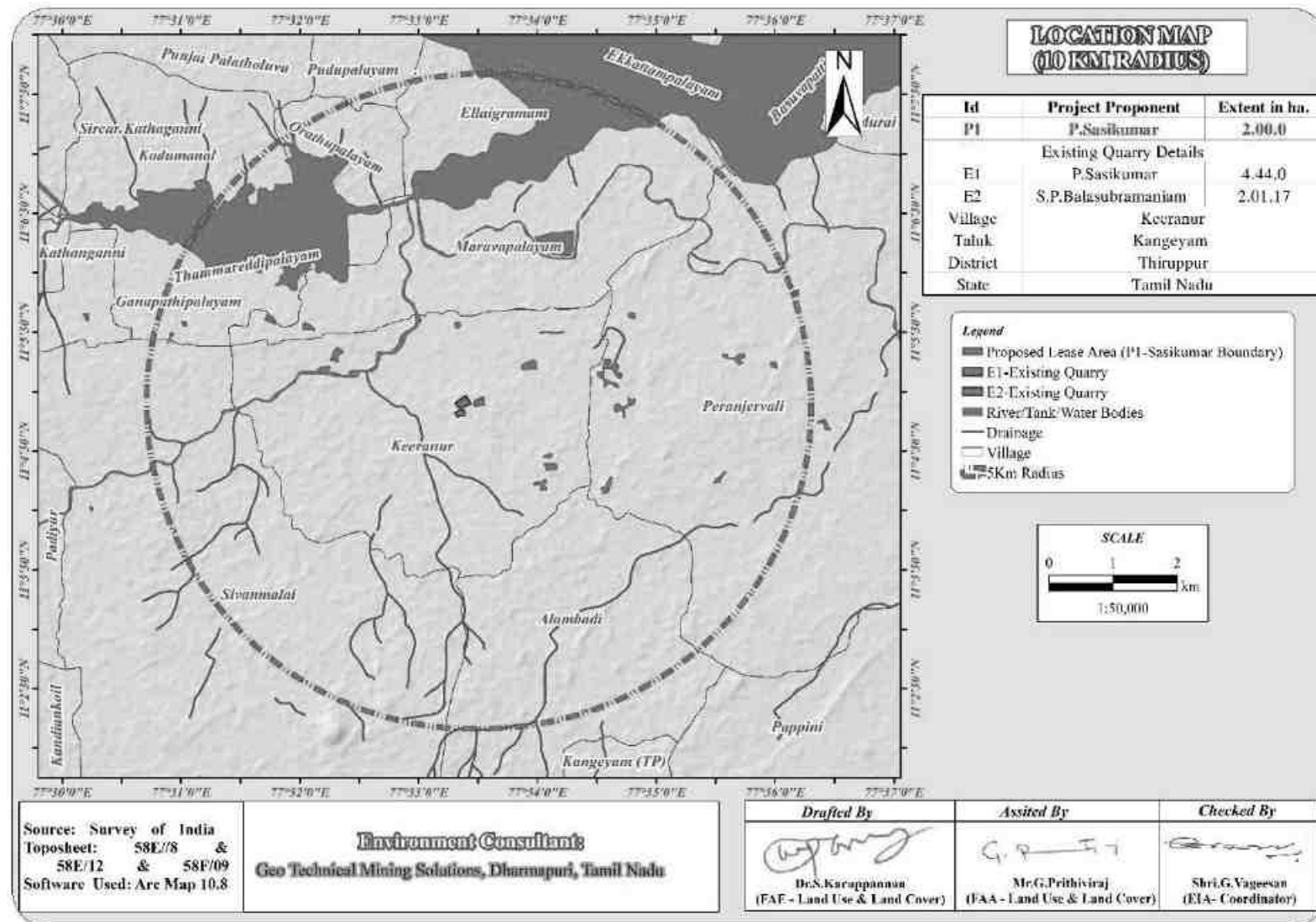


Figure 2.5 Location map showing surface features around 5km radius from the proposed project site



### 2.2.1 Magnitude of Operation

**Table 2.4 Operational Details for Proposed Project**

PARTICULARS	DETAILS	
	Rough Stone in m <sup>3</sup> (5 Year Plan period)	Gravel in m <sup>3</sup>
Geological Resources in m <sup>3</sup>	7,98,080	39,904
Ten years plan period Mineable Reserves in m <sup>3</sup>	2,87,800	30,888
Proposed production for first five years plan period	1,44,275	30888
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m <sup>3</sup>	96	16
No of Lorry loads (6m <sup>3</sup> per load)	34	6
Depth of Mining first five years plan of period	17m (2m Gravel + 15m Rough Stone)	
Ultimate depth of Mining	42m (2m Gravel + 40m Rough stone) for a period of Ten years	

Approved Mining Plan.

## 2.3 GEOLOGY

### 2.3.1 Regional Geology

Regional geology provides a framework for site-specific geology. When the site-specific geology data are put in the context of regional geology, more substantial and scientifically sound interpretations can be made. Regional geological information can be found in many sources such as Geological Survey of India (GSI), state geological surveys, universities, research institutions, local governments, and published literature.

Tiruppur district is covered by a wide range of high-grade metamorphic rocks of the peninsular gneissic complex. These rocks are extensively weathered and overlain by recent valley fills and alluvium at places. The major rock types occurring in the district are charnockites, granites, complex gneisses mainly hornblende biotite gneiss and sillimanite gneiss with basic and ultra-basic intrusives, crystalline limestone, syenite, pegmatite and quartz veins, as shown in Figure 2.7. Stratigraphic succession of the district has been given in Table 2.5.

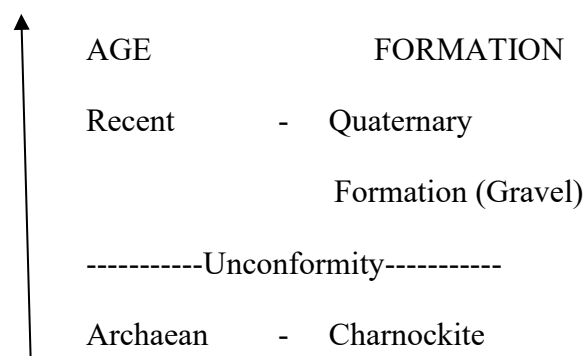
**Table 2.5 Stratigraphy of Tiruppur District**

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

### 2.3.2 Local Geology & Geomorphology

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:



Geomorphologically, the proposed project area consists of plain landforms. In plain landforms, shallow weathered shallow buried pediplain have occupied major part of the study area followed by pediplan canal command as shown in Figure 2. 9



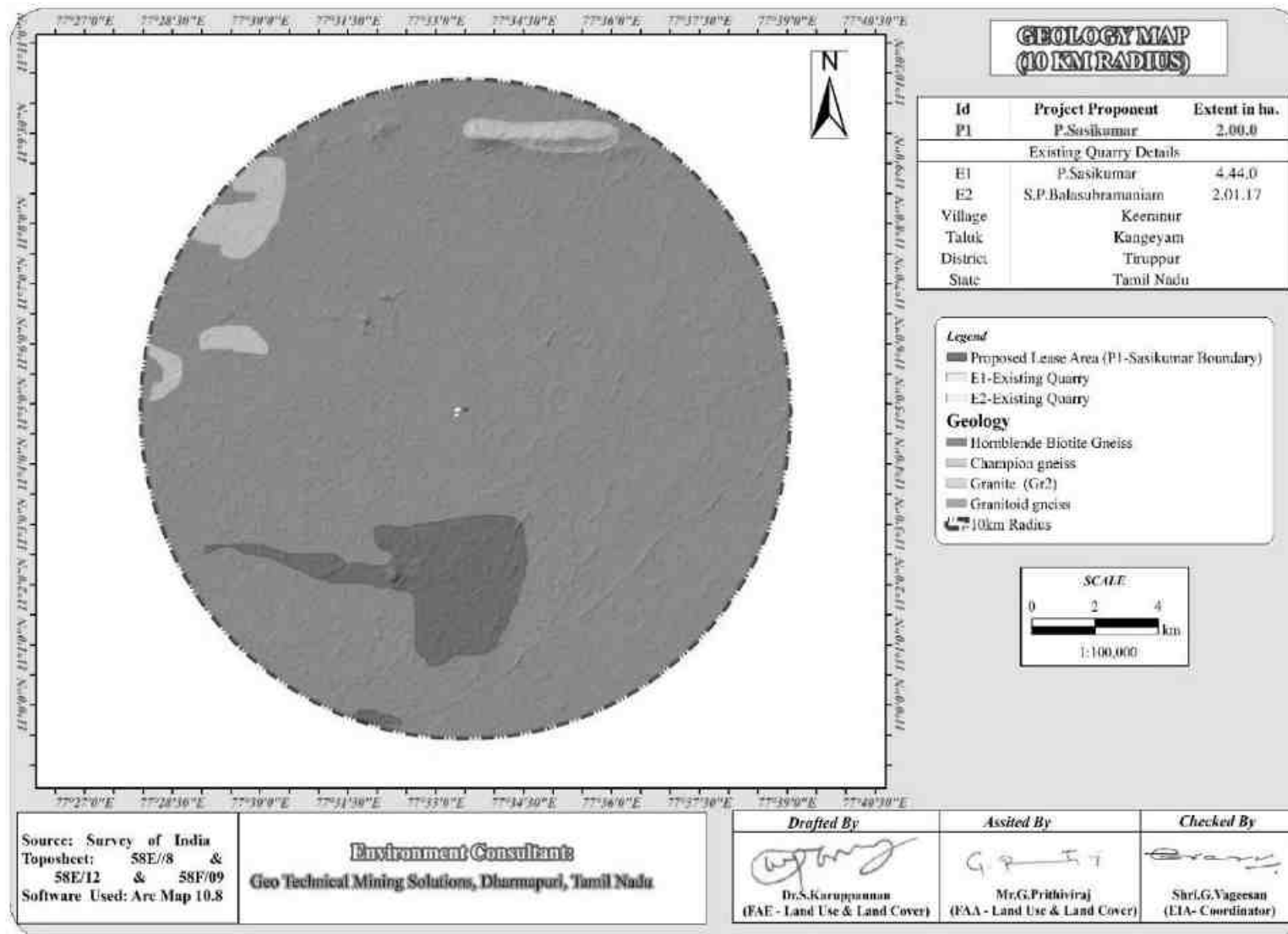


Figure 2.8 Geology map of 10km radius from the proposed Project Site

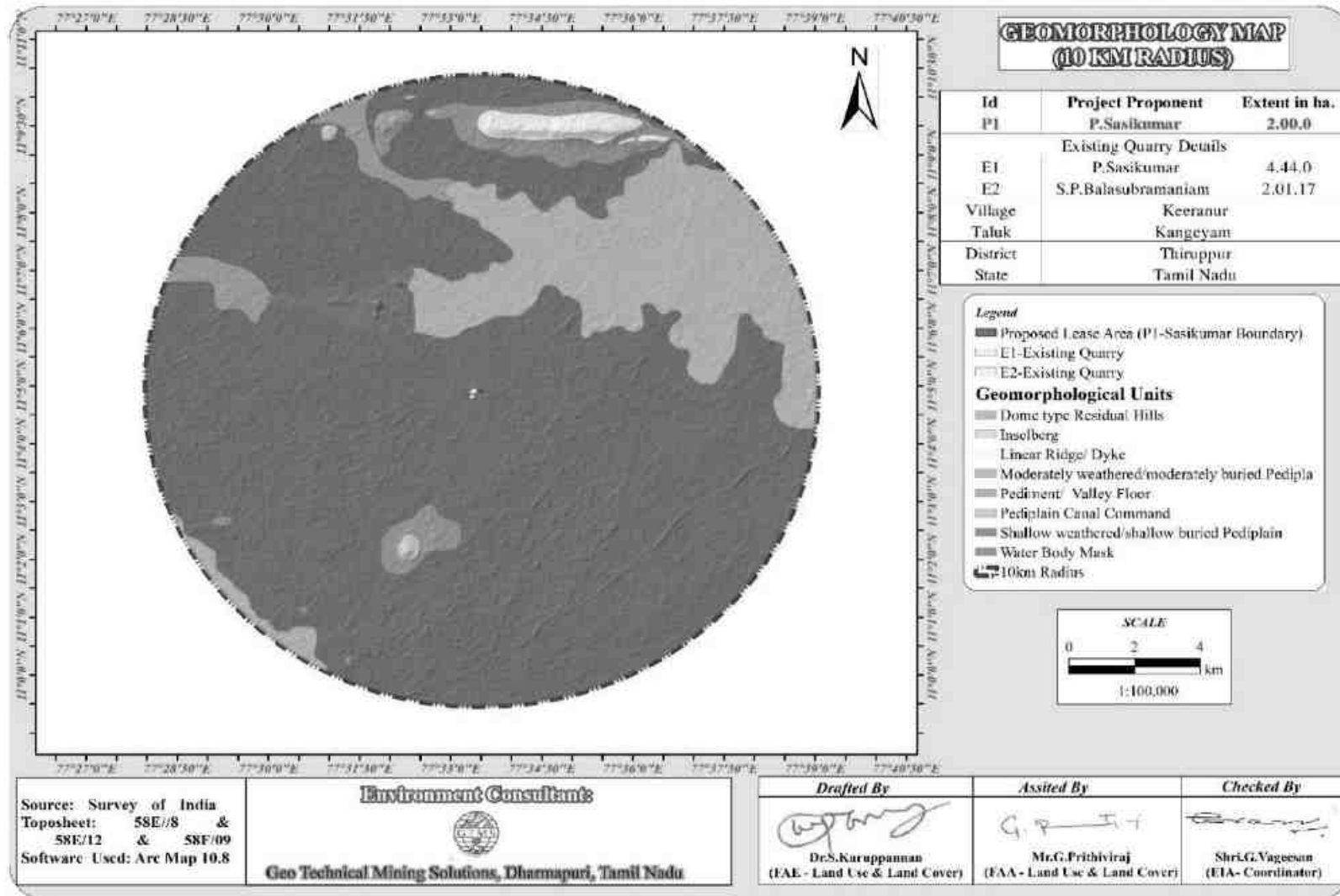


Figure 2.9 Geomorphology map of 10km radius from the proposed Project site

## 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 the proposed project.

Based on the availability of Geological Resources the Mineable Reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m (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 the proposed project.

**Table 2.6 Available Geological Resources of Proposed Project**

	<b>Rough Stone in m<sup>3</sup></b>	<b>Gravel in m<sup>3</sup></b>
Geological Resource in m <sup>3</sup>	7,98,080	39,904
Proposed production for five years in m <sup>3</sup>	1,44,275	30888

**Table 2.7 Year-Wise Production Plan**

<b>YEAR</b>	<b>ROUGH STONE (m<sup>3</sup>)</b>	<b>GRAVEL (m<sup>3</sup>)</b>
I	29290	8712
II	29040	6534
III	28830	15642
IV	28655	-
V	28460	-
<b>TOTAL</b>	<b>144275</b>	<b>30888</b>

Source: Approved Mining Plan

### 2.4.1 Disposal of Waste

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

### 2.4.2 Conceptual Mining Plan and Sections

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**

<b>Pit</b>	<b>Length (Max) (m)</b>	<b>Width (Max) (m)</b>	<b>Depth (Max)</b>
<b>I</b>	157	101	42m bgl

Source: Source: Approved Mining Plan.



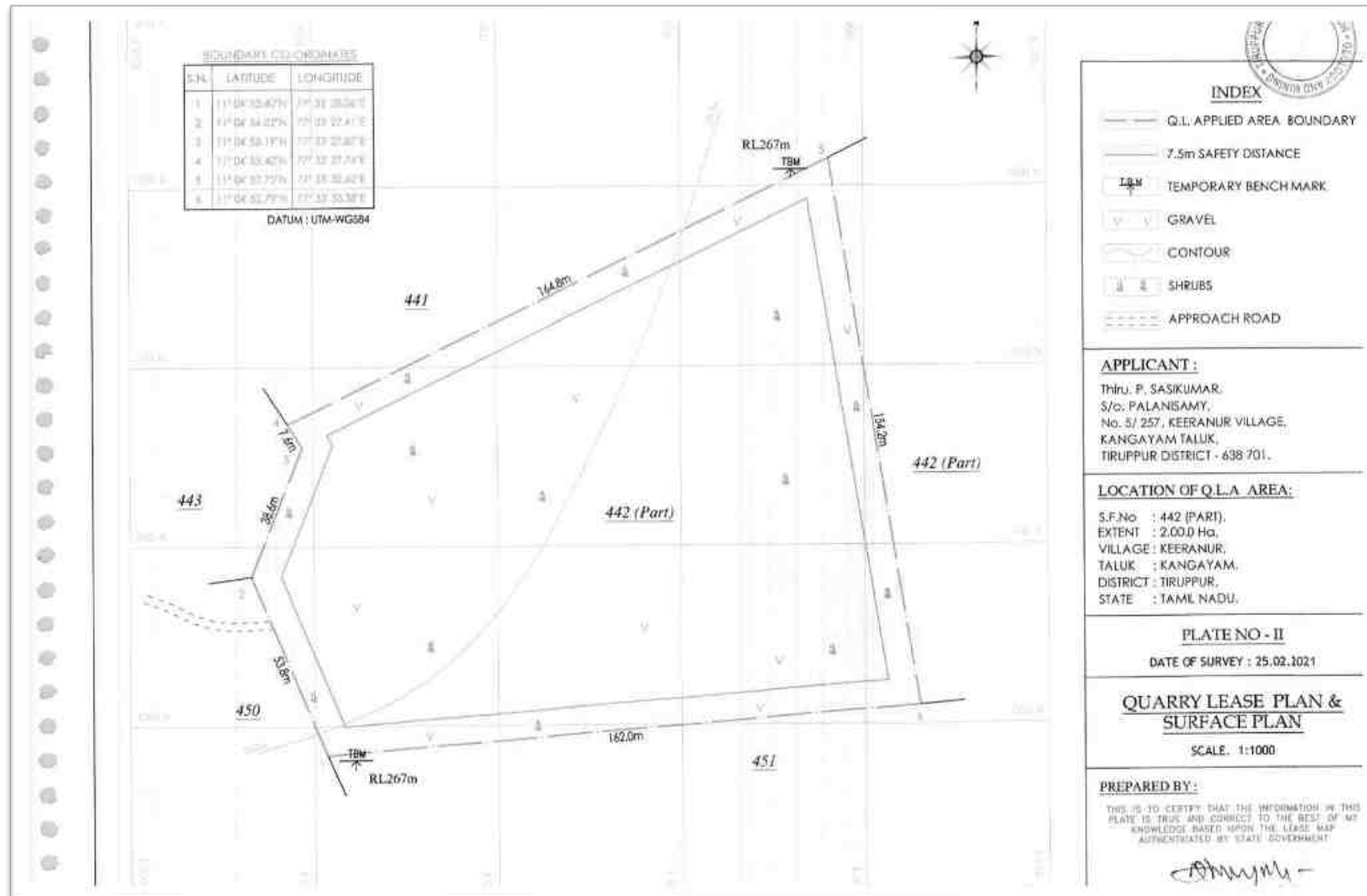


Figure 2.10 Quarry lease plan and surface plan



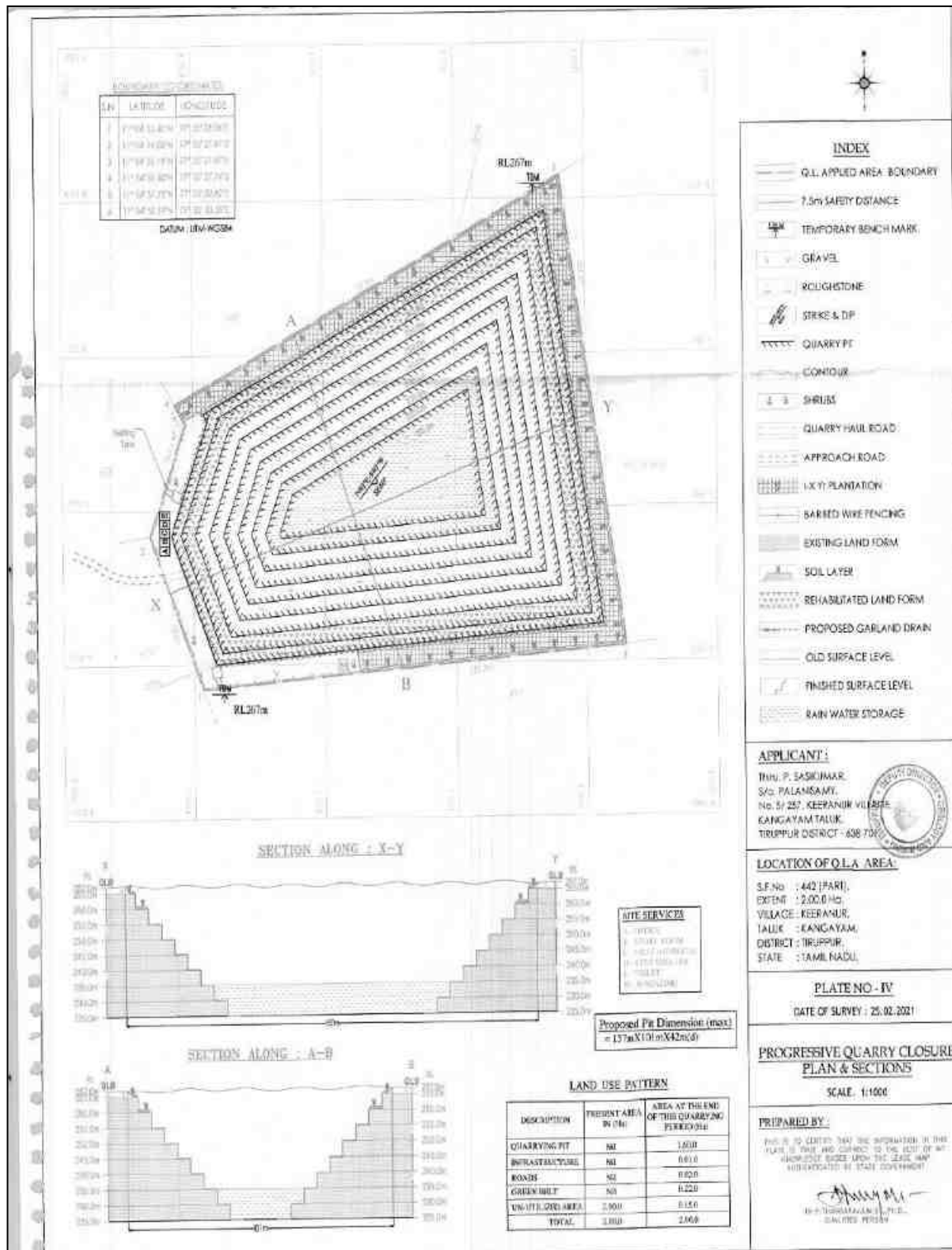


Figure 2.12 Progressive mine closure plan and sections

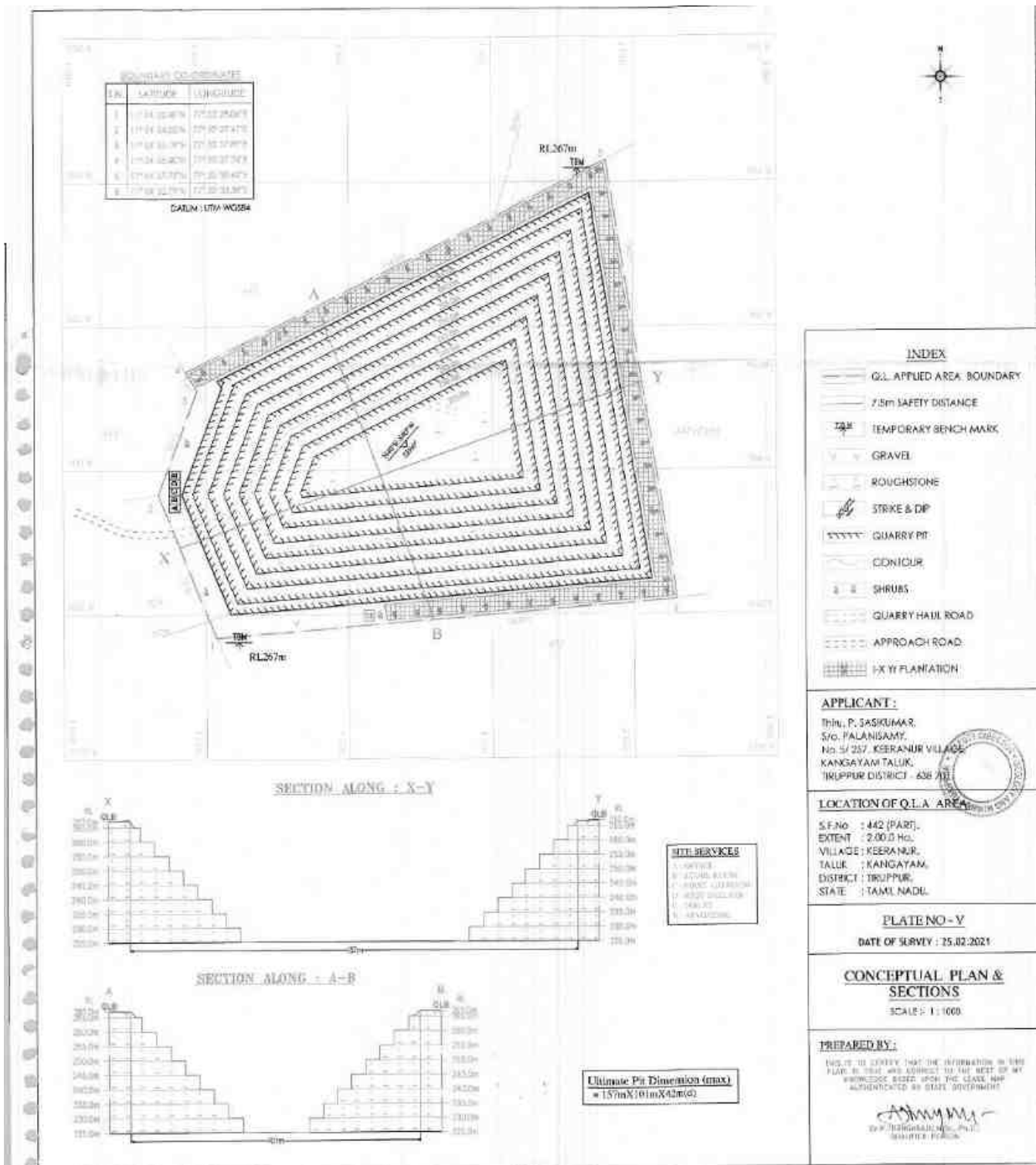
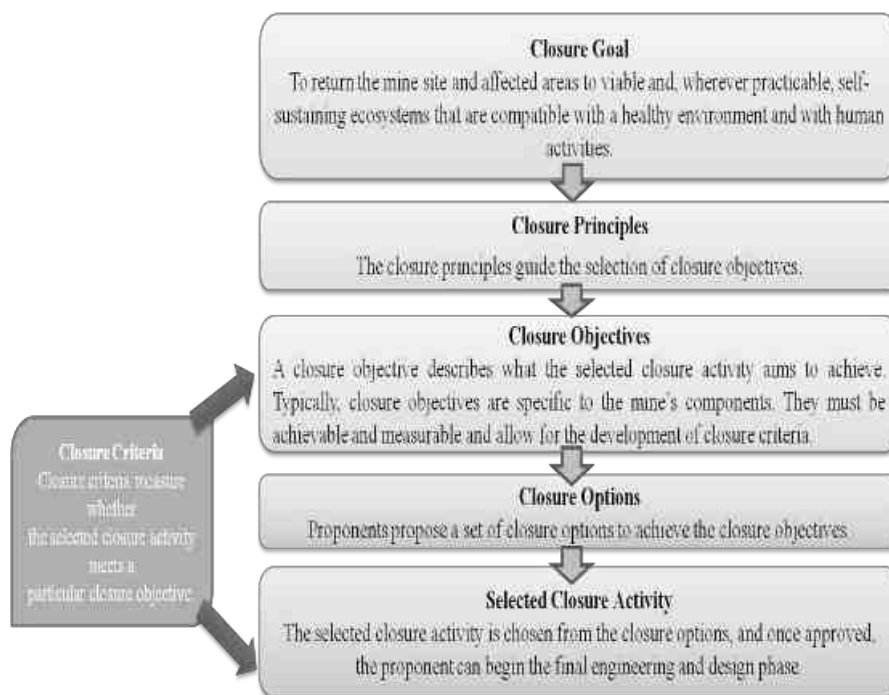


Figure 2.13 Conceptual plan and sections

### 2.4.3 Mine closure

- ❖ 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. After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem.
- ❖ 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.



### 2.4.4 Closure Planning & Options Considerations in Mine Design

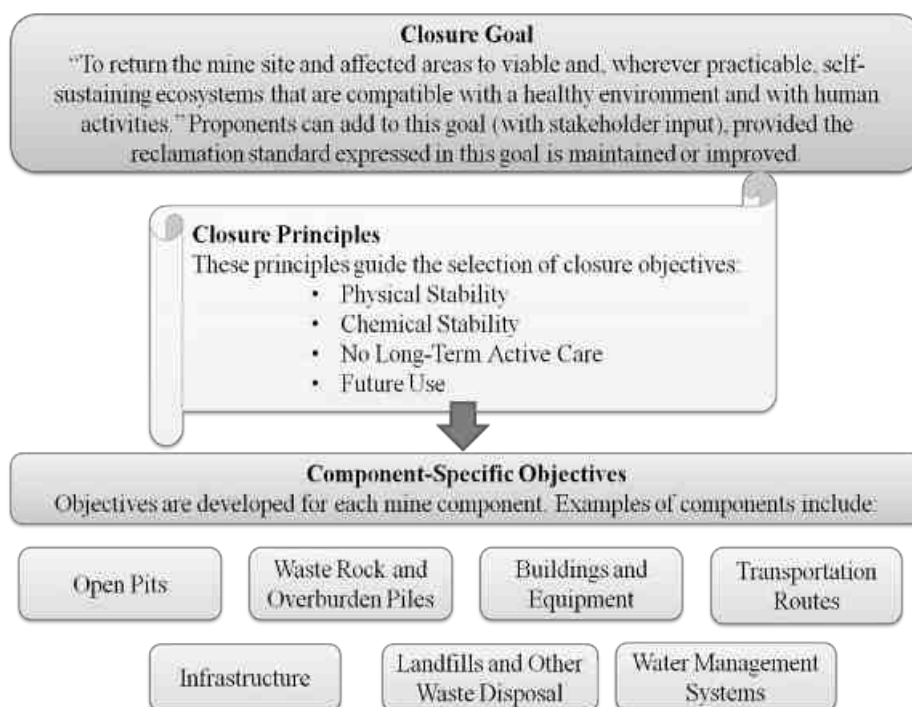
- ❖ The closure of mine is well planned at the initial stage of planning & design consideration by the internal and external stake holders.
- ❖ Construction of 2m height bund all along the mine pit boundary and ensure its stability all time & construction of garland drain along the natural slope to avoid 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.
- ❖ 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 1<sup>st</sup> 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.

#### **2.4.5 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										RATE	COST (Rs.)
		I	II	III	IV	V	VI	VII	VIII	IX	X		
Plantation under safety zone	Nos.	30	30	30	30	30	30	30	30	30	30	@100 Rs Per sapling	30,000/-
	Cost	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000		
Plantation in quarried out benches and approach road	Nos.	45	45	45	45	45	45	45	45	45	45	@100 Rs Per sapling	45,000/-
	Cost	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500		
Wire Fencing (In Mtrs) 560 Mtrs		168000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	1,68,000/-
Garland drain (In Mtrs) 460 Mtrs		138000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	1,38,000/-
<b>TOTAL</b>													<b>3,81,000/-</b>

Source: Proposed by FAEs 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 involving formation of 5.0-meter height benches with a bench width of 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 petrogenetic 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**

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

#### **2.5.1.1 Type of Explosives**

Small Dia. 25mm slurry explosives are proposed to be used for shattering and heaving effect for removal and winning of rough stone. No deep hole drilling or primary blasting is proposed

#### **2.5.1.2 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	4	1.2m to 2m	Compressed air
2	Compressor	1	400psi	Diesel Drive
3	Excavator with Bucket / Rock Breaker	1	300 HP	Diesel Drive
4	Tipper	3	20 Tonnes	Diesel Drive

Source: Approved Mining Plan

## 2.6 GENERAL FEATURES

### 2.6.1 Drainage Pattern

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin over time that reveals characteristics of the kind of rocks and geological structures in a landscape. 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.

Dendritic drainage pattern is one of the most common types that develop in areas where the rock (or unconsolidated material) beneath the stream has no particular fabric or structure and can be easily eroded equally in all directions.

There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic, as shown in Figure 2.14.

### 2.6.2 Traffic Density

The traffic survey conducted based on the transportation route of material, the Rough Stone is proposed to be transported mainly through Sivanmalai to Savadipalayam Road in west and Kangayam to Chennimalai Road in east.

Traffic density measurements were performed at two locations

1. Sivanmalai to Savadipalayam Road
2. SH-96-Kangayam to Chennimalai Road

**TRAFFIC DENSITY MAP (1 KM RADIUS)**

Id	Project Proposer	Extent in ha.
P1	P. Sudhakar	2.60.0
P2	P. Sankaran	4.44.0
P3	S. P. Balasubramaniam	2.01.17

Village: Kengeri  
Taluk: Kengeri  
District: Tirupur  
State: Tamil Nadu

**Legend**

- Proposed Quarry Area (Shaded Grey)
- Proposed Haul Road (Thick Black Line)
- Proposed Access Road (Thin Black Line)
- Proposed Access Road (Thin Black Line)

**SCALE**

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

**Software Used: Arc Map 10.3**

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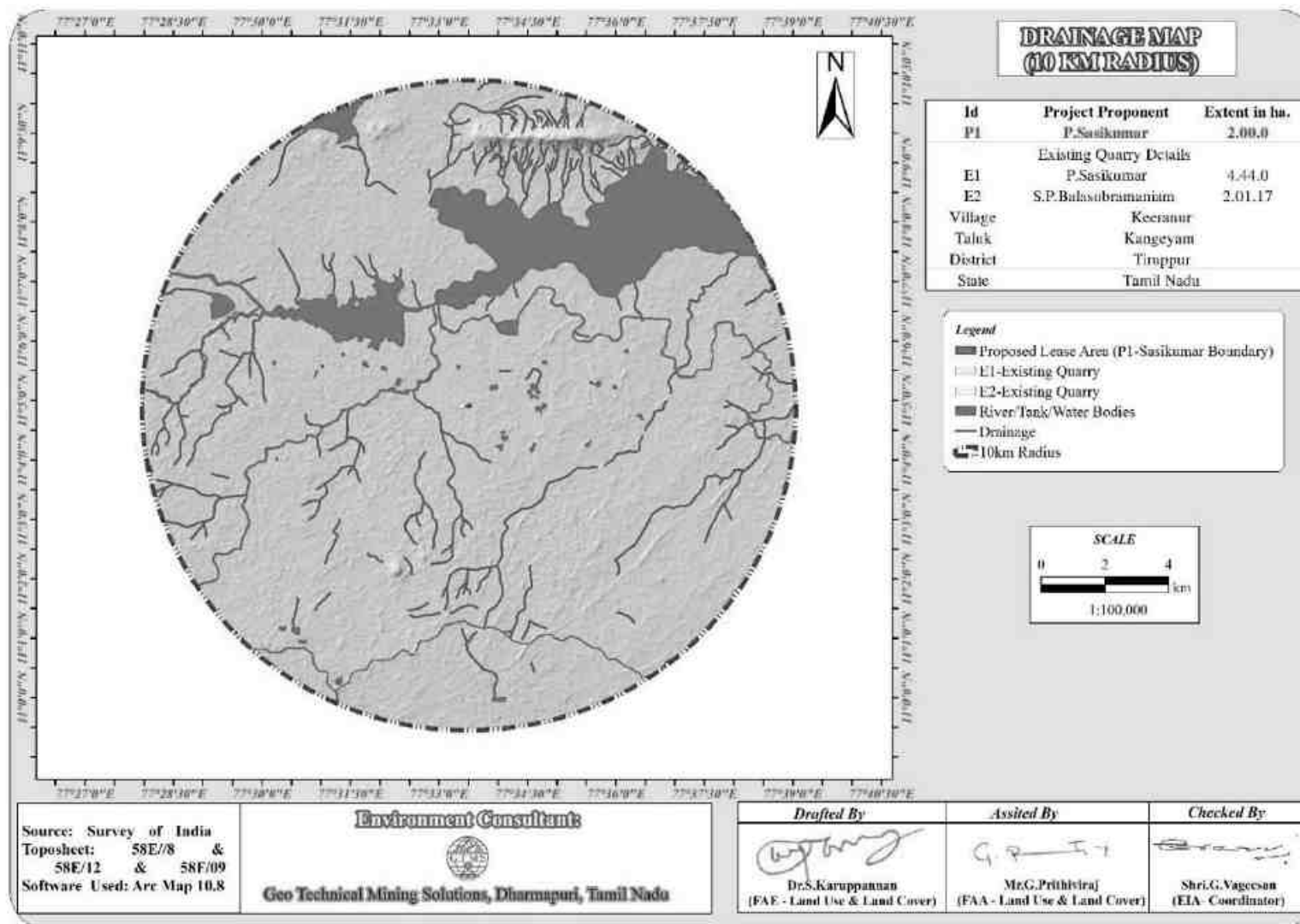


Figure. 2.15 Drainage map of 10km radius from the proposed project site

**Table.2.11 Traffic Survey Locations**

Station Code	Road Name	Distance and Direction	Type of Road
TS1	Sivanmalai to Savadipalayam Road	West 0.86km	Panchayat Road
TS2	SH-96-Kangayam to Chennimalai Road	East 2.3km	State Highway

Source: On-site monitoring by GTMS FAE & TM

**Table 2.12 Existing Traffic Volume**

Station code	HMV		LMV		2/3 Wheelers		Total PCU
	No	PCU	No	PCU	No	PCU	
TS1	30	90	25	25	76	38	153
TS2	210	630	112	112	342	171	913

Source: On-site monitoring by GTMS FAE & TM

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

**Table 2.13 Rough Stone Hourly Transportation Requirement**

Transportation of Rough Stone & Gravel per day		
Capacity of trucks	No. of Trips per day	Volume in PCU
20 tonnes	16	48

Source: Approved Mining Plan

## 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
Sivanmalai to Savadipalayam Road	153	48	201	1200
SH-96-Kangayam to Chennimalai Road	913	48	961	1500

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

- ❖ Due to this project 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.

### 2.6.3 Mineral Beneficiation and Processing

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

#### 2.6.4 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.

### 2.7 PROJECT REQUIREMENT

#### 2.7.1 Water Requirement

Details of water requirements in KLD as given below:

**Table 2.15 Water Requirement for the Project**

Purpose	Quantity	Source
Dust Suppression	2.0 KLD	From Existing bore wells from nearby area
Green Belt development	1.5 KLD	From Existing bore wells from nearby area
Drinking & Domestic purpose	0.8 KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
<b>Total</b>	<b>4.3KLD</b>	

Source: Prefeasibility report

\* Drinking water will be sourced from Approved Water Vendors

#### 2.7.2 Power and Other Infrastructure Requirement

No proposed project requires power supply for the mining operations. The quarrying activity is proposed during daytime only (General Shift 8 AM – 5 PM, Lunch Break 1 PM – 2 PM). Respective project proponent will obtain electricity for use in office and other internal infrastructure from SEB. No workshops are proposed inside the project area. Hence, there will not be any effluent generation from the project area. Domestic effluents from the mine office will be discharged to septic tank and soak pit. There are no toxic effluents 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.

One Hydraulic Excavator will excavate and load into the tippers about 20m<sup>3</sup> of material /hour

Hydraulic Excavator will consume about 16 Litres per hour

Average diesel consumption = 2, 30,240 Litters of Diesel  
for the entire period of mining life.  
= 23,024 Litters of Diesel per year.  
= 77 Litters of Diesel/day.  
(Source: Pre-feasibility report)

## 2.7.4 Project Cost

**Table 2.16 Project Cost of Proposed Project**

Operational cost	Rs. 66,99,000/-
EMP cost	Rs. 7,60,000/-
<b>Total Project Cost</b>	<b>Rs. 74,59,000/-</b>

Source: Approved Mining Plan & Prefeasibility Report

## 2.7.5 Employment Requirement

The following manpower has been proposed in the mining plan to carry out the day-to-day quarrying activities. The employment is aimed at the proposed production target and also to comply with the statutory provisions of the metalliferous mines regulations, 1961 for the proposed project.

**Table 2.17 Proposed Manpower Deployment**

Mines Manager/Mines Foreman	1
Mate & Blaster	1
Excavator Operator & Driver	4
Jack hammer operator	8
Security	1
Helper & Labour	4
Cleaner & Co-operator	5
<b>Total</b>	<b>24</b>

Source: Approved Mining Plans

## 2.8 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the Environmental Clearance will be compiled before the start of mining operation.

**Table 2.18 Expected Time Schedule**

S.No.	Particulars	Time Schedule (In Month)					Remarks if any
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
1	Environmental Clearance						
2	Consent to Establish						Project Establishment Period
3	Consent to Operate						Production Starting Period
Time line may vary; subjected to rules and regulations /& other unforeseen circumstances							

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

## **CHAPTER III**

### **DESCRIPTION OF THE ENVIRONMENT**

#### **3.0 GENERAL**

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering March, April and May, 2022 with CPCB guidelines. Environmental data have been collected with reference to cluster quarries by Richardson & Cruddas (1972) Ltd, ISO 9001:2015 certified & MoEF notified laboratory for the below attributes:

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

An area of 10 km radius around the periphery of the cluster is considered for EIA study. The data collection has been used to understand the existing environment scenario around the cluster against which the potential impacts of the project can be assessed. The study area has been divided into two zones: core zone and buffer zone. Core zone is considered as cluster and buffer zone as 10km radius from the periphery of the cluster. Both core and buffer zones are taken as the study area. The baseline study was conducted during summer season i.e., March, April and May, 2022.

#### **Study Methodology**

- ❖ The project area was surveyed in detail with the help of total station and the boundary pillars were picked up with the help of GPS. 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, exchangeable cations, nutrients & micro nutrients etc., to assess the impact due to mining activities and to recommend saplings for greenbelt development.
- ❖ Ground water samples were collected during the study period from the existing bore wells, while surface water was collected from ponds in the buffer zone. The samples were analysed for parameters necessary to determine water quality (based on IS: 10500:2012 criteria) and those which are relevant from the point of view of environmental impact of the proposed mines.
- ❖ 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.
- ❖ In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected using Respiratory Dust Samplers (RDS) for fugitive dust, PM<sub>10</sub> and SO<sub>2</sub>, NO<sub>x</sub> with gaseous attachments & Fine Dust Samplers (FDS) for PM<sub>2.5</sub> 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 sample analysis, etc., are given in Table 3.1.

**Table 3.1 Monitoring Attributes and Frequency of Monitoring**

Attribute	Parameters	Frequency of Monitoring	Number of Locations	Protocol
Land Use/ Land Cover	Land-use Pattern within 10 km radius of the study area	Data from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physico-Chemical characteristics	Once during the study period	6	IS 2720 Agriculture Handbook -



			(1 core & 5 buffer zone)	Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (4 ground water, 2 Surface water)	IS 10500 & CPCB Standards
Meteorology	Wind speed Wind direction Temperature Cloud cover Dry bulb temperature Rainfall	1 hourly continuous mechanical/automatic weather station	1	Site specific primary data & secondary data from IMD Station
*Ambient Air Quality	PM <sub>10</sub> PM <sub>2.5</sub> SO <sub>2</sub> NO <sub>x</sub> Fugitive dust	24 hourlies, twice a week (March -May 2022)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient noise	Hourly observation for 24 hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing flora and fauna	Through field visit during the study period	Study area	Primary Survey by Quadrant & 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 Richardson & Cruddas (1972) Ltd, in association with GTMS \* 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 in the surroundings due to the mining activities 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, 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 LU/LC Statistics of the Study Area**

S. No.	CLASSIFICATION	AREA (hectare)	AREA (%)
1	Crop land	27159	90.33
2	Land with or without scrub	403	1.34
3	Mining / Industrial wastelands	54	0.18
4	Dense forest	191	0.64
5	Man-made features	378	1.26
6	Fallow land	32	0.11
7	Settlement	378	1.26
8	Water bodies	105	0.35
9	Plantations	1258	4.18
10	Barren Rocky / stony waste / sheet rock area	108	0.36
<b>Total Area</b>		<b>30066</b>	<b>100.00</b>

Source: LISS III Satellite Imagery

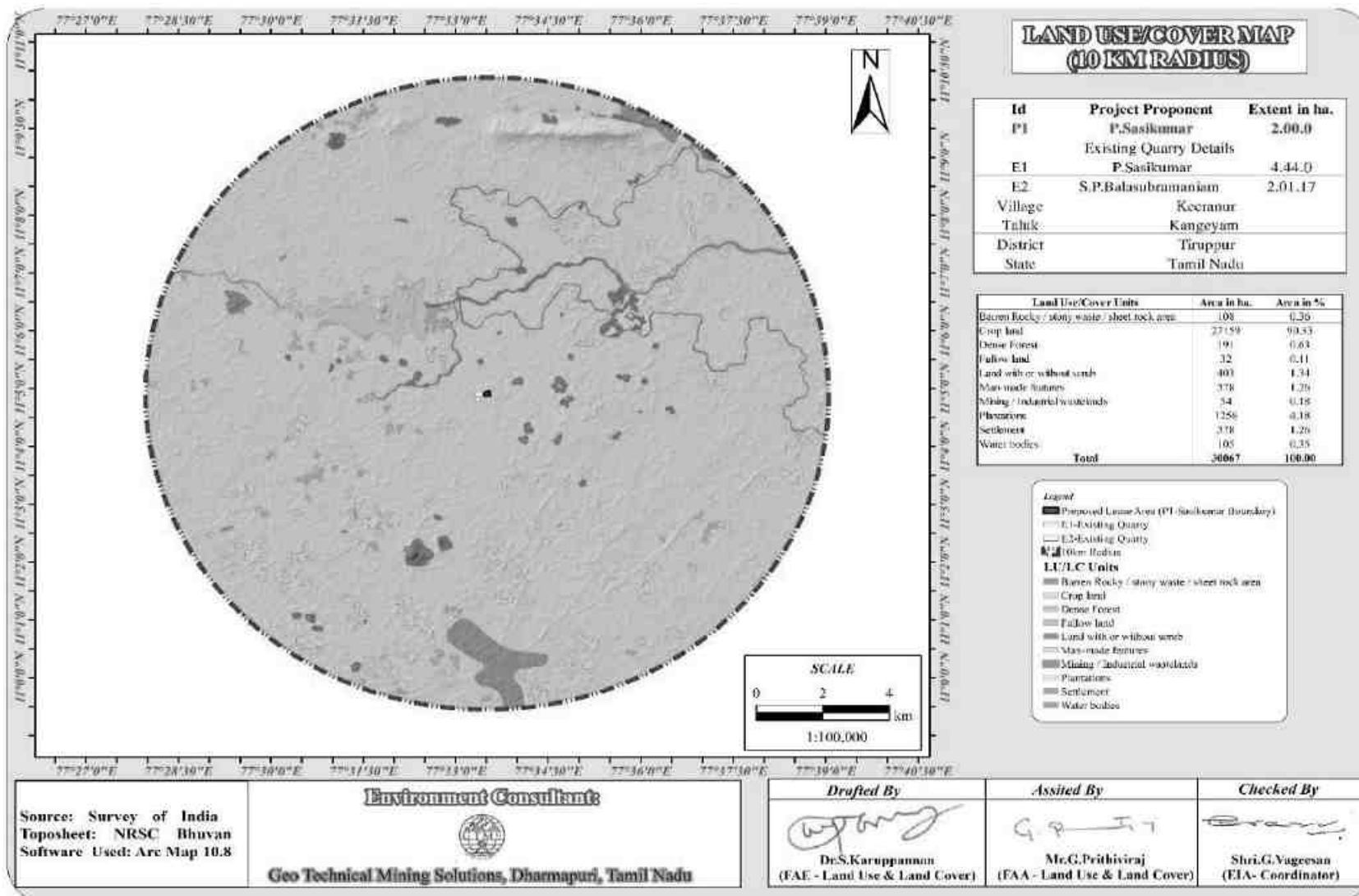
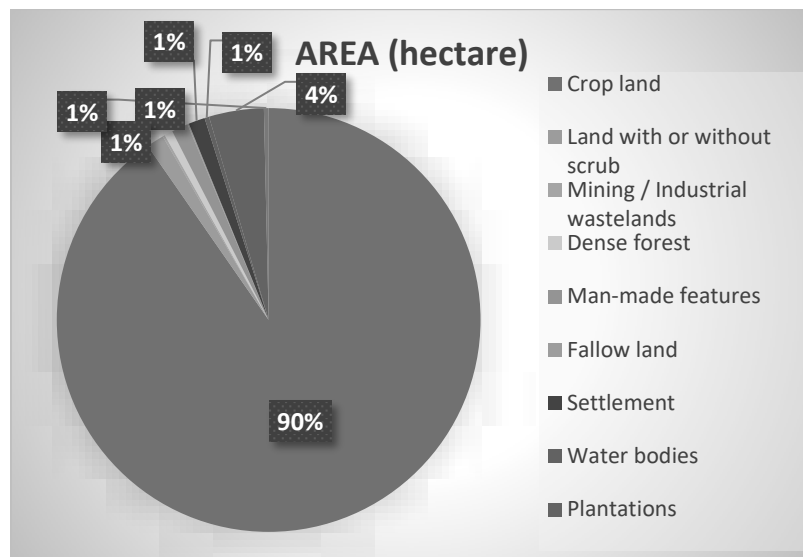


Figure 3.1 LULC map of 10km radius from the proposed project site



**Figure 3.2 Pie Diagram showing proportion of LULC in the study area**

From the above table (3.2), pie diagram(fig.3.2), and land use map, it is known that the majority of the land in the study area is crop land 90.33%, followed by plantations 4.18%, Land with or without scrub 1.34%, and settlement 1.26%. The total mining area within the study area is 54 ha, i.e., 0.18 %. The cluster area of 8.45.17 ha contributes about 0.0028% 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 proposed project area has gentle sloping towards Northeast side. The altitude of the area is 267m (max) above Mean Sea level. The area is covered by 2m thickness of Gravel formation.

### 3.1.3 Drainage Pattern of the Area

Drainage pattern is the pattern formed by the streams, rivers, and lakes in a particular drainage basin. They are governed by the topography, gradient, and geology of the land. Drainage patterns reveal characteristics of the underlying rocks and geological structures in a landscape region drained by streams.

Dendritic patterns, which are by far the most common, develop in areas where the rock beneath the stream has no particular fabric or structure and can be eroded equally easily in all directions. There are no streams, canals or water bodies crossing within the project area. The drainage pattern of the area is dendritic – sub dendritic.

### 3.1.4 Seismic Sensitivity

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

(Source: [https://moes.gov.in/writereaddata/files/LS\\_EN\\_20032020\\_385.pdf](https://moes.gov.in/writereaddata/files/LS_EN_20032020_385.pdf))

### 3.1.5 Environmental Features in the Study Area

There are no Wildlife Sanctuaries, National Park and Archaeological monuments within the project area. No Protected and Reserved Forest area is located within the project area. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environment sensitivity around the proposed mine lease area i.e., 10 km radius and the nearby water bodies are given in the Tables 3.3 & 3.4.

**Table 3.3 Details of Environmentally Sensitive Ecological Features in the Study Area**

S. No.	Sensitive Ecological Features	Name	Distance in km from Cluster
1	National Park / Wild life Sanctuaries	None	Nil within 10km Radius
2	Reserve Forest	None	Nil within 10km Radius
3	Lakes/Reservoir/ Dams/Stream/Rivers	Orathuppalayam Reservoir	3.5km-NW
		Noyyal River	3 km-N
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 Water Bodies Nearby the Proposed Project Site**

S. No.	Name	Distance & Direction
1	Orathuppalayam Reservoir	3.5km-NW
2	Noyyal River	3 km-N

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 shown 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
- ❖ to study the impact of proposed activity on soil characteristics and
- ❖ to study the impact on agriculture production.

**Table 3.5 Soil Sampling Locations**

S. No.	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	S-1	Core Zone	-	11° 4'56.07"N 77°33'29.70"E
2	S-2	Alambadi	3.67km SE	11° 2'58.40"N 77°34'7.73"E
3	S-3	Peranjervali	4.16km SE	11° 4'25.60"N 77°35'48.62"E
4	S-4	Pudupalayam	3.65km NW	11° 6'48.37"N 77°32'50.82"E
5	S-5	Padiyur	7km SW	11° 3'45.00"N 77°29'44.33"E
6	S-6	Sivanmalai	5.7km SW	11° 1'53.99"N 77°32'25.34"E

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

### 3.1.6.1 Methodology

For studying soil quality, sampling locations were selected to assess the existing soil conditions in and around the project site representing various land use conditions. The samples were collected 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 are given in Table 3.6.

**Table 3.6 Details of Soil Sampling**

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

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

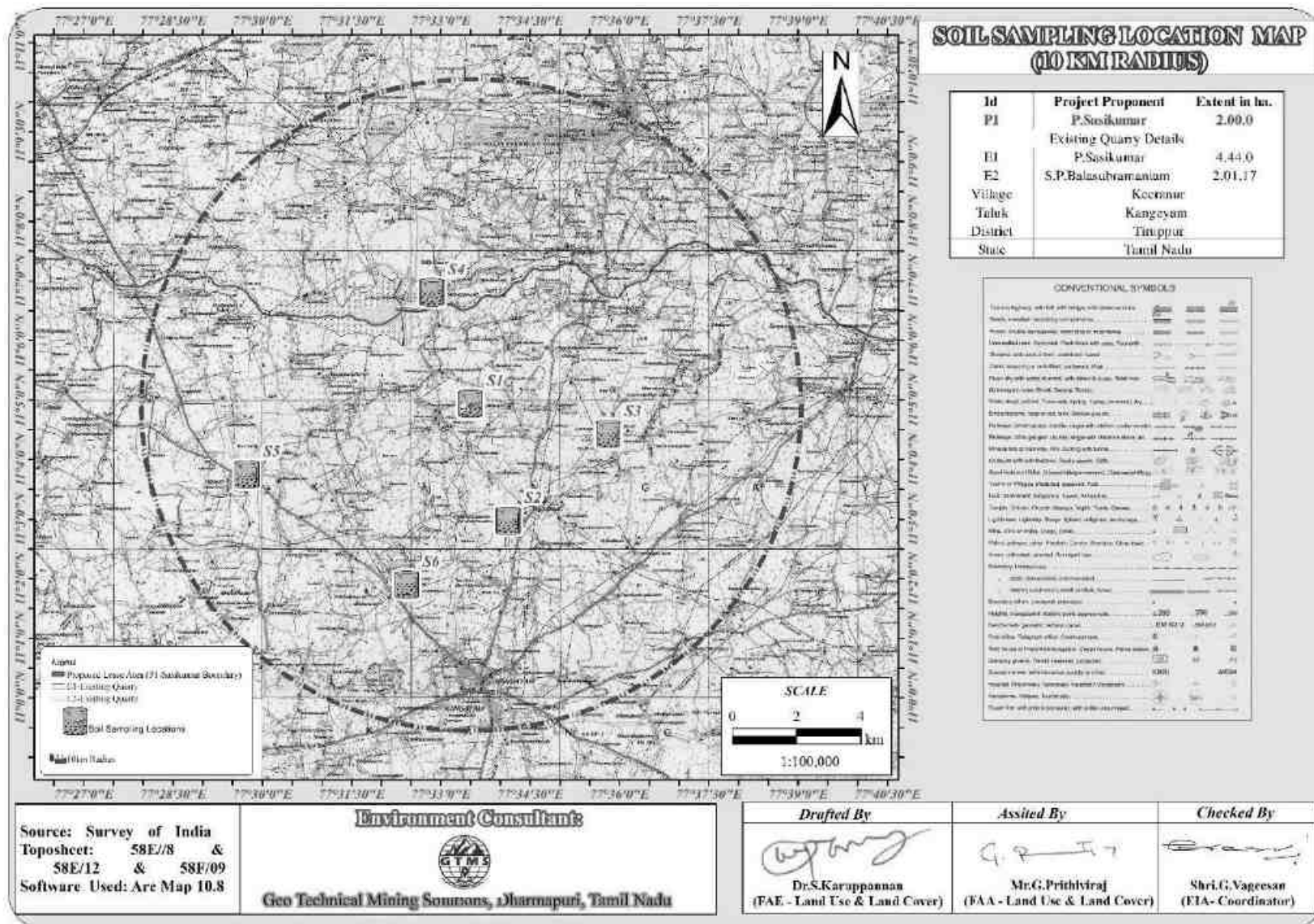


Figure 3.3 Geo-referenced topo sheet showing soil-sampling locations within 10km radius around the proposed project site

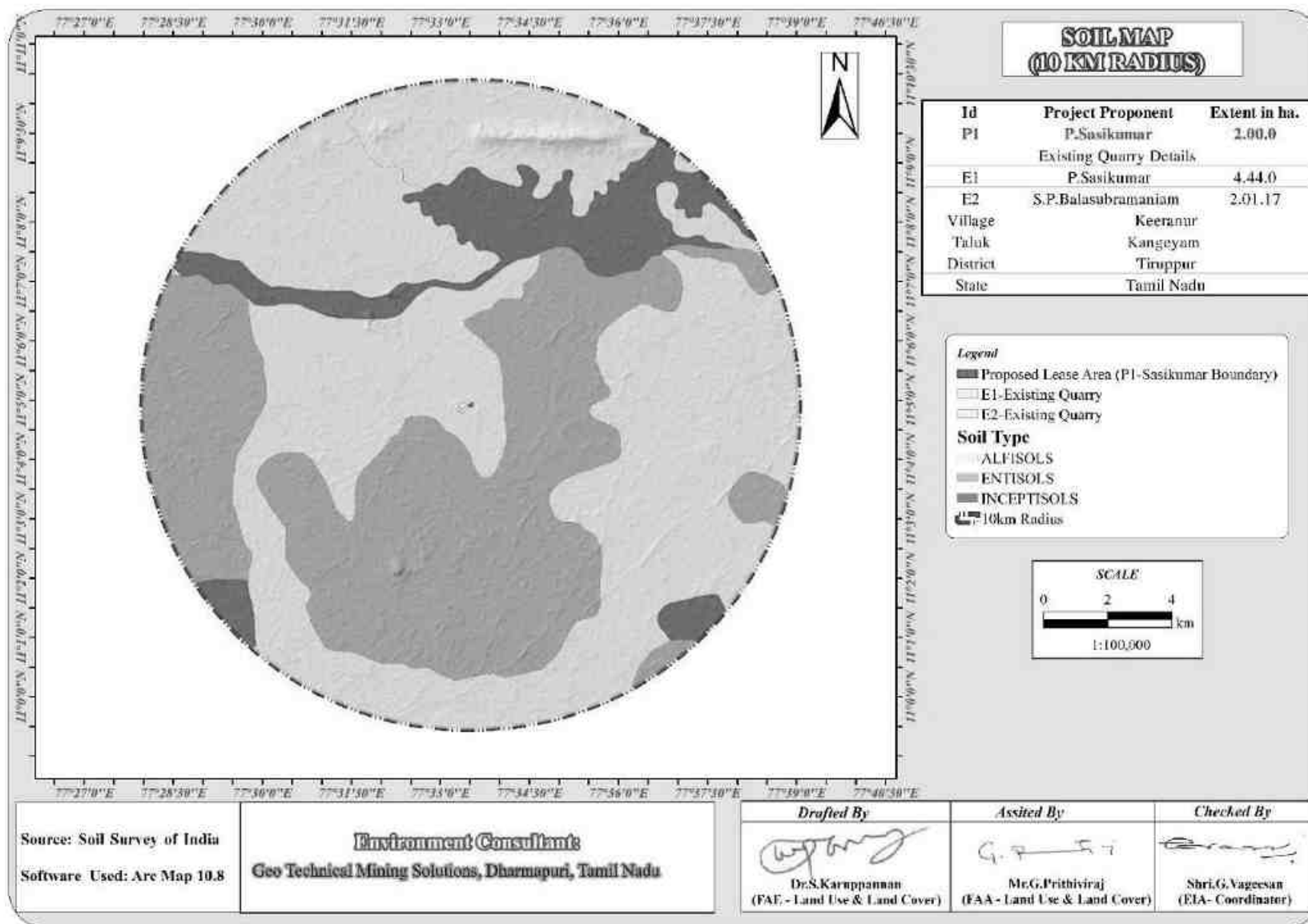


Figure 3.4 Spatial variation in soil chemistry around 10km radius from the proposed project site



**Table 3.7 Soil Quality of the Study Area**

Parameter		Unit	S-1 Core Zone	S-2 Alambadi	S-3 Peranjervali	S-4 Pudupalayam	S-5 Padiyur	S-6 Sivanmalai
1	pH at 27°C	-	7.13	8.24	8.32	8.19	8.72	7.56
2	Electrical Conductivity at 25°C	µs/cm	550	510	438	380	410	358
3	Texture	-	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam
4	Sand	%	35.1	32.3	33.2	31.8	35.7	34.2
5	Slit	%	37.7	35.9	34.6	35.9	38.0	33.9
6	Clay	%	27.2	31.8	32.2	32.3	26.3	31.9
7	Water Holding Capacity	%	43.5	46.5	44.2	48.3	45.4	42.2
8	Bulk Density	g/cc	1.15	1.08	1.53	1.12	0.86	1.06
9	Porosity	%	31.8	28.9	32.6	36.2	39.9	33.4
10	Exchangeable Calcium (as Ca)	mg/Kg	182	173	142	139.6	121	132
11	Exchangeable Magnesium (as Mg)	mg/Kg	22.2	22	31.4	26.2	23.4	38.7
12	Exchangeable Manganese (as Mn)	mg/Kg	31.8	36	33.6	38.4	20	27.6
13	Exchangeable Zinc as Zn	mg/Kg	0.28	0.55	1.17	1.24	0.49	1.22
14	Available Boron (as B)	mg/Kg	0.71	0.57	0.62	0.81	0.63	1.01
15	Soluble Chloride (as Cl)	mg/Kg	141	119	138	158	164	139
16	Soluble Sulphate (as S04)	mg/Kg	124	112	142.3	140	89	143
17	Available Potassium (as K)	mg/Kg	38.2	37.2	42.1	30.2	21.5	29.8
18	Available Phosphorous (as P)	Kg/hect	0.79	1.08	0.92	0.73	0.62	1.19
19	Available Nitrogen (as N)	Kg/hect	212	192	174	186	169	165
20	Cadmium (as Cd)	mg/Kg	BDL (DL:0.003)	BDL (DL:0.003)	BDL (DL:0.003)	BDL (DL:0.003)	BDL (DL:0.003)	BDL (DL:0.003)
21	Chromium (as Cr)	mg/Kg	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
22	Copper (as Cu)	mg/Kg	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
23	Lead (as Pb)	mg/Kg	0.74	0.63	0.78	1.02	0.19	1.17
24	Total Iron	mg/Kg	1.58	1.46	1.09	2.23	2.52	1.52
25	Organic Matter	%	1.42	3.42	2.52	1.95	2.12	2.31
26	Organic Carbon	%	0.82	1.98	1.46	1.13	1.22	1.33
27	CEC	meq/100g	31.3	32.3	28.7	33.9	39	44.5

Source: Sampling Results by Richardson & Cruddas (1972) Ltd,

### 3.1.6.2 Soil Testing Results

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 are presented below in Figure 3.4 and the physico-chemical characteristics of the soil & test results in Table 3.7.

### 3.1.6.3 Results and Discussion

#### *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 0.86 and 1.53 g/cc. The Water Holding Capacity of the soil in the study area varied between 42.2 and 48.3%.

#### *Chemical Characteristics*

- ❖ The nature of soil is slightly alkaline to strongly alkaline with pH range 7.13 to 8.72
- ❖ The Exchangeable Calcium (Ca) content range varied between 121 and 182 mg/kg
- ❖ The Exchangeable Magnesium (Mg) content range varied between 22 and 38.7 mg/kg
- ❖ The available Potassium (K) content range varied between 21.5 and 42.1mg/kg
- ❖ The Soluble Chloride content range varied between 119 and 164 mg/kg
- ❖ The Available Nitrogen content range varied between 165 and 212 kg/ha

## 3.2 WATER ENVIRONMENT

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

Noyyal 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 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 Achaean 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. Open wells as wells as bore wells are more common ground water abstraction structures in the area. The diameter of the open well is in the range of 7 to 10 m and depth of open wells range from 15 to 20 m bgl. The open 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 /likely impact areas, and
- Likely areas which can represent baseline conditions

Two (2) surface water and four (4) bore well water samples were collected from the study area and were analysed for physico-chemical conditions, heavy metals and bacteriological contents in order to assess the effect of mining and other activities on surface and ground water. The samples were analysed as per the procedures specified by CPCB, IS-10500:2012 and 'Standard methods for the examination of water and wastewater' published by American Public Health Association (APHA). The water sampling locations are given in Table 3.8 and shown as Figure 3.5.

**Table 3.8 Water Sampling Locations**

S.No.	Code	Locations	Distance & Direction	Coordinates
<b>Ground Water</b>				
1	SW-1	Maravapalayam,	2.74km NE	11° 6'19.19"N 77°34'8.89"E
2	SW-2	Chinna Gounden Valasu	4.02 NE	11° 5'58.13"N 77°35'29.79"E
3	BW-1	Core Zone	360m NW	11° 5'1.21"N 77°33'17.95"E
4	BW-2	Ekkattampalayam	4.84km NE	11° 6'46.72"N 77°35'26.09"E
5	BW-3	Sivanmalai	5.78 SW	11° 1'54.28"N 77°32'19.29"E
6	BW-4	Pudupalayam	3.68km NW	11° 6'51.82"N 77°33'05.11"E

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

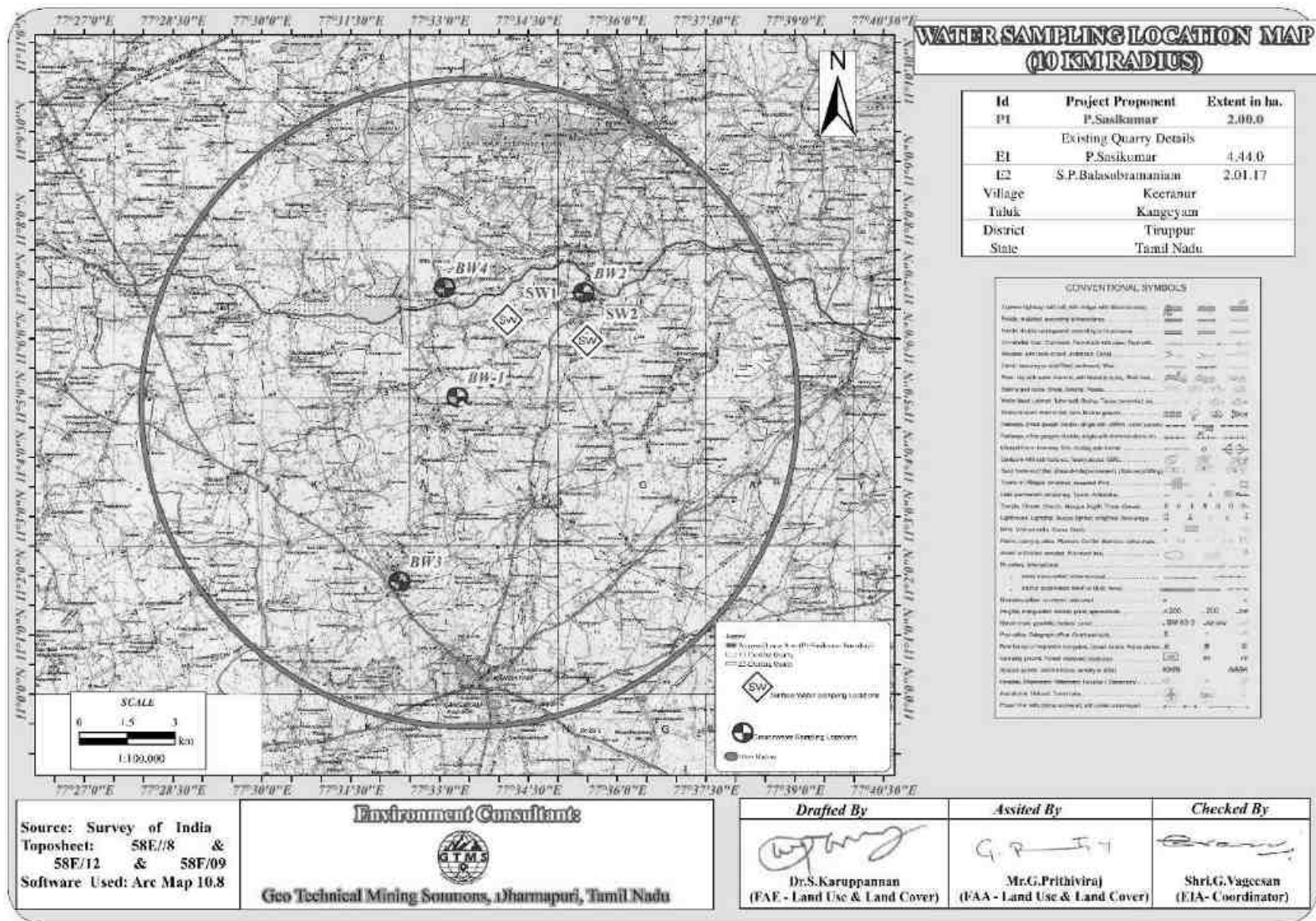


Figure 3.5 Geo-referenced topo sheet showing water-sampling locations within 10km radius around the proposed project site

**Table 3.9 Surface Water Sampling Quality Results**

S.No.	Parameter	UNIT	SW1 Maravapalayam	SW2 Chinna Gounden Valasu	CPCB Designated Best Use
1	Color	Hazen	7	9	300
2	Odour	-	Agreeable	Agreeable	Not specified
3	pH@ 25°C	-	7.32	7.62	6.5 – 8.5
4	Electrical Conductivity @ 25°C	µs/cm	709	680	Not specified
5	Turbidity	NTU	4.9	6.8	Not specified
6	Total Dissolved Solids	mg /l	415	396	1500
7	Total Hardness as CaCO <sub>3</sub>	mg/l	194	184	Not specified
8	Calcium as Ca	mg/l	40.9	38.47	Not specified
9	Magnesium as Mg	mg/l	22.3	22.86	Not specified
10	Total Alkalinity as CaCO <sub>3</sub>	mg/l	172	156	Not specified
11	Chloride as Cl <sup>-</sup>	mg/l	70.9	67.9	600
12	Sulphate as SO <sub>4</sub> <sup>-</sup>	mg/l	23.8	19.7	400
13	Iron as Fe	mg/l	0.13	0.1	50
14	Free Residual Chlorine	mg/l	BDL(DL: 2.0)	BDL(DL: 2.0)	400
15	Fluoride as F	mg/l	0.12	0.16	1.5
16	Nitrates as NO <sub>3</sub>	mg/l	5.1	5.7	50
17	Copper as Cu	mg/l	BDL (DL:0.2)	BDL (DL:0.2)	1.5
18	Manganese as Mn	mg/l	BDL (DL:0.05)	BDL (DL:0.05)	Not specified
19	Mercury as Hg	mg/l	(BDL (DL: 0.0005)	(BDL (DL: 0.0005)	Not specified
20	Cadmium as Cd	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	0.01
21	Selenium as Se	mg/l	BDL (DL: 0.05)	BDL (DL: 0.05)	Not specified
22	Aluminium as Al	mg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	Not specified
23	Lead as Pb	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	0.1
24	Zinc as Zn	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	15
25	Total Chromium	mg/l	BDL (DL: 0.05)	BDL (DL: 0.05)	0.05
26	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	Not specified
27	Mineral Oil	mg/l	BDL (DL:1.0)	BDL (DL:1.0)	Not specified
28	Phenolic Compunds as	mg/l	Absent	Absent	0.005
29	Anionic Detergents as	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	Not specified
30	Cynaide as CN	mg/l	Absent	Absent	0.05
31	Biological Oxygen	mg/l	8.3	10.1	3
32	Chemical Oxygen	mg/l	32	36	Not specified

33	Dissolved Oxygen	mg/l	5.6	6.2	4
34	Total Coliform	Per 100ml	present	present	5000
35	E-Coli	Per 100ml	present	present	Not specified
36	Barium as Ba	mg/l	BDL (DL:0.5)	BDL (DL:0.5)	300
37	Ammonia-n (as Total	mg/l	2.3	2.7	Not specified
38	Sulphide as H <sub>2</sub> S	mg/l	BDL (DL:0.05)	BDL (DL:0.05)	Not specified
39	Molybdenum as Mo	mg/l	BDL (DL:0.5)	BDL (DL:0.5)	Not specified
40	Total Arsenic as As	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	0.2
41	Total Suspended Solids	mg/l	16	16.1	-

### 3.2.4 Results and Discussion

Results of important water quality parameters were compared with the standards of IS 10500:2012 and have been discussed in the following sections.

#### 3.2.4.1 Surface Water

The pH value of the water varied from 7.32 to 7.62 and turbidity varied from 4.9 to 6.8. Total Dissolved Solid varied from 396 to 415 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter. Chloride content varied from 67.9 to 70.9 mg/l. sulphates varied from 19.7 to 23.8 mg/l. Total hardness varied from 184 to 194 mg/l.

#### 3.2.4.2 Ground Water

The pH of the water samples collected ranged from 6.56 to 7.65. The Total Dissolved Solids were found in the range between 364 and 455 mg/l in all samples. The Total hardness varied between 116 and 184 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.

**Table 3.10 Ground Water Sampling Quality Results**

S.No	Parameter	Unit	RESULT				Standards as Per IS 10500: 2012	
			BW1 Core Zone	BW2 Ekkattampalay am	BW3 Sivanmalai	BW4 Pudupalayam	Acceptable Limit	Permissible Limit
1	Color	Hazen	< 5	< 5	< 5	< 5	5	15
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH@ 25°C	-	6.56	7.13	7.08	7.65	6.5-8.5	No relaxation
4	Electrical Conductivity	µs/cm	725	773	676	617	Not specified	Not specified
5	Turbidity	NTU	< 1	< 1	< 1	< 1	1	5
6	Total Dissolved Solids	mg /l	428	455	398	364	500	2000
7	Total Hardness as CaCO <sub>3</sub>	mg/l	142	184	176	116	200	600
8	Calcium as Ca	mg/l	33.6	42.4	37.6	29.6	75	200
9	Magnesium as Mg	mg/l	14.1	18.9	19.9	7.78	30	100
10	Total Alkalinity	mg/l	170	182	158	126	200	600
11	Chloride as Cl <sup>-</sup>	mg/l	97.9	83.2	73	64.2	250	1000
12	Sulphate as SO <sub>4</sub> <sup>-</sup>	mg/l	26.3	23.5	29.2	31.8	200	400
13	Iron as Fe	mg/l	0.15	0.21	0.23	BDL (DL:0.1)	0.3	No relaxation
14	Free Residual Chlorine	mg/l	BDL(DL: 2.0)	BDL(DL: 2.0)	BDL(DL: 2.0)	BDL(DL: 2.0)	0.2	1
15	Fluoride as F	mg/l	0.17	0.14	0.19	0.21	1.0	1.5
16	Nitrates as NO <sub>3</sub>	mg/l	14.2	18.1	12.5	19.2	45	No relaxation
17	Copper as Cu	mg/l	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	0.05	1.5
18	Manganese as Mn	mg/l	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	0.1	0.3
19	Mercury as Hg	mg/l	(BDL (DL: 0.0005)	(BDL (DL: 0.0005)	(BDL (DL: 0.0005)	(BDL (DL: 0.0005)	0.001	No relaxation
20	Cadmium as Cd	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.003	No relaxation

21	Selenium as Se	mg/l	BDL (DL: 0.05)	BDL (DL: 0.05)	BDL (DL: 0.05)	BDL (DL: 0.05)	0.01	No relaxation
22	Aluminium as Al	mg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	0.03	No relaxation
23	Lead as Pb	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.01	No relaxation
24	Zinc as Zn	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	5	15
25	Total Chromium	mg/l	BDL (DL: 0.05)	BDL (DL: 0.05)	BDL (DL: 0.05)	BDL (DL: 0.05)	0.05	No relaxation
26	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.5	1.0
27	Mineral Oil	mg/l	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	0.5	No relaxation
28	Phenolic Compunds	mg/l	Absent	Absent	Absent	Absent	0.001	No relaxation
29	Anionic Detergents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.2	0.1
30	Cynaide as CN	mg/l	Absent	Absent	Absent	Absent	0.05	No relaxation
31	Total Coliform	Per 100ml	< 2	< 2	< 2	< 2	Shall not be detectable in any100 ml	Shall not be detectable in any100 ml
32	E-Coli	Per 100ml	< 2	< 2	< 2	< 2	Shall not be detectable in any100 ml	Shall not be detectable in any100 ml
33	Barium as Ba	mg/l	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	0.7	No relaxation
34	Ammonia (as Total	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.5	No relaxation
35	Sulphide as H <sub>2</sub> S	mg/l	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	0.05	No relaxation
36	Molybdenum as Mo	mg/l	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	0.07	No relaxation
37	Total Arsenic as	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.01	0.05
38	Total Suspended Solids	mg/l	BDL(DL:2)	BDL(DL:2)	BDL(DL:2)	BDL(DL:2)	-	-

\* IS: 10500:2012-Drinking Water Standards; # within the permissible limit as per the WHO Standard. The water can be used for drinking purpose in the absence of alternate sources. Note: SW-Surface water, BW–Borewell Water



### **3.2.5 Hydrogeological Studies**

The area within 10km radius consists of numerous open wells and deep wells. The groundwater potential study was conducted to ascertain the water yielding capacity of the study area. For this study, groundwater prospecting map was prepared, as shown in Figure 3.6. The map shows that wells located in the major portion of the study area can be capable of yielding 50-100 litter of water per minute.

#### **3.2.5.1 Groundwater Levels and flow direction**

In general, groundwater moves from the points of highest static groundwater elevation to the points of lowest static groundwater elevation under the influence of gravity, data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 6 open wells and 6 bore wells at various locations within 2 km radius around the proposed project site for the Period of March April and May 2022 the data thus collected from 6 monitoring open and bore wells respectively and which are presented in Tables 3.11 and 3.12. According to the data, the three months' average depths to the static water table in Open wells range from 13 to 17.2m; the three months 'average depths to potentiometric surface in borewells from 48.9 to 55m. Static water table and potentiometric contour maps are shown in Figures 3.7-3.8. The depths to static water table and potentiometric surface data were used to calculate static groundwater table and potentiometric surface elevations for Open wells and borewells, respectively to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

The maps thus produced are shown in Figures 3.13 and 3.14. From the maps of groundwater flow direction, it is understood that most of the Open well groundwater underneath the proposed mine lease flows towards the Open well number 5 located in NNW of the proposed project site and that most of the borewell groundwater beneath the proposed project site flows towards the bore well number 3 located in NW of the proposed project site. On the basis of the groundwater flow direction, Open well 5 located in NNW and bore wells 5 located in NW of the proposed project site can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the site in future.

**Table 3.11 Water Level of Open Wells within 2 km Radius**

Station ID	Latitude	Longitude	Elevation (meter)	Depth to static water table bgl (m)			
				March 2022	April 2022	May 2022	Average
<b>OW1</b>	11° 3'53.05"N	77°33'22.86"E	272	16	17.1	18.5	17.2
<b>OW2</b>	11° 4'20.51"N	77°33'14.98"E	262	15	16.2	17.5	16.2
<b>OW3</b>	11° 4'24.89"N	77°33'20.25"E	264	15.5	16.6	17.9	16.7
<b>OW4</b>	11° 5'25.72"N	77°33'8.74"E	246	12.4	13.5	15.4	13.8
<b>OW5</b>	11° 5'14.47"N	77°33'24.74"E	253	13.5	14.7	16	14.7
<b>OW6</b>	11° 5'45.01"N	77°33'51.50"E	245	11.2	12.8	15	13.0

Source: Onsite monitoring data

**Table 3.12 Water Level of Borewells within 2 km Radius**

Station ID	Latitude	Longitude	Elevation (meter)	Depth to static water table bgl (m)			
				March 2022	April 2022	May 2022	Average
<b>BW1</b>	11° 4'11.74"N	77°33'29.27"E	267	53.4	54.5	57	55
<b>BW2</b>	11° 4'46.45"N	77°33'1.18"E	256	49.5	51.1	53.4	51.3
<b>BW3</b>	11° 5'24.25"N	77°33'3.80"E	248	47.6	49.5	51.6	49.6
<b>BW4</b>	11° 5'44.64"N	77°33'35.09"E	253	48.5	50	53	50.5
<b>BW5</b>	11° 5'36.70"N	77°33'53.71"E	245	46.5	48.7	51.5	48.9
<b>BW6</b>	11° 4'53.18"N	77°34'8.58"E	261	51	52.5	54.8	52.8

Source: Onsite monitoring data

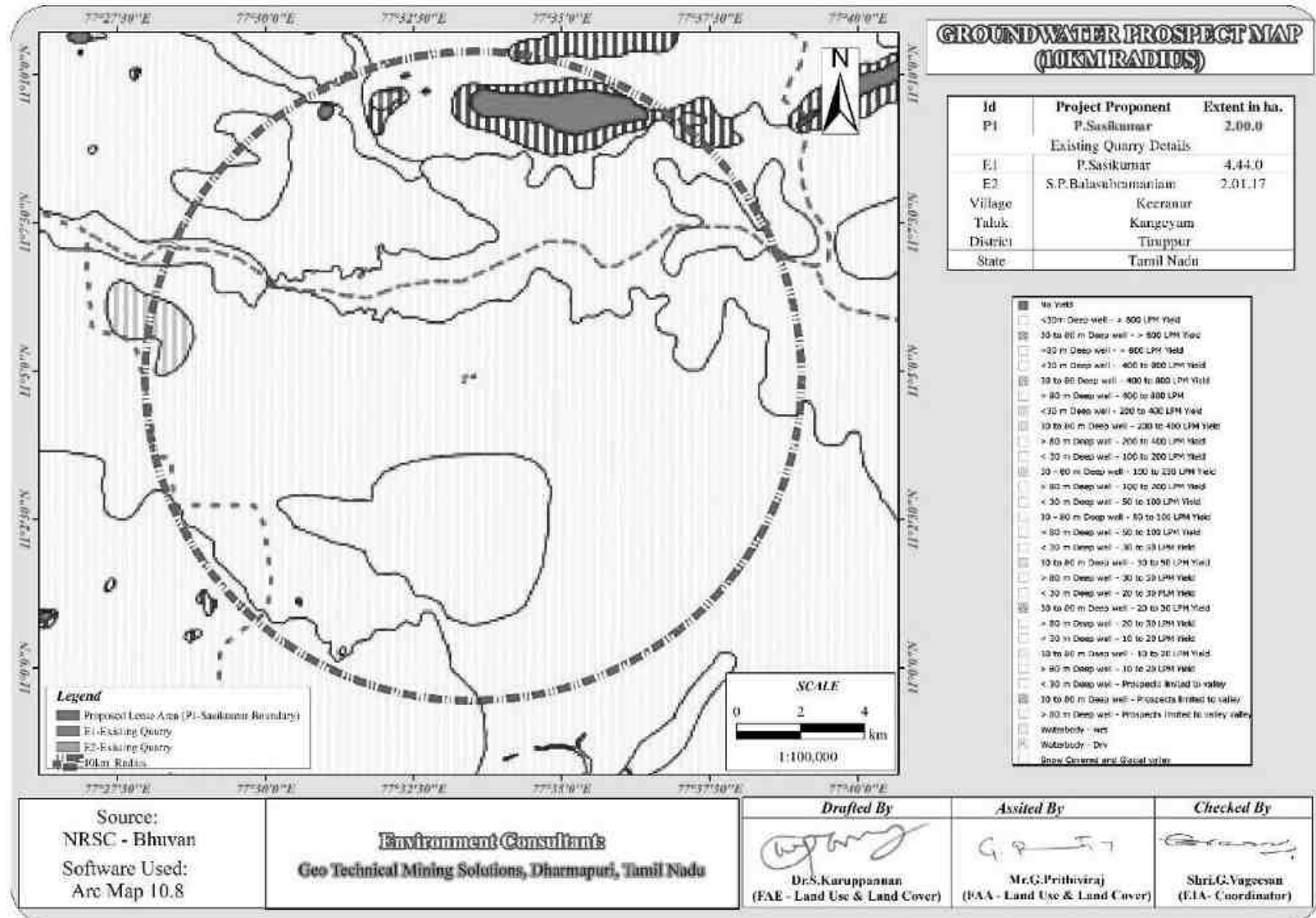


Figure 3.6 Groundwater prospecting map of 10km radius from the proposed project site

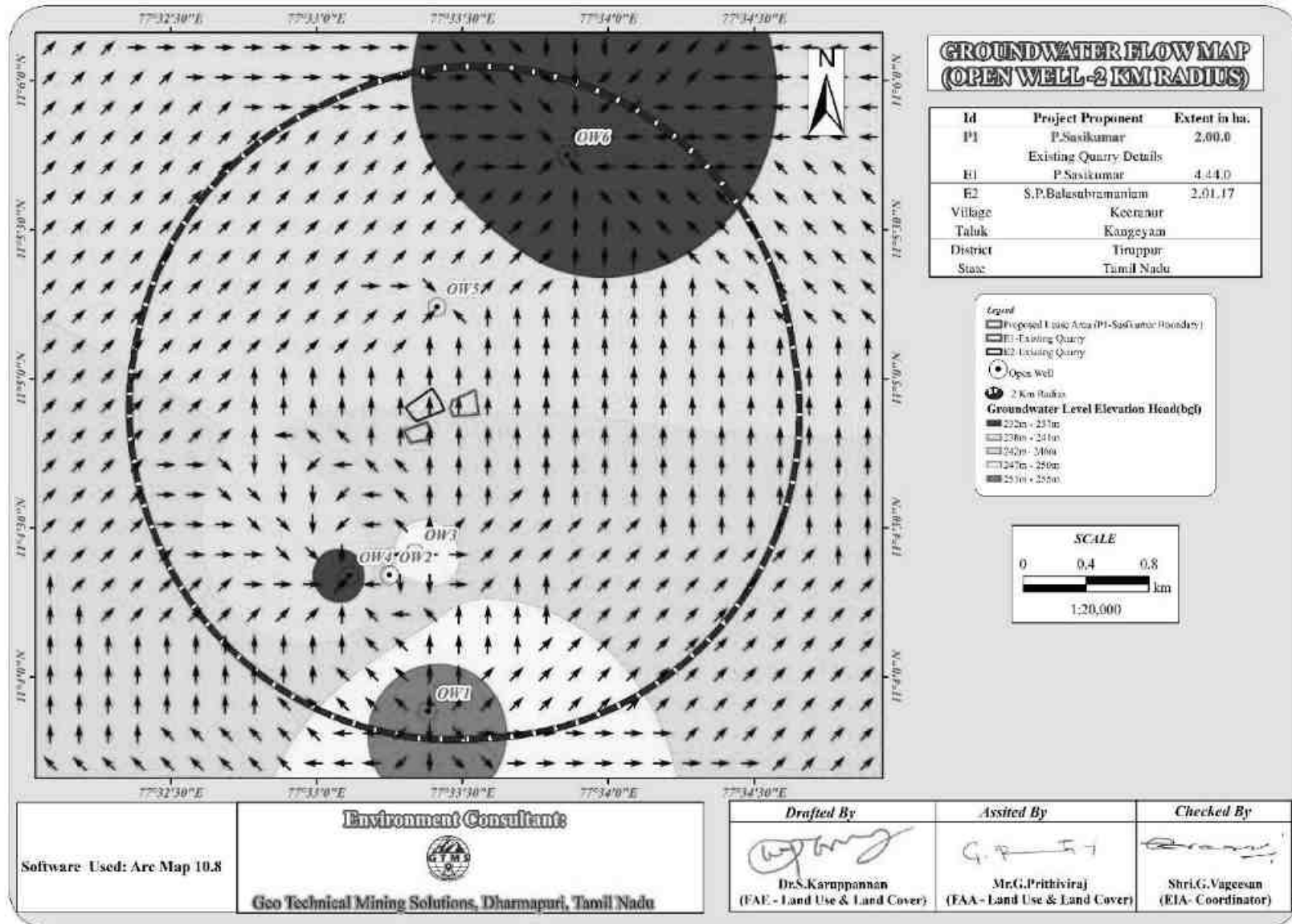


Figure 3.7 Open well static groundwater elevation map showing the direction of groundwater flow within the unconfined aquifer

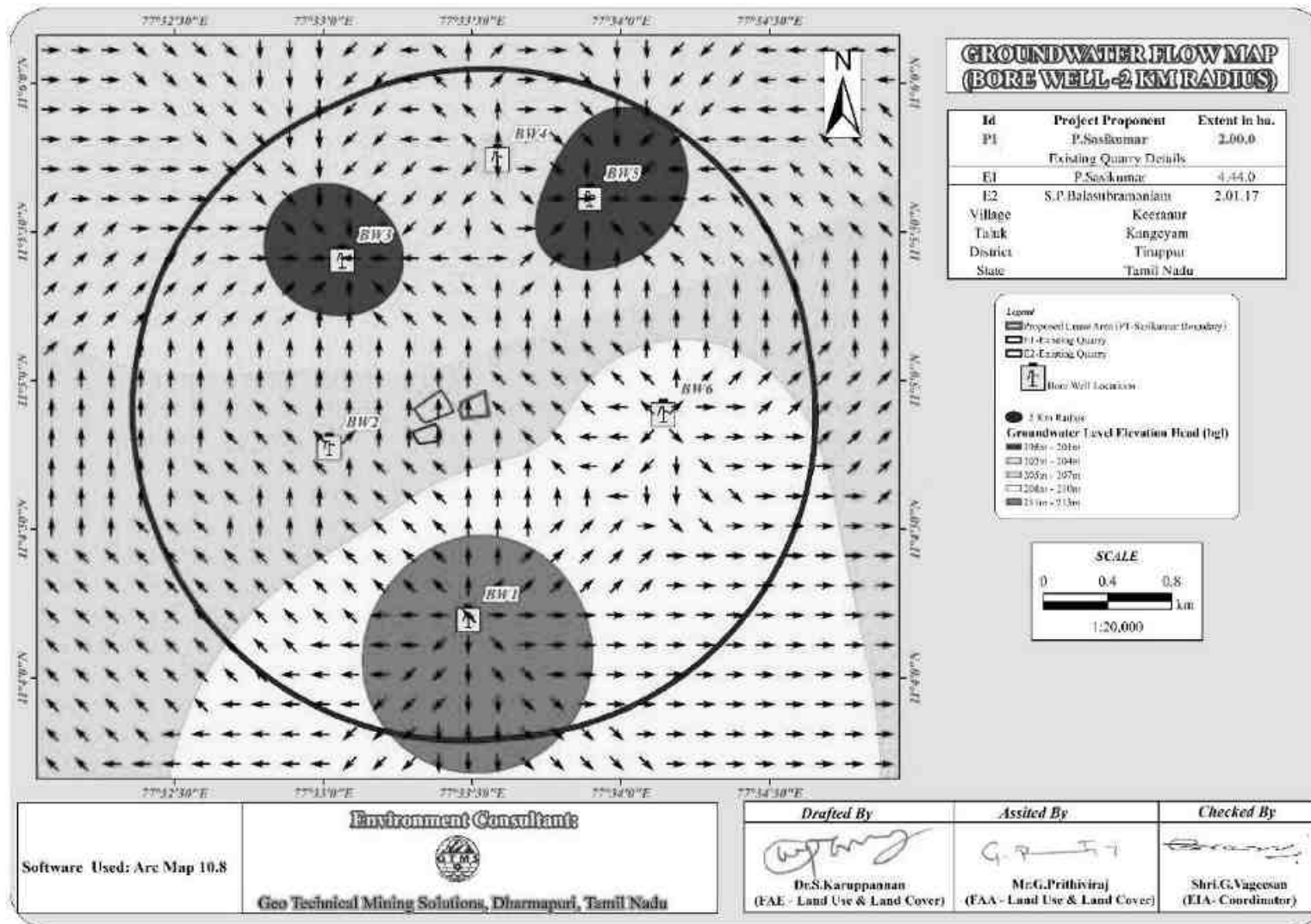


Figure 3.8 Bore well static groundwater elevation map showing the direction of groundwater flow within the confined aquifer

### 3.2.5.2 Electrical Resistivity Investigation

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

### 3.2.5.3 Methodology and Data Acquisition

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

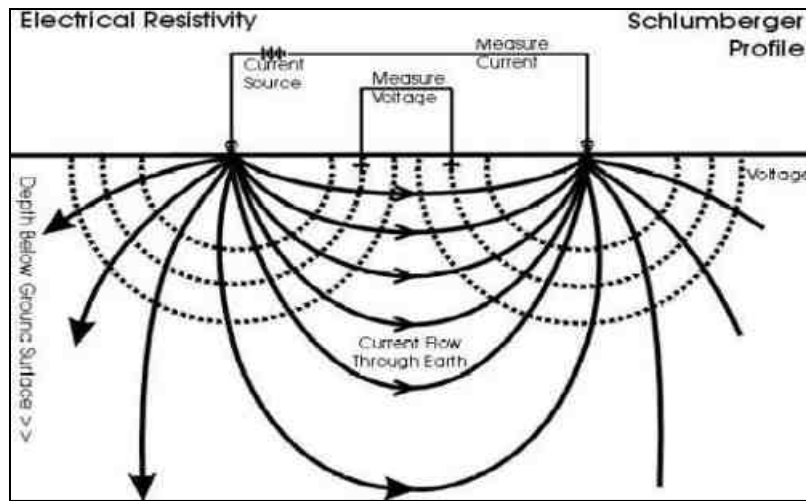
For a Schlumberger, the apparent resistivity can be calculated as follows:

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

$\Delta V$  = potential difference

$G$  = Geometric Factor.

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



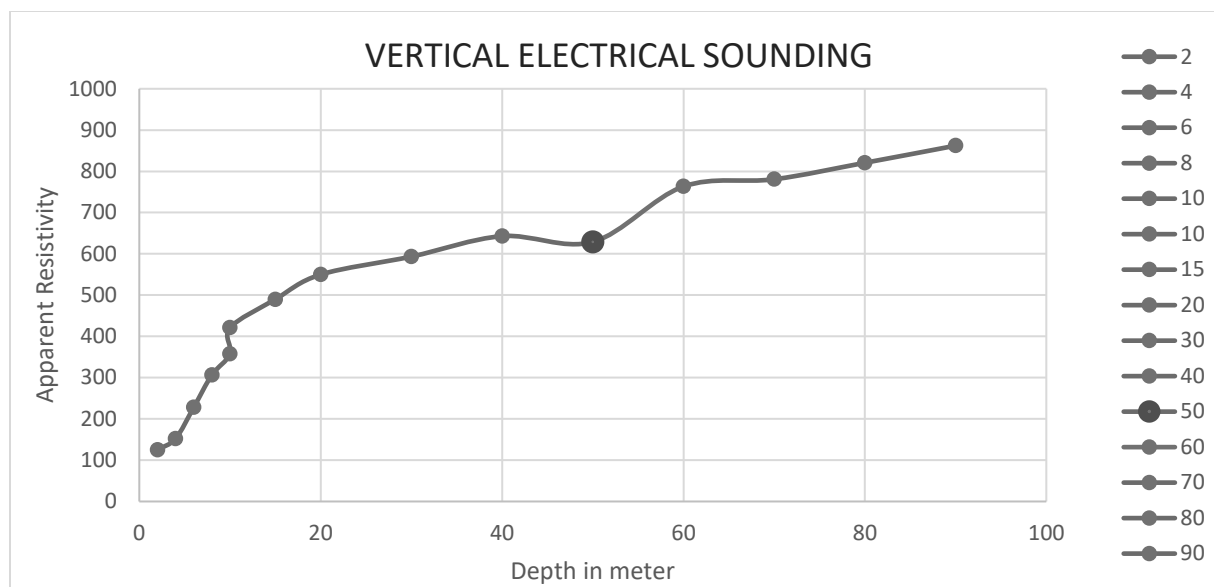
**Figure 3.9 Principle of electrical resistivity investigation**

### 3.2.5.4 Data Presentation

The Geophysical VES data obtained from the project site have been shown in Table 3.13. The field data obtained from a detailed geophysical investigation were plotted with the help of software provided by the manufacturer (I.G.I.S) for interpretation. The plot, known as inverse slope used for the purpose of interpretation has been shown in Figure 3.10.

**Table 3.13 Vertical Electrical Sounding Data**  
**Location Coordinates - 11° 4'53.50"N 77°33'30.43"E**

S.No.	AB/2(m)	MN/2(m)	Geometrical Factor (G)	Resistance in $\Omega$	Apparent Resistivity in $\Omega m$
1	2	1	4.71	26.48	124.91
2	4	1	23.55	6.47	152.37
3	6	1	54.95	4.16	228.04
4	8	1	98.91	3.10	306.62
5	10	1	155.45	2.32	357.54
6	10	5	23.55	17.88	420.84
7	15	5	62.80	7.80	489.84
8	20	5	117.75	4.65	549.89
9	30	5	274.75	2.15	593.46
10	40	5	494.55	1.31	642.92
11	50	5	777.15	0.81	629.49
12	60	5	1122.55	0.66	763.33
13	70	5	1530.75	0.50	780.68
14	80	5	2001.75	0.40	820.72
15	90	5	2535.55	0.34	862.09
16	100	5	3132.15	0.29	939.65



**Figure 3.10 Graph showing occurrence of water bearing fracture zones indicated by purple round**

### 3.2.5.5 Geophysical Data Interpretation

The rock formation with low resistivity indicating occurrence of water occurs at the depths between 50 and 55m below ground level. The maximum depth proposed for the proposed project during the first five-year plan is 17m below ground level. Therefore, the mining operation will not affect the aquifer throughout the entire mine life period.

## 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 project in cluster.

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



### 3.3.1 Meteorology

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

A temporary meteorological station was installed at the project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level as there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature. Meteorological data obtained from the onsite monitoring station are provided in Table 3.14.

According to the onsite data, the temperature in March, 2022 varied from 19 to 33<sup>0</sup>C with the average of 27<sup>0</sup>C; in April ,2022 from 21 to 36<sup>0</sup>C with the average of 28.5<sup>0</sup>C; and in May,2022 from 22 to 37<sup>0</sup>C with the average of 29<sup>0</sup>C. During the period of the three months, relative humidity ranged from 50 to 58 % in average. The highest average humidity was measured in May 2022, whereas the lowest in March,2022. When speaking about wind velocity, the wind velocity in March, 2022 varied from 0.83 to 5.22 m/s with the average of 2.47m/s; in April,2022 from 1.12 to 5.83m/s with the average of 2.85m/s; and in May,2022 from 1.67 to 6.67 m/s with the average of 3.08m/s. During the three months, the values of cloud cover ranged from 0 to 8 oktas.

**Table 3.14 Onsite Meteorological Data**

S.No.	Parameters		March2022	April– 2022	May- 2022
1	Temperature ( <sup>0</sup> C)	Max	33	36	37
		Min	19	21	22
		Avg	27	28.5	29
2	Relative Humidity (%)	Avg	50	52	58
3	Wind Speed (m/s)	Max	5.22	5.83	6.67
		Min	0.83	1.12	1.67
		Avg	2.47	2.85	3.08
4	Cloud Cover (OKTAS)		0-8	0-8	0-8

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

### 3.3.1.1 Climate

Tiruppur is situated at an altitude of 302m above mean sea level. According to the data from <https://en.climate-data.org/asia/india/tamil-nadu/tiruppur-2789/>, The climate Tiruppur is tropical. When compared with winter, the summers have much more rainfall. This location is classified as Aw by Köppen and Geiger. In Tiruppur, the average annual temperature is 26.4 °C, 79.6 °F. The annual rainfall is 943 mm 37.1 inch. April is the warmest month of the year. The temperature in April averages 30.0 °C | 86.0 °F. At 23.7 °C, 74.7 °F on average, December is the coldest month of the year.

### 3.3.1.2 Rainfall

**Table 3.15 Rainfall Data**

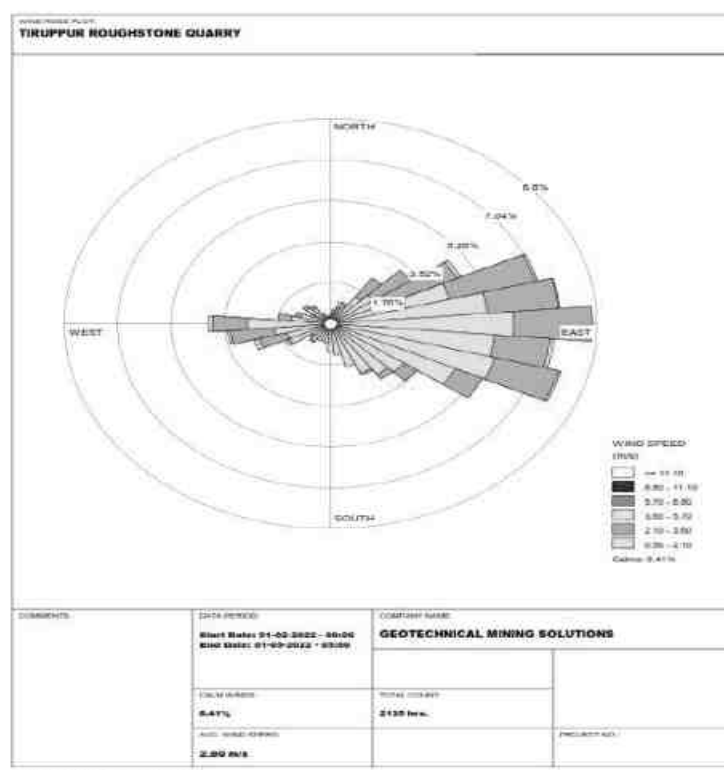
Actual Rainfall in mm					Normal Rainfall
2013	2014	2015	2016	2017	in mm
703.00	360.10	277.60	411.2	679.8	486.34

Data regarding precipitation were collected for the district of the study area from <https://www.twadboard.tn.gov.in/content/tiruppur/>. From the data for the period of 2013-17, the average annual rainfall has been calculated to be 486.34mm. Of the 5 years, the lowest rainfall (277.60mm) occurred in the year 2015, while the highest rainfall(703mm) in the year 2013.

### 3.3.1.3 Wind Pattern

Local wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction over a period of 3 months. The wind rose thus produced, as shown in Figure 3.11 reveals that:

- ❖ The measured average wind velocity during the study period is 2.80m/s
- ❖ Predominant wind direction during the study period is East to West, followed by Southeast to Northwest.



**Figure 3.11 Onsite wind rose diagram**

#### 3.3.1.4 Correlation between Primary and Secondary Data

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

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

In the abstract of collected data wind rose were drawn on presented during the monitoring period in the study area

1. Predominant winds were from E-W & SE – NW
2. Wind velocity readings were recorded between 0.00 to 8.80 m/s
3. Calm conditions prevail of about 3.33 % of the monitoring period
4. Temperature readings ranging from 26.5 to 29 °C
5. Relative humidity ranging from 50 to 58 %
6. The monitoring was carried out continuously for three months

### 3.3.2 Methodology and Objectives

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

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

### 3.3.3 Sampling and Analytical Techniques

**Table 3.16 Methodology and Instrument Used for AAQ Analysis**

Parameter	Method	Instrument
PM2.5	Gravimetric method Beta attenuation method	Fine Particulate Sampler Make – Thermo Environmental Instruments – TEI 121
PM10	Gravimetric method Beta attenuation method	Respirable Dust Sampler Make –Thermo Environmental Instruments – TEI 108
SO <sub>2</sub>	IS-5182 Part II (Improved West & Gaeke method)	Respirable Dust Sampler with gaseous attachment
NO <sub>x</sub>	IS-5182 Part II (Jacob & Hochheiser modifiedmethod)	Respirable Dust Sampler with gaseous attachment
Free Silica	NIOSH – 7601	Visible Spectrophotometry

Source: Sampling methodology based on Richardson & Cruddas (1972) Ltd, & CPCB Notification

**Table 3.17 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 ( $\mu\text{g}/\text{m}^3$ )	Annual Avg.* 24 hours**	50.0 80.0	20.0 80.0
2	Nitrogen Dioxide ( $\mu\text{g}/\text{m}^3$ )	Annual Avg. 24 hours	40.0 80.0	30.0 80.0
3	Particulate matter (size less than $10\mu\text{m}$ ) PM10 ( $\mu\text{g}/\text{m}^3$ )	Annual Avg. 24 hours	60.0 100.0	60.0 100.0
4	Particulate matter (size less than $2.5\mu\text{m}$ ) PM2.5 ( $\mu\text{g}/\text{m}^3$ )	Annual Avg. 24 hours	40.0 60.0	40.0 60.0

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

\*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval, \*\* 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year.

However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

### 3.3.4 Frequency and Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two samples per week at eight (8) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period March to May 2022. The baseline data of ambient air has been generated for PM<sub>10</sub>, PM<sub>2.5</sub>, sulphur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>) 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  $3 \pm 0.5\text{m}$  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

Eight monitoring stations were set up in the study area as depicted in Figure 3.12 for the assessment of the existing ambient air quality. Details of the sampling locations are given in the Table 3.18. The concentrations of air pollutants measured from the proposed project site have been given in Table 3.19

**Table 3.18 Ambient Air Quality (AAQ) Monitoring Locations**

S. No.	Location Code	Monitoring Locations	Distance & Direction	Coordinates
1	AAQ-1	Core Zone	-	11° 4'53.80"N 77°33'30.63"E
2	AAQ-2	Keeranur	1 km SW	11° 4'41.76"N 77°32'57.05"E
3	AAQ-3	Alambadi	3.79km SE	11° 2'58.93"N 77°34'24.02"E
4	AAQ-4	Peranjervali	4.19km SE	11° 4'25.95"N 77°35'48.90"E
5	AAQ-5	Ekkattampalayam	4.66km NE	11° 6'40.06"N 77°35'26.29"E
6	AAQ-6	Tippampalayam	3.5km NW	11° 6'47.29"N 77°33'1.02"E
7	AAQ-7	Padiyur	7.25km SW	11° 3'46.88"N 77°29'38.15"E
8	AAQ-8	Sivanmalai	5.85km SW	11° 1'56.35"N 77°32'14.12"E

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS



**Table 3.19 Summary of AAQ 1 to AAQ8**

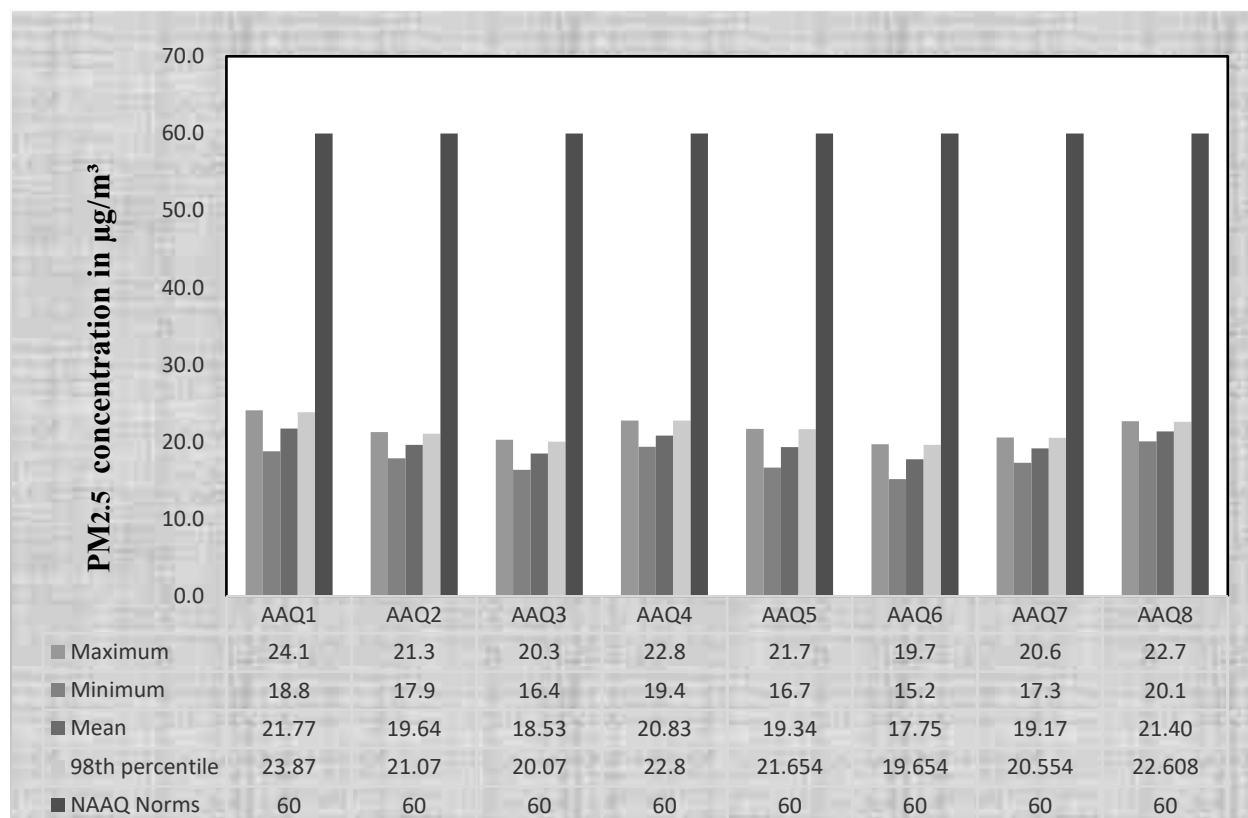
PM <sub>2.5</sub>					
Station	Max	Min	Mean	98 Percentile	STDEV
AAQ-1	24.1	18.8	21.77	23.87	1.40
AAQ-2	21.3	17.9	19.64	21.07	0.95
AAQ-3	20.3	16.4	18.53	20.07	0.91
AAQ-4	22.8	19.4	20.83	22.8	1.09
AAQ-5	21.7	16.7	19.34	21.654	1.41
AAQ-6	19.7	15.2	17.75	19.654	1.35
AAQ-7	20.6	17.3	19.17	20.554	0.89
AAQ-8	22.7	20.1	21.40	22.608	0.70
PM <sub>10</sub>					
Station	Max	Min	Mean	98 Percentile	STDEV
AAQ-1	46.6	42.8	44.66	46.554	1.20
AAQ-2	42.6	40.1	41.48	42.554	0.68
AAQ-3	42	36.4	38.90	41.494	1.29
AAQ-4	46.5	42.4	44.59	46.316	1.11
AAQ-5	43.4	37.2	40.58	43.262	1.59
AAQ-6	41.7	36.6	39.39	41.654	1.47
AAQ-7	42.7	37.1	39.55	42.148	1.27
AAQ-8	44.2	41.1	42.69	44.062	0.82
SO <sub>2</sub>					
Station	Max	Min	Mean	98 Percentile	STDEV
AAQ-1	9.7	7.9	8.90	9.7	1.78
AAQ-2	7.5	5.1	6.38	7.362	0.60
AAQ-3	7.4	5.3	8.98	7.3	0.57
AAQ-4	13.4	8.2	10.47	13.03	1.24
AAQ-5	9.1	6.1	7.60	9.07	0.75
AAQ-6	7.3	5.6	6.55	7.254	0.41
AAQ-7	7.5	5.8	6.63	7.5	0.54
AAQ-8	7.9	6.7	7.18	7.762	0.31
NO <sub>2</sub>					
Station	Max	Min	Mean	98 Percentile	STDEV
AAQ-1	21.6	19.4	20.31	21.6	0.68
AAQ-2	20.3	17.1	18.85	20.254	0.83
AAQ-3	18.3	15.8	16.81	18.208	0.64
AAQ-4	28.9	21.8	25.50	28.302	1.94
AAQ-5	20.1	13.8	17.60	19.594	1.26
AAQ-6	17.9	15.9	16.99	17.854	0.57
AAQ-7	19.4	16.2	17.34	19.26	0.92
AAQ-8	20.1	17.8	18.99	19.916	0.55

**Table 3.20 Maximum, Minimum, Average And 98<sup>th</sup> Percentile of Average Air Pollutant Concentrations Over the Study Area**

S.No.	Statistical Parameters	Pollutant Concentration, $\mu\text{g}/\text{m}^3$			
		PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>
1	Maximum	21.65	43.71	8.73	20.83
2	Minimum	17.73	39.21	6.34	17.23
3	Mean	19.80	41.48	7.84	19.05
4	98 <sup>th</sup> percentile	21.54	43.51	8.62	20.62
5	NAAQ Norms	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>

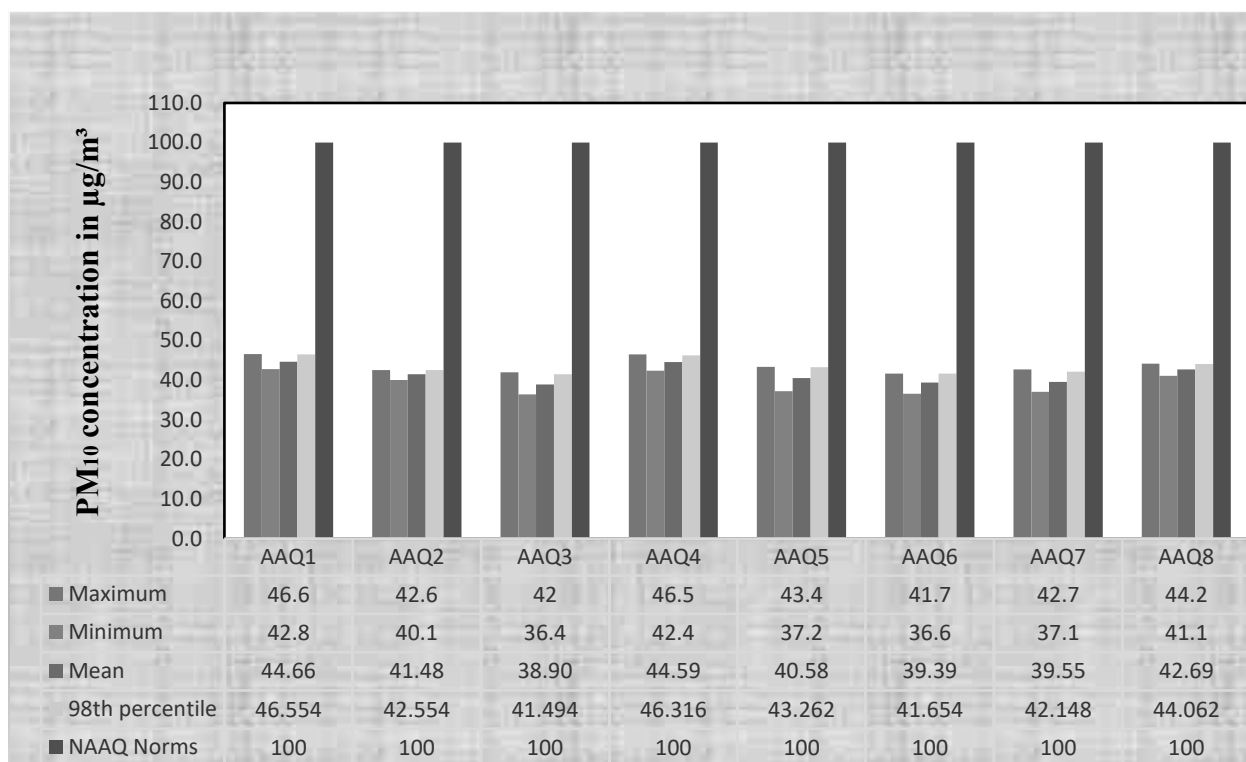
**Legend:** PM<sub>2.5</sub>-Particulate Matter size less than 2.5  $\mu\text{m}$ ; PM<sub>10</sub>-Respirable Particulate Matter size less than 10  $\mu\text{m}$ ; SO<sub>2</sub>-Sulphur dioxide; NO<sub>x</sub>-Oxides of Nitrogen; in particulate phase levels were monitored below their respective detectable limits

\* NAAQ Norms-National Ambient Air Quality Norms-Revised as per GSR 826(E) dated 16.11.2009 for Industrial, Residential, Rural and other Areas.

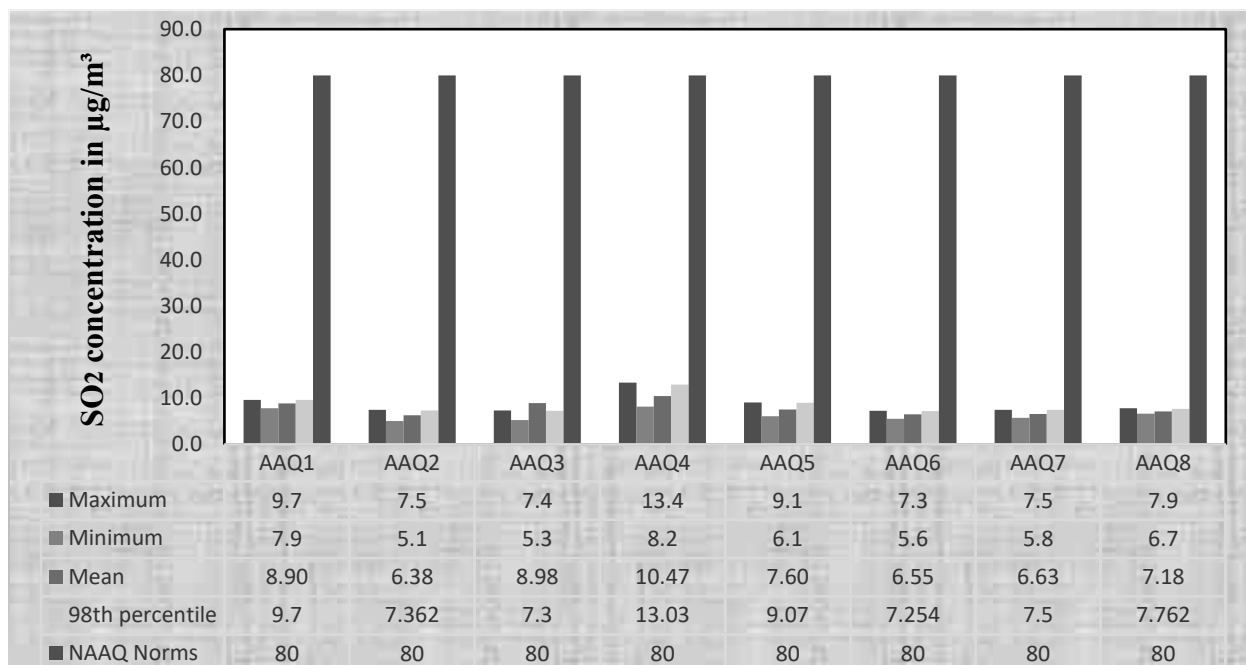


**Figure 3.13 Bar chart showing maximum, minimum, and the average concentrations of PM<sub>2.5</sub> measured from the 8 air quality monitoring stations within 10km radius**

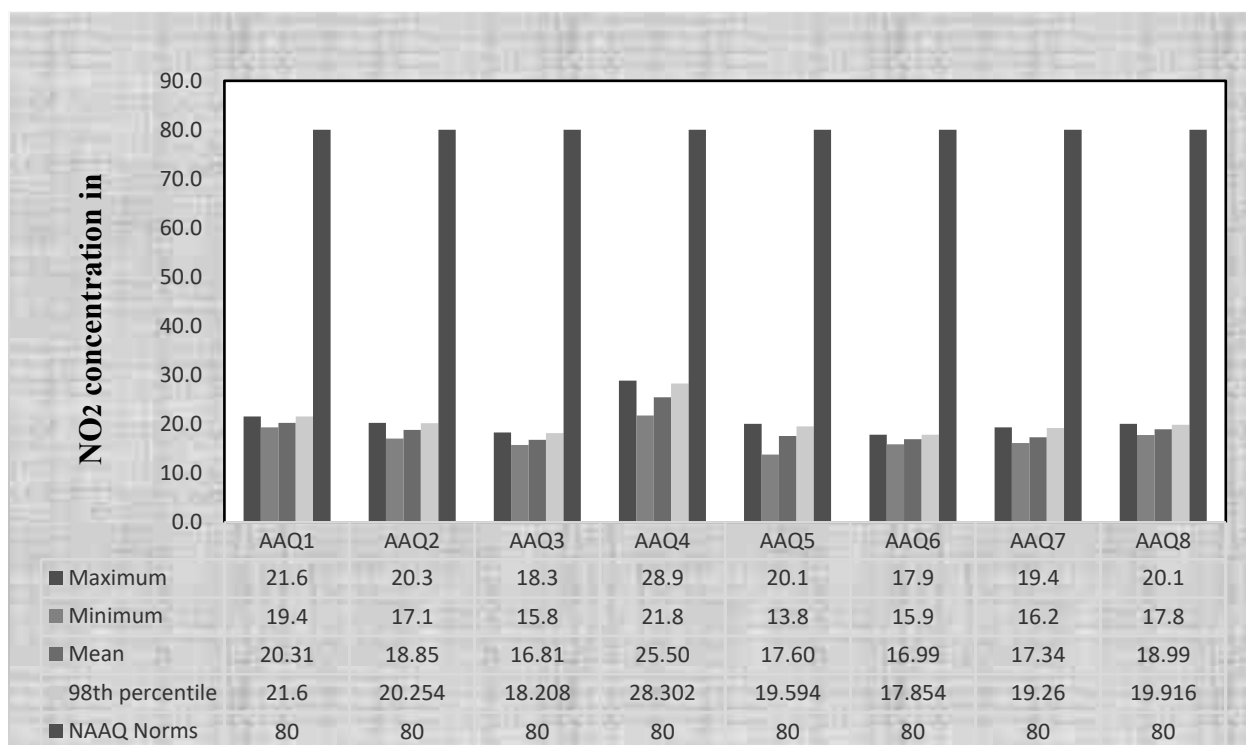




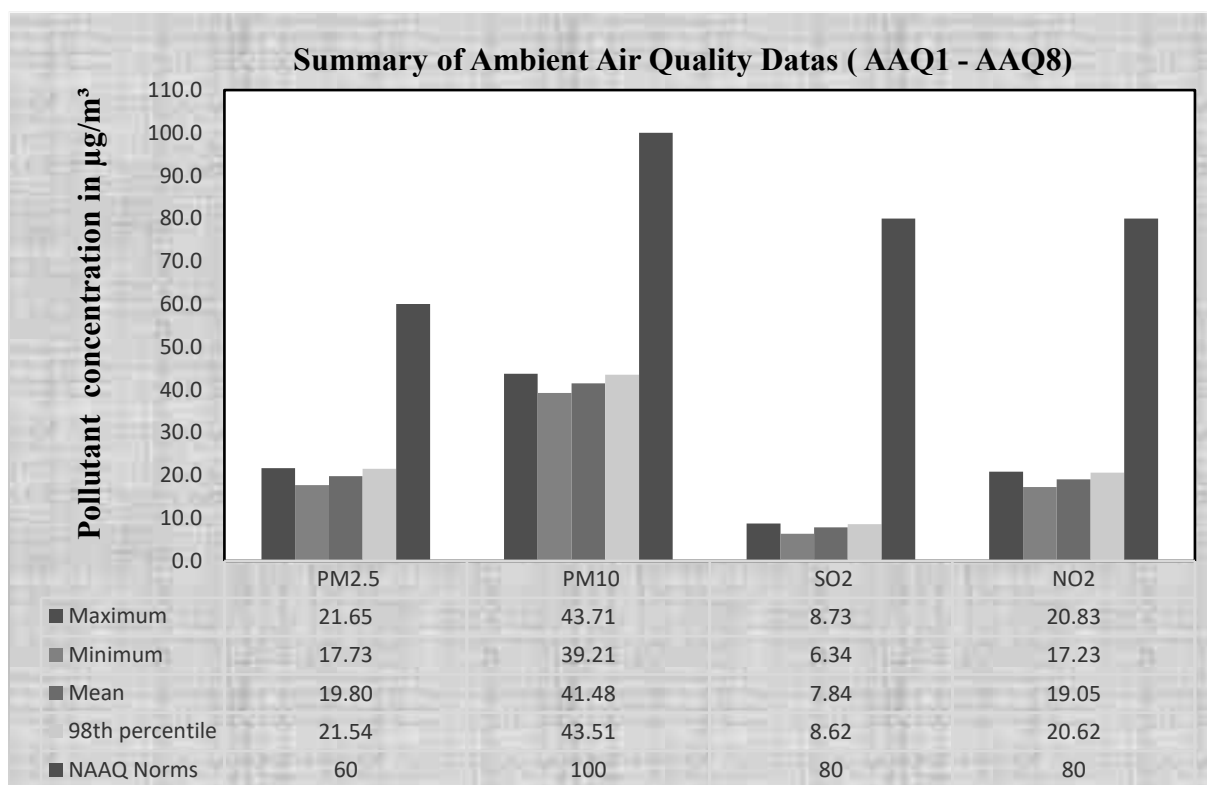
**Figure 3.14 Bar chart showing maximum, minimum, and the average concentrations of PM<sub>10</sub> measured from the 8 air quality monitoring stations within 10km radius**



**Figure 3.15 Bar chart showing maximum, minimum, and the average concentrations of SO<sub>2</sub> measured from the 8 air quality monitoring stations within 10km radius**



**Figure 3.16 Bar chart showing maximum, minimum, and the average concentrations of NO<sub>x</sub> measured from the 8 air quality monitoring stations within 10km radius**



**Figure 3.17 Bar chart showing maximum, minimum, and the average concentrations of pollutants in the atmosphere within 10km radius**

### 3.3.6 FUGITIVE DUST EMISSION

Fugitive dust was recorded at 8 AAQ monitoring stations for 30 days during the study period. The results are given in table 3.21.

**Table 3.21 Average Fugitive Dust Sample Values**

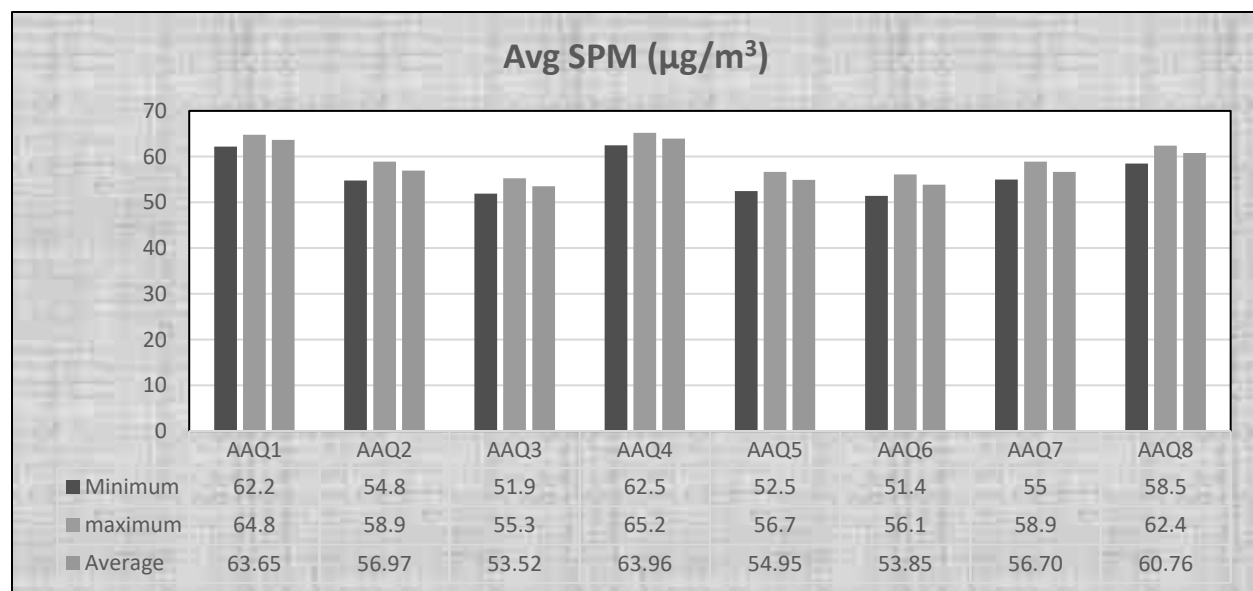
AAQ Locations	Avg SPM ( $\mu\text{g}/\text{m}^3$ )
AAQ 1	63.65
AAQ 2	56.97
AAQ 3	53.52
AAQ 4	63.96
AAQ 5	54.95
AAQ 6	53.85
AAQ7	56.80
AAQ 8	60.76

Source: Onsite monitoring/ sampling by Richardson & Cruddas (1972) Ltd,

**Table 3.22 Fugitive Dust Sample Values in  $\mu\text{g}/\text{m}^3$**

SPM ( $\mu\text{g}/\text{m}^3$ )	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ 7	AAQ 8
<b>Average</b>	63.65	56.97	53.52	63.96	54.95	53.85	56.70	60.76
<b>Min</b>	62.2	54.8	51.9	62.5	52.5	51.4	55	58.5
<b>Max</b>	64.8	58.9	55.3	65.2	56.7	56.1	58.9	62.4

Source: Calculations from Lab Analysis Reports



**Figure 3.18 Bar chart showing minimum, maximum, and the average concentrations of SPM in the atmosphere within 10km radius**

### 3.3.7 Results & Discussion

As per the monitoring data, PM<sub>10</sub> ranges from 39.21 µg/m<sup>3</sup> to 43.71 µg/m<sup>3</sup>; PM<sub>2.5</sub> from 17.73 µg/m<sup>3</sup> to 21.65 µg/m<sup>3</sup>; SO<sub>2</sub> from 6.34 µg/m<sup>3</sup> to 8.73 µg/m<sup>3</sup>; NO<sub>2</sub> from 17.23 µg/m<sup>3</sup> to 20.83 µg/m<sup>3</sup>. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

### 3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area, the environmental assessment of noise from the mining activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses. The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

#### 3.4.1 Identification of Sampling Locations

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at eight (8) locations covering commercial, residential, rural areas within the radius of 10km. A suitable noise monitoring methodology was chosen to meet the purpose and objectives of the study.

**Table 3.23 Details of Noise Monitoring Locations**

S. No	Location code	Monitoring Locations	Distance & Direction	Coordinates
1	N-1	Core Zone	-	11° 4'56.76"N 77°33'32.26"E
2	N-2	Keeranur	0.96 km SW	11° 4'40.08"N 77°32'59.06"E
3	N-3	Alambadi	3.76km SE	11° 3'0.23"N 77°34'23.38"E
4	N-4	Peranjervali	4.23km SE	11°4'26.54"N 77°35'50.69"E
5	N-5	Ekkattampalayam	4.72km NE	11° 6'42.14"N 77°35'25.89"E
6	N-6	Tippampalayam	3.48km NW	11° 6'46.34"N 77°33'1.28"E
7	N-7	Padiyur	7.31km SW	11° 3'47.75"N 77°29'35.67"E
8	N-8	Sivanmalai	5.78km SW	11° 1'55.29"N 77°32'17.00"E

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

### 3.4.2 Method of Monitoring

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

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

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

T = Time interval of observation

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

### 3.4.3 Analysis of Ambient Noise Level in the Study Area

The Digital Sound pressure level has been measured by a sound level meter (Model: HTC SL-1352). An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time. The results are presented in below Table 3.24.

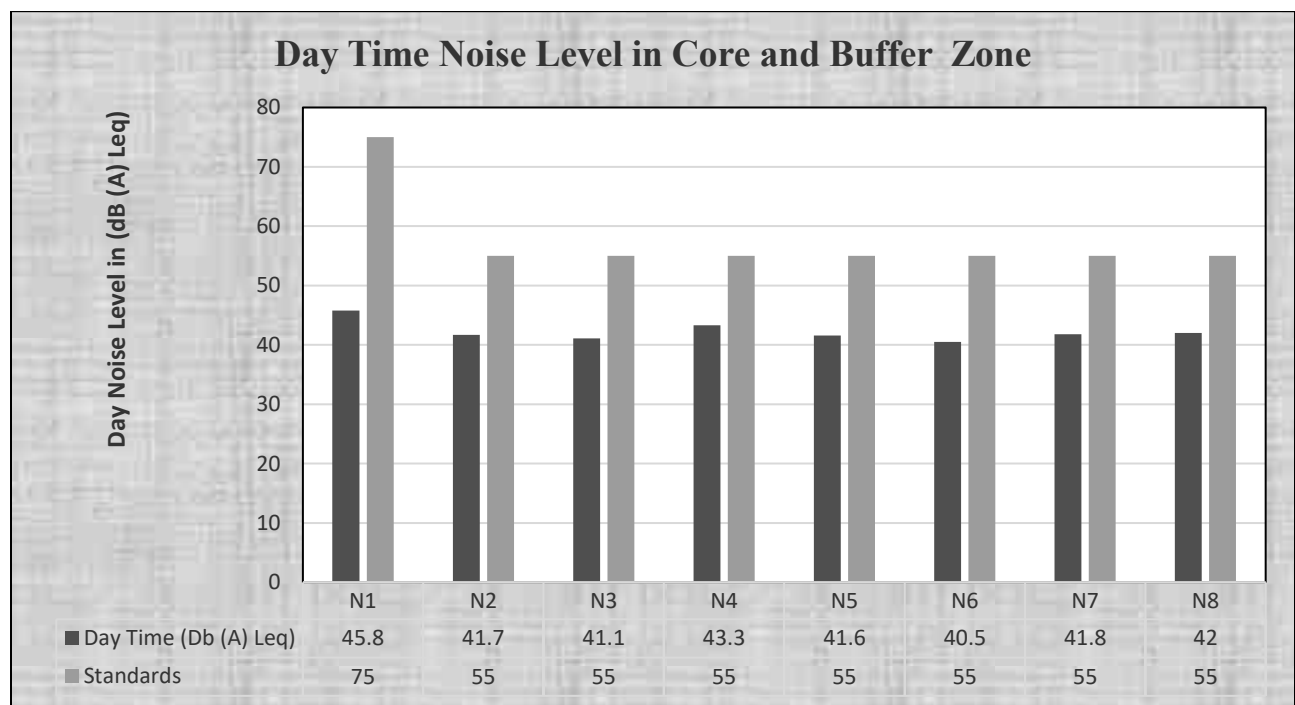
Day time: 6:00 hours to 22.00 hours.

Night time: 22:00 hours to 6.00 hours.

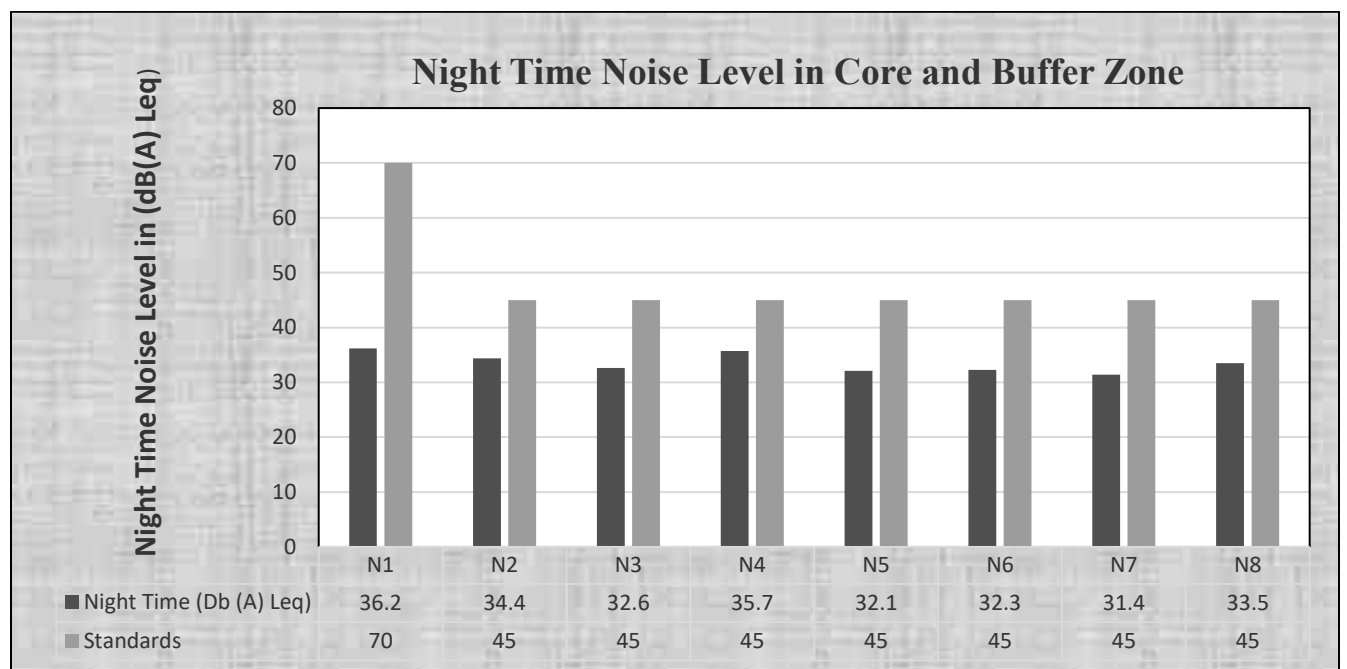
**Table 3.24 Ambient Noise Quality Result**

S. No	Locations	Noise level (dB (A) Leq)		Ambient Noise Standards
		Day Time	Night Time	
1	Core Zone	45.8	36.2	<b>Industrial</b> <b>Day Time- 75 dB (A)</b> <b>Night Time- 70 dB (A)</b>
2	Keeranur	41.7	34.4	
3	Alambadi	41.1	32.6	
4	Peranjervali	43.3	35.7	
5	Ekkattampalayam	41.6	32.1	<b>Residential</b> <b>Day Time- 55 dB (A)</b> <b>Night Time- 45 dB (A)</b>
6	Tippampalayam	40.5	32.3	
7	Padiyur	41.8	31.4	
8	Sivanmalai	42.0	33.5	

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS



**Figure 3.19 Bar chart showing daytime noise levels measured in core and buffer zones**



**Figure 3.20 Bar chart showing night-time noise levels measured in core and buffer zone**

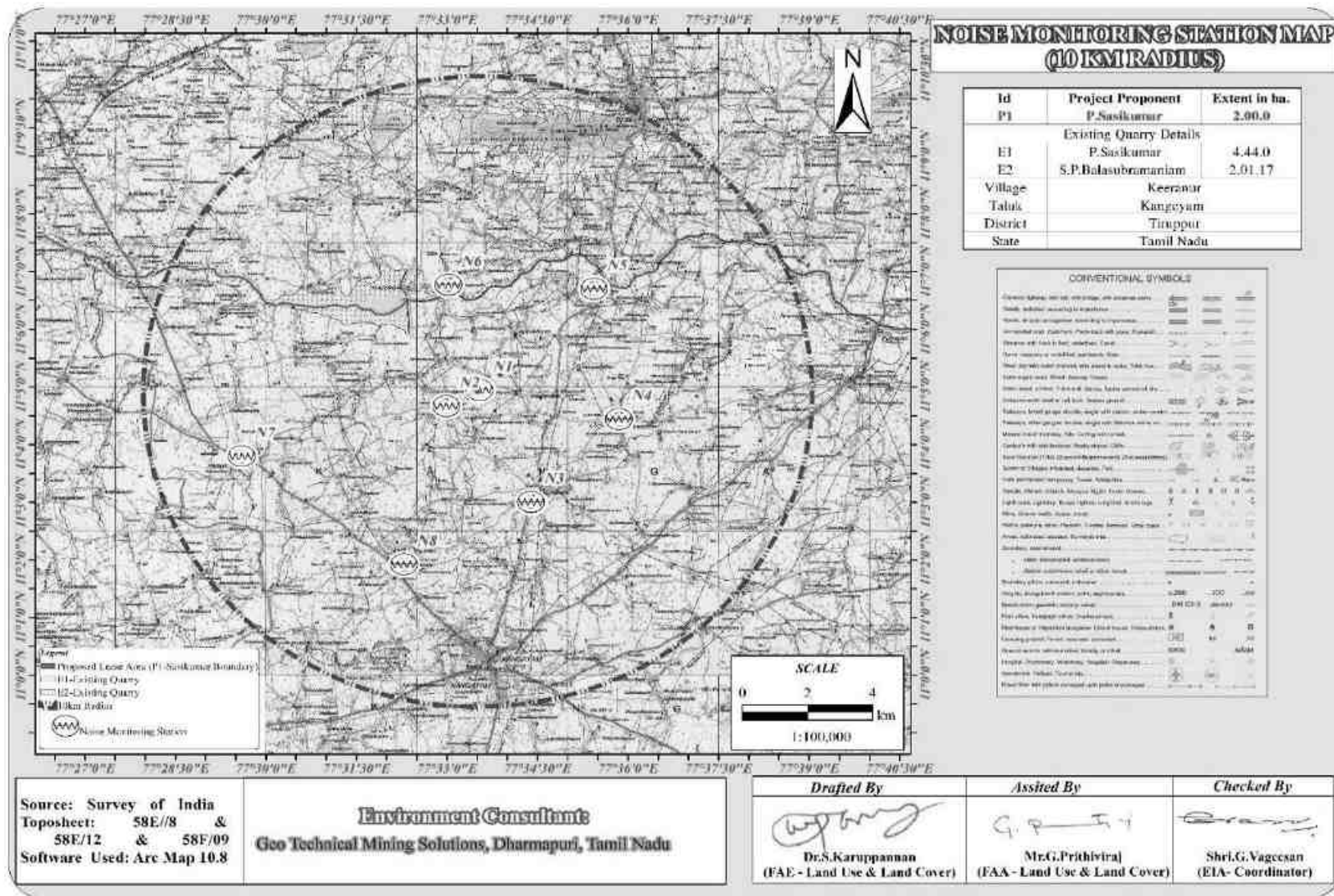


Figure 3.21 Geo- referenced toposheet showing Noise level monitoring station locations around 10km radius from the Proposed project site

### 3.4.4 Results & Discussion

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. During day time, recorded average noise level in core zone was 45.8 dB (A) Leq and during night time, it was 36.2 dB (A) Leq. During day time, average noise level recorded in buffer zone was from 40.5 to 43.3 dB (A) Leq and during night time, it was from 31.4 to 35.7 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.



*Figure 3.22 (a) Soil sample collection using motorized auger for soil chemistry analysis*



*Figure 3.22 (b) A person collecting ambient air quality data in the field*



*Figure 3.22 (c) A person collecting noise level data in the road*



*Figure 3.22 (d) Open well water sample collection for water quality analysis*



### **3.5 INTRODUCTIONS**

Tamil Nadu is the southernmost state of the Indian peninsula, spread over 1,30,058Sq.Km. Among the southern states, Tamil Nadu contains the maximum number of 9 of the totals of 16 major forest types recognized in India by Champion and Seth. Within the major types 48 subtypes in the zone in which they are present.

Tiruppur District is located in the western part of the state of Tamil Nadu at 11°18"N and 77°25"E. The headquarters of the district is in Tiruppur city. It is located on the banks of the Noyyal River. Tiruppur is a major textile and Knitwear hub. The textile industry provides employment to over six lakh people and has an annual turnover of 220 billion Rupees. Of this, nearly 120 billion rupees come from exports.

#### **A. Forest and Wildlife in Tiruppur District**

The diverse topography and rainfall gradient allow a wide variety of vegetation comprising a mix of natural and man-made habitats. The former includes wet evergreen forest and semi-evergreen forest, montane shola-grassland, moist deciduous, dry deciduous, thorn forests, and marshes. Tropical wet evergreen forest is found at an altitude of 600m to 1,600m. Tropical montane forests occur at higher elevations and are interspersed with montane grasslands, forming the shola-grassland complex.

#### **Important Wildlife Sanctuaries**

##### **(a) Amaravathy crocodile farm**

The Crocodile farm at Amaravathy dam is one of the four major crocodile farms in the country and is a popular destination. The crocodile farm is also the home of grizzled squirrels with many nests located on trees within the farm. The largest wild breeding population of Crocodiles in South India lives in the Amaravathy reservoir and in the Chinnar, Thennar and Pambar rivers.

The Amaravathy Sagar Crocodile Farm, established in 1976, the largest Crocodile nursery (captivity) in India should be 90 km from Tiruppur via Palladam and Udumalpet and one km. before the Amaravathy dam site.

##### **b) Indira Gandhi Wildlife Sanctuary**

Indira Gandhi Wild Life Sanctuary is spread over at the altitude of 1400 meters in the Western Ghats area of Pollachi, Valparai and Udumalaipettai. The area of the sanctuary is 958 sq km of which only 387 sq km spreadover in Tiruppur district. Amaravthy Reserve Forest and part of Anaimalai Reserve Forest of Anaimalai wildlife Sanctuary falls within the Tiruppur district.

### **3.5.1 BIOLOGICAL ENVIRONMENT**

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

### **3.5.2. Study area Ecology**

The core area extent of 2.00 Ha of Rough stone and gravel quarry has an impact on diversity of flora and fauna of the surrounding area. But present work was carried out on detailed study of the impacts of Rough stone and gravel quarry on the ecology and biodiversity of the core lease area with the proper mitigation and sustainable management plan. The Core mining area is dry land with the area exhibits topography. whereas in buffer zone some places agricultural land is dominated. The following methods were applied during the baseline study of flora, fauna and diversity assessment.

### **3.5.3 Objectives of Biological Studies**

- a) To study the likely impact of the proposed mining project on the local biodiversity and to suggest mitigation measures, if required, for vulnerable biota.
- b) To identify the impacts of mining on agricultural lands and how it affects.
- c) To assess the nature and distribution of vegetation Terrestrial in and around the mining activity.
- d) Carefully assessment of species diversities, genetic Diversities, densities abundance, etc. within the study area.
- e) Detail of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately for core and buffer area based on such primary field survey and clearly indicating the Schedule of fauna present. In case of any schedule- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished.
- f) Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of the project area.

- g) Devise management & conservation measures for biodiversity.

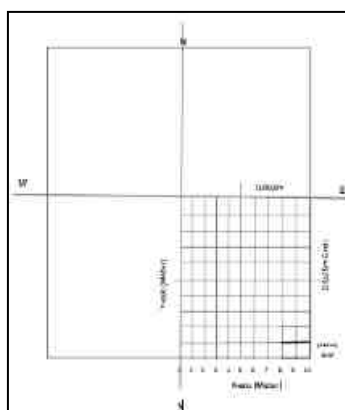
### 3.5.4 Methodology of Sampling

1. Field survey was conducted by visual encounter survey for flora present within the 10 km radius study area of proposed mine site.
2. After surveying the core and buffer areas, a detailed floral inventory has been compiled. List of all plants in the study area was prepared and their habitats were recorded.
3. Verification of Rare, Endangered, and Threatened Flora species from IUCN Red Data Book.

A methodology of Sampling Flora and fauna studies were carried out during the summer season to assess the list of terrestrial plant and animal species that occur in the core area and the buffer area up to 10 km radius from the project site. No damage is created to flora and fauna during the sampling. In order to provide representative ecological status for the study area, the 10-km buffer zone has been divided into four quartiles for biodiversity sampling, i.e., NE (Quartile-1), NW (Quartile-2) SW (Quartile-3) and SE (Quartile-4). Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (20x20-m), shrubs (10x10-m) and herbs (2x2-m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

### 3.5.5 Quadrats method

Quadrats of  $20 \times 20$ -m were laid down randomly within core and 5-km buffer area; each quadrat was laid to assess the trees ( $>5$  cm GBH) and one,  $10 \times 10$ -m sub-quadrat nested within the quadrat for shrubs. The quadrats were laid randomly to cover the area to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, wildlife areas, natural forest area, avenue plantations, house backyards, etc. In each quadrat individuals belonging to tree ( $20 \times 20$ -m) and shrub ( $10 \times 10$ -m) were recorded separately and have been identified on the field. Quadrates sampling methods is given in Fig no.3.23.



**Figure 3.23 A Schematic diagram of random sampling of flora**

### 3.5.6 Flora in Core Zone

Taxonomically a total of 15 species belonging to 11 families have been recorded from the core mining lease area. The lease applied area exhibits plain topography. The area has gentle slope towards the northeast side. Based on habitat classification of the enumerated plants the majority of species were herbs 6 (38%) followed by trees 5 (31%), Shrubs 3 (19%), Climbers 1 (6%), Cactus 1 (6%). Details of flora with the scientific name were mentioned in Table 3.25. The result of the core zone of flora studies shows that Fabaceae, and Apocynaceae are the main dominating species in the study area mentioned in Table No.3.25 and the details of the diversity of flora family's patterns are given in Figure 3.26 No species found as threatened category.

### 3.5.7 Flora in Buffer Zone

The applied lease area is very dry and exhibits plain topography. A similar type of environment is also in the buffer area but with more flora diversity compared to the core zone area because nearby some agricultural land was found to dominate in all directions away from the applied lease area. The majority of the flat landscape around the project unit is occupied by agricultural fields. It contains a total of 80 species belonging to 37 families that have been recorded from the buffer zone. The floral (80) varieties among them Thirty-two Trees 32 (40%) Sixteen Shrubs 16 (20%) and Nineteen Herbs 19 (24%) and Five Climbers 5 (6%), Two Creepers 2 (3%), Five Grass 5 (6%) and one Cactus 1 (1%) were identified. The result of the buffer zone of flora studies shows that Poaceae, Solanaceae, and Euphorbiaceae are the main dominating species in the study area mentioned in Table 3.26.

There are no Rare, Endangered, and Threatened Flora species in the mining area and their surrounding study area. Details of flora with the scientific name were mentioned in Table 3.26. The diversity of flora families is given in Figure 3.28.

**However, the information required as per the Standard Terms of Reference (ToR)**

**Tor No: 10. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, National Park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.**

The lease applied area exhibits plain topography. There are no protected or ecologically sensitive areas such as the Wildlife sanctuaries or 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. Even in the 10 Km buffer zone around the mine lease area, there are no reserve forests or 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.

**Tor No: 12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.**

There are neither reserved (RF) nor protected (PF) forests either in the mine lease area or in the buffer zone. Thus no forest land is involved in any manner. Hence, no certificate from the Forest department is required.

**Tor No: 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.**

As stated earlier, no forest land is involved in the proposed project in any manner. Hence no forest clearance is required.

**Tor No: 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.**

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.

**Tor No: 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.**

There are neither reserved forests (RF) nor Protected Forests (PF) in the study area. There is no reserve forest nearby study area. Detailed list of flora found in the mine lease area and the buffer zone have been collected during March 2022 (Summer season) based on primary survey. In each quadrat individuals belonging to tree (20 × 20-m) and shrub (10 × 10-m) were recorded separately and have been identified on the field. But no quadrat analysis was done in seasonal croplands. Vegetation and flora of the Mine lease area is given in below Table 3.25.

**Table 3.25 Flora in Core Zone**

Sl. No	English Name	Vernacular Name	Scientific Name	Family Name
<b>Trees</b>				
1	Neem	Vembu	<i>Azadirachta indica</i>	Meliaceae
2	Acacia Nilotica	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae
3	White Bark Acacia	Vela maram	<i>Vachellia leucophloea</i>	Fabaceae
4	Mesquite	Mullu maram	<i>Prosopis juliflora</i>	Fabaceae
5	Arapu Tree	Unja maram	<i>Albizia amara</i>	Fabaceae
<b>Shrubs</b>				
1	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae
2	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae
3	Pala indigo plant	Pala maram	<i>Wrightia tinctoria</i>	Apocynaceae
<b>Herbs</b>				
1	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae
2	Devil's thorn	Nerunji	<i>Tribulus terrestris</i>	Zygophyllales
3	Common nut sedge	Korai	<i>Cyperus rotundus</i>	Cyperaceae
4	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae
5	Prickly chaff flower	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae
6	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae
<b>Climber</b>				
1	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae
<b>Cactus</b>				
1	Prickly pear	Nagathali	<i>Opuntia dillenii</i>	Cactaceae



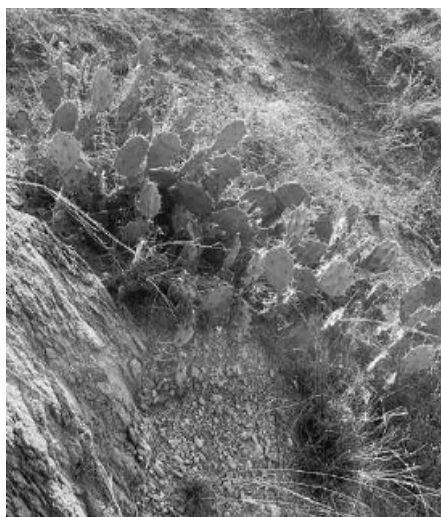
*a. Azadirachta indica*



*b. Wrightia tinctoria*



*c. Albizia amara*



*d. Opuntia dillenii*



*e. Vachellia leucophloea*



*f. Prosopis juliflora*



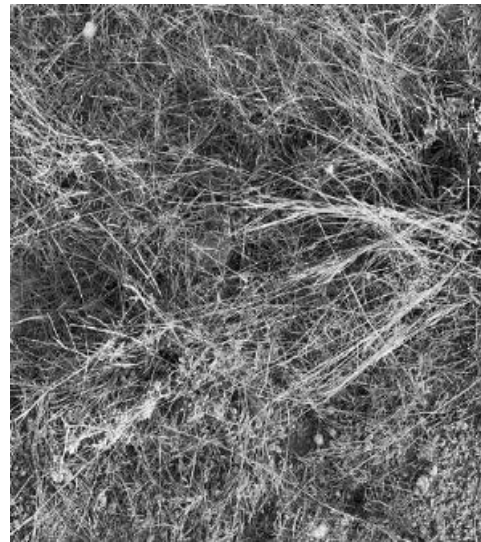
*g. Senna auriculata*



*h. Calotropis gigantea*

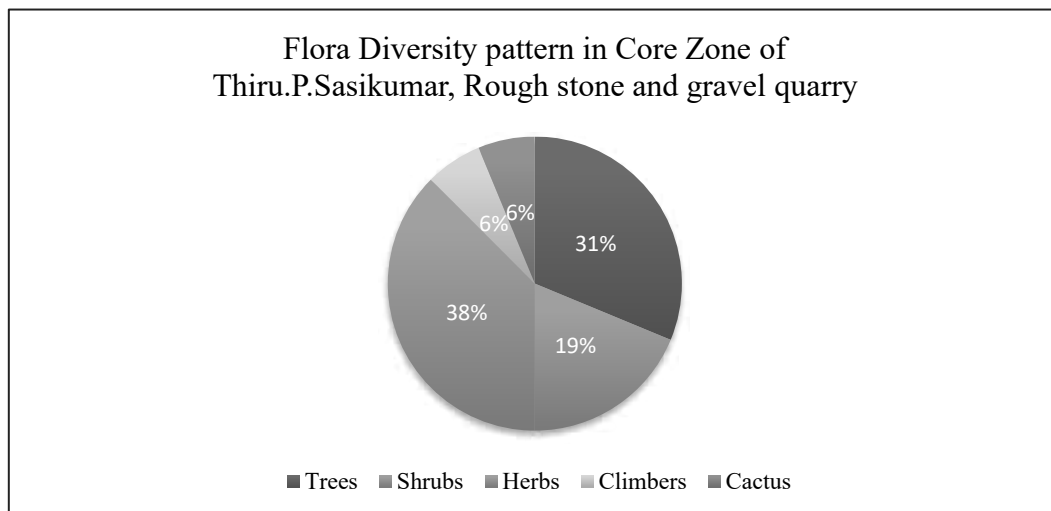


*i. Tridax procumbens*

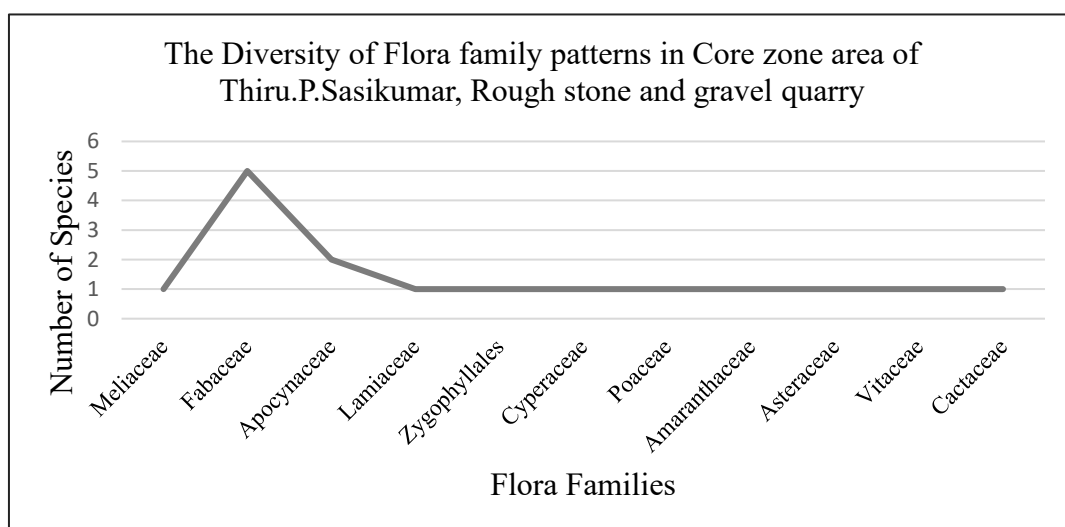


*j. Cyperus rotundus*

**Figure 3.24 Flora species observation in the core zone area**



**Figure 3.25 Flora Diversity pattern in Core Zone**



**Figure 3.26 The Diversity of Flora family patterns in the core zone area**



Table 3.26 Flora in Buffer Zone

Sl.No.	English Name	Vernacular Name	Scientific Name	Family Name	Resource use type *(E,M,EM)
Trees					
1.	Millettia pinnata	Pongam oiltree	<i>Pongamia pinnata</i>	Fabaceae	E
2.	Tamarind	Puliyamaram	<i>Tamarindus indica</i>	Legumes	EM
3.	Asian Palmyra palm	Panai maram	<i>Borassus flabellifer</i>	Arecaceae	E
4.	Coconut	Thennai maram	<i>Cocos nucifera</i>	Arecaceae	EM
5.	Lemon	Ezhumuchaipalam	<i>Citrus lemon</i>	Rutaceae	EM
6.	Mango	Manga	<i>Mangifera indica</i>	Anacardiaceae	E
7.	Banyan tree	Alamaram	<i>Ficus benghalensis</i>	Moraceae	E
8.	Neem or Indian lilac	Vembu	<i>Azadirachta indica</i>	Meliaceae	M
9.	Creamy Peacock flower	Vadanarayani	<i>Delonix elata</i>	Fabaceae	M
10.	Beauty leaf	Punnai	<i>Calophyllum inophyllum</i>	Calophyllaceae	M
11.	Castor oil plant	Amanakku	<i>Ricinus communis</i>	Euphorbiaceae	M
12.	Gum arabic tree	Karuvelam	<i>Acacia nilotica</i>	Mimosaceae	NE
13.	Bitter Albizia	Arappu	<i>Albizia amara</i>	Fabaceae	M
14.	Giant thorny bamboo	Perumungil	<i>Bambusa bambos</i>	Poaceae	M
15.	Black plum	Navalmaram	<i>Syzygium cumini</i>	Myrtaceae	EM
16.	Eucalyptus	Eucalyptus	<i>Eucalyptus globules</i>	Myrtaceae	EM
17.	Custard apple	Seethapazham	<i>Annona reticulata</i>	Annonaceae	E
18.	Acacia Nilotica	Karuvelam maram	<i>Vachellia nilotica</i>	Fabaceae	M
19.	Indian gooseberry	Nelli	<i>Emblica officinalis</i>	Phyllanthaceae	EM
20.	Henna	Marudaani	<i>Lawsonia inermis</i>	Lythraceae	EM
21.	Teak	Thekku	<i>Tectona grandis</i>	Verbenaceae	E
22.	Papaya	Pappali maram	<i>Carica papaya L</i>	Caricaceae	EM
23.	Chinese chaste tree	Nochi	<i>Vitex negundo</i>	Verbenaceae	E
24.	Peepal	Arasanmaram	<i>Ficus religiosa</i>	Moraceae	M
25.	Indian fir tree	Nettilinkam	<i>Polylathia longifolia</i>	Annonaceae	E
26.	Guava	Koyya	<i>Psidium guajava</i>	Myrtaceae	EM
27.	Curry tree	Velipparuthi	<i>Murraya koenigii</i>	Asclepiadaceae	EM
28.	Bamboo	Moonghil	<i>Bambusa bambo</i>	Poaceae	E

29.	Drumstick tree	Murunga maram	<i>Moringa oleifera</i>	Moringaceae	EM
30.	Indian almond	Padam maram	<i>Terminalia catappa</i>	Combretaceae	EM
31.	Mesquite	Velikathan maram	<i>Prosopis juliflora</i>	Fabaceae	M
32.	Portia tree	Poovarasam	<i>Thespesia populnea</i>	Malvaceae	E
<b>Shrubs</b>					
1.	Avaram	Avarai	<i>Senna auriculata</i>	Fabaceae	M
2.	Night shade plan	Sundaika	<i>Solanum torvum</i>	Solanaceae	EM
3.	Triangular spruge	Chaturakalli	<i>Euphorbia antiquorum</i>	Euphorbiaceae	NE
4.	Rosy Periwinkle	Nithyakalyani	<i>Catharanthus roseus</i>	Apocynaceae	M
5.	Indian Oleander	Arali	<i>Nerium indicum</i>	Apocynaceae	M
6.	Shoe flower	Chemparuthi	<i>Hibiscu rosa-sinensis</i>	Malvaceae	EM
7.	Puriging nut	Kattamanakku	<i>Jatropha curcas</i>	Euphorbiaceae	EM
8.	Columnar Cactus	Sappathikalli	<i>Cereus pterogonus</i>	Cactaceae	M
9.	Thorn apple	Oomathai	<i>Datura stramonium</i>	Solanaceae	E
10.	Indian mallow	Thuthi	<i>Abutilon indicum</i>	Meliaceae	M
11.	Flame of the Woods	Idlipoo	<i>Xoracoc cineia</i>	Rubiaceae	M
12.	Datura metel	Umaththai	<i>Datura metel</i>	Solanaceae	NE
13.	Milk Weed	Erukku	<i>Calotropis gigantea</i>	Apocynaceae	M
14.	Cassava	Maravalli kizhangu	<i>Manihot esculenta</i>	Euphorbiaceae	EM
15.	Paper flower	Kahitha poo	<i>Bougainvillea glabra</i>	Nyctaginaceae	M
16.	Tiger nail	Eli verandi	<i>Martynia annua</i>	Martyniaceae	M
<b>Herbs</b>					
1.	Prickly chaff flower	Nayuruv	<i>Achyranthes aspera</i>	Amaranthaceae	M
2.	Tridax daisy	Veetukaayapoondur	<i>Tridax procumbens</i>	Asteraceae	M
3.	Indian Copperleaf	Kuppaimeni	<i>Acalypha indica</i>	Euphorbiaceae	M
4.	Indian doab	Arugampul	<i>Cynodon dactylon</i>	Poaceae	E
5.	Cleome viscosa	Nai kadugu	<i>Celome viscosa</i>	Capparidaceae	M
6.	Punarnava	Mukkirattai	<i>Boerhaavia diffusa</i>	Nyctaginaceae	EM
7.	Common leucas	Thumbai	<i>Leucas aspera</i>	Lamiaceae	M
8.	Node Flower	Kumattikkirai	<i>Allmania nodiflora</i>	Amaranthaceae	M
9.	Holy basil	Thulasi	<i>Ocimum tenuiflorum</i>	Lamiaceae	M
10.	Digeria muricata	Thoiya keera	<i>Digeria muricata</i>	Amaranthaceae	EM
11.	Carrot grass	Partiniyam	<i>Parthenium hysterophorus</i>	Asteraceae	NE

12.	Europeanblack nightshade	Manathakkali	<i>Solanumnigrum</i>	Solanaceae	EM
13.	Chrysanthemum	Samanthi Poo	<i>Chrysanthemum</i>	Asteraceae	E
14.	Tomato	Thakkali	<i>Solanum lycopersicum</i>	Solanaceae	EM
15.	Chilli	Milakai	<i>Capsicum annuum</i>	Solanaceae	EM
16.	Eggplant	Kathrikkai	<i>Solanum melongena</i>	Solanaceae	EM
17.	Coat buttons	Thatha poo	<i>Tridax procumbens</i>	Asteraceae	M
18.	Indian mint	Karpura valli	<i>Coleus amboinicus</i>	Lamiaceae	EM
19.	Aloe barbadensis	Katrashai	<i>Aloe vera</i>	Asphodelaceae	EM
<b>Climber</b>					
1.	Stemmed vine	Perandai	<i>Cissus quadrangularis</i>	Vitaceae	M
2.	Wild bitter	Pavarkai	<i>Momordica charantia</i>	Cucurbitaceae	EM
3.	Pointed gourd	Kovakkai	<i>Trichosanthes dioica</i>	Cucurbitaceae	EM
4.	Ivy gourd	Kovai	<i>Coccinia grandis</i>	Cucurbitaceae	M
5.	Bottle Guard	Sorakkai	<i>Lagenaria siceraria</i>	Cucurbitaceae	EM
<b>Creeper</b>					
1.	Ground Spurge	Sithrapaalavi	<i>Euphorbia prostrata</i>	Euphorbiaceae	EM
2.	Nut grass	Korai	<i>Cyperus rotandus</i>	Poaceae	M
<b>Grass</b>					
1.	Jungle rice	Kuthirai vaal Kattu arusi	<i>Echinochloa colona</i>	Poaceae	NE
2.	Eragrostis	Pullu	<i>Eragrostis ferruginea</i>	Poaceae	E
3.	Windmill grass	Chevvarakupul	<i>Chloris barbata</i>	Amaranthaceae	NE
4.	Sugarcane	Karumbu	<i>Saccharum</i>	Poaceae	E
5	Paddy	Nellu	<i>Oryza sativa</i>	Grasses	E
<b>Cactus</b>					
1.	Prickly pear	Nagathali	<i>Opuntia dillenii</i>	Cactaceae	M

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



*a. Pongamia pinnata*



*b. Cocos nucifera*



*c. Azadirachta indica*



*d. Mangifera indica*



*e. Thespesia populnea*



*f. Wrightia tinctoria*



*g. Citrus lemon*



*h. Lawsonia inermis*



*i. Hibiscu rosa-sinensis*



*j. Emblica officinalis*

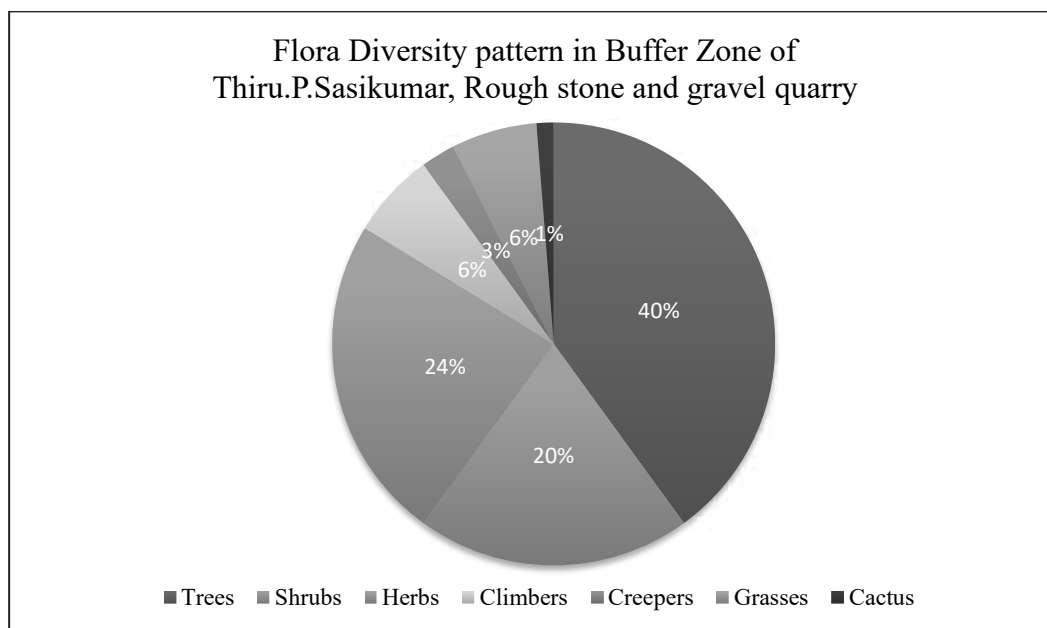


*k. Nerium indicum*

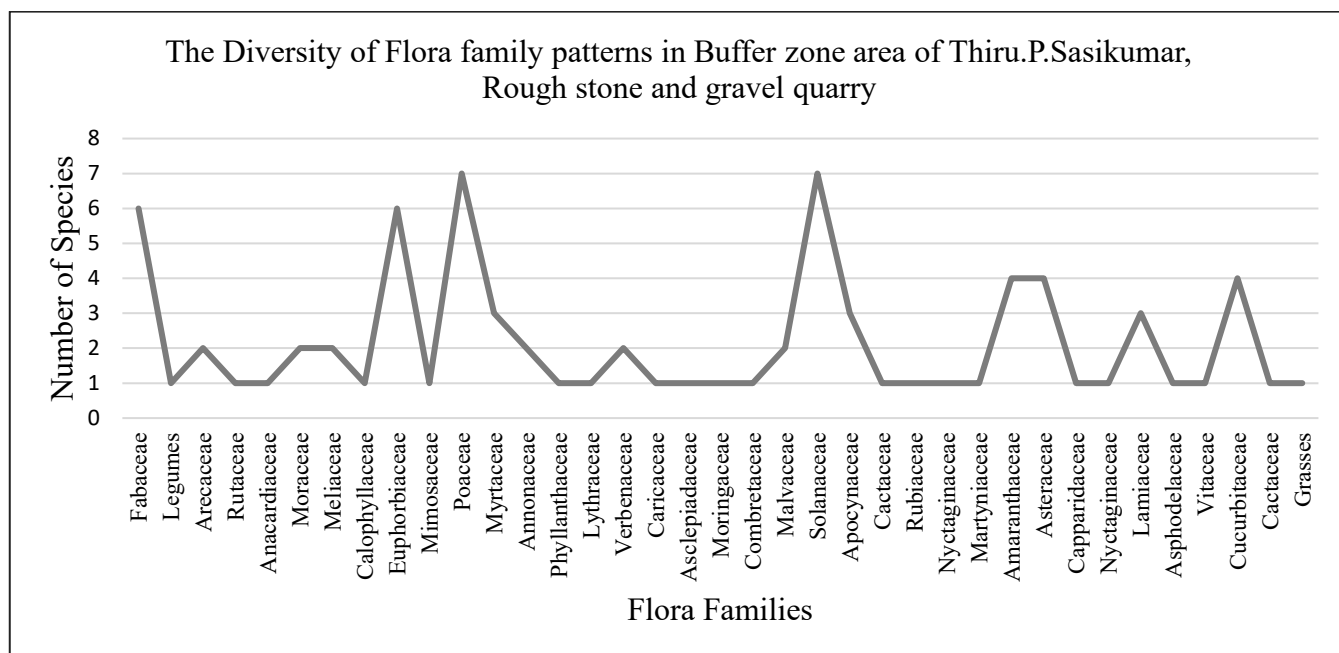


*l. Psidium guajava*

**Figure 3.27 Flora species observation in the Buffer zone area**



**Figure 3.28 Flora Diversity pattern in Buffer Zone**



**Figure 3.29 The Diversity of Flora family patterns in the Buffer zone area**

### 3.5.8 Aquatic Vegetation

The field survey for assessing the aquatic vegetation was also undertaken during the study period. The list of aquatic plants observed in the study area is given in Table 3.27

**Table 3.27 List of aquatic plants observed in the study area**

Sl.No.	Scientific name	Common Name	Vernacular Name (Tamil)	IUCN Red List of Threatened Species
1	<i>Eichornia crassipe</i>	Water hyacinth	Agayatamarai	NA
2	<i>Aponogeton natans</i>	Floating laceplant	Kottikizhnagu	NA
3	<i>Carex cruciata</i>	Cross Grass	Koraipullu	NA
4	<i>Cyperus exaltatus</i>	Tall Flat Sedge	Koraikizhangu	LC

\*LC- Least Concern, NA-Not yet assessed

### 3.5.9 Agriculture & Horticulture in Tiruppur District

#### A. Major Agricultural Crops

Tiruppur district though an industrial district plays important role in Agriculture also. The food production required to be enhanced to provide food and nutritional security to the growing district population. In Tiruppur more than 80% of the farmers belong to small and marginal category and they play a key role in overall development in Agriculture. The total area of cultivation is around 2,28,556 hectares, mainly food and commercial crops. The chief food crops are paddy, millets and pulses. The non-food or commercial crops in the district are cotton, oil seeds and coconut. Details of the major crops are given in Table 3.28

**Table 3.28 Major crops in Tiruppur District**

S.No	Major crops	Scientific name	Families
1	Paddy	<i>Oryza sativa</i>	Grasses
2	Sorghum	<i>Sorghum bicolor</i>	Grasses
3	Maize	<i>Zea mays</i>	Grasses

#### B.Horticulture

Major horticulture crops cultivated in this district are fruits crops like mango, banana, aonla, sapota and papaya, vegetables like bhendi, tomato, brinjal, onion, tapioca, moringa, spices and condiments like chillies and turmeric, plantation crops like cocoa, flower crops like jasmine, tube rose, marigold, cock's comb and medicinal plants like gloriosa and coleus. Details of major field crops and horticulture in Tiruppur district is given in Table 3.29

**Table 3.29 Major Field crops & horticulture in Tiruppur District.**

SI.NO	Common Name	Scientific Name	Family
<b>Major Horticultural Crops</b>			
1	Banana	<i>Musa</i>	Musaceae
2	Mango	<i>Mangifera indica</i>	Anacardiaceae
3	Jack	<i>Artocarpus heterophyllus</i>	Mulberry
4	Guava	<i>Psidium guajava</i>	Myrtle
5	Sapota	<i>Manilkara zapota</i>	Sapotaceae
6	Lemon	<i>Citrus × limon</i>	Rutaceae
<b>Vegetables</b>			
7	Onion	<i>Allium cepa</i>	Amaryllidaceae
8	Tapioca	<i>Manihot esculenta</i>	Spurges
9	Brinjal	<i>Solanum melongena</i>	Nightshade
10	Tomato	<i>Solanum lycopersicum</i>	Nightshade
11	Gourds	<i>Lagenaria siceraria</i>	Cucurbits
12	Bhendi	<i>Abelmoschus esculentus</i>	Mallows
13	Moringa	<i>Moringa oleifera</i>	Moringaceae
<b>Medicinal and Aromatic Plants</b>			
14	Gloriosa superba	<i>Colchicaceae</i>	Colchicaceae
15	Coleus	<i>Plectranthus scutellarioides</i>	Mints
<b>Flowers</b>			
16	Jasmine	<i>Jasminum</i>	Jasminaceae
17	Crossandra	<i>Crossandra infundibuliformis</i>	
18	Crysanthimum	<i>Asteraceae</i>	Asteraceae
19	Rose & Jathi	<i>Rosa</i>	Rosaceae
20	Tuberose	<i>Polianthes tuberosa</i>	Asparagus
<b>Spices and Condiments</b>			
21	Chillies	<i>Capsicum frutescens</i>	Solanaceae
22	Turmeric	<i>Curcuma longa</i>	Zingiberaceae
23	Tamarind	<i>Tamarindus indica</i>	Legumes
24	Curry leaf	<i>Murraya koenigii</i>	Rutaceae
<b>Plantation Crops</b>			
25	Cashew	<i>Anacardium occidentale</i>	Cashews
26	Cocoa	<i>Theobroma cacao</i>	Mallows

### 3.5.10 Types of Irrigation

Irrigation is the artificial application of water to the soil for normal growth of plants. Water is an important determinant factor for production of crops in agriculture sector. Intensive and extensive cultivation of land depends mainly on the availability of water. Medium and minor



irrigation schemes are implemented in the state for augmenting the water supply for agriculture. The various sources of irrigation are canals, tanks, tube wells, ordinary wells, springs and channels. The Following Table 3.30 Shows the area irrigated in Tiruppur District.

**Table 3.30 Area irrigated in the district**

<i>S.No</i>	<i>Irrigation</i>	<i>Area ('000 ha)</i>
<b>1</b>	Net irrigated area	119.3
<b>2</b>	Gross irrigated area	123.1
<b>3</b>	Rain fed area	72.9

*(Source: Statistical handbook of Tamil Nadu-2013)*

Dug wells are the major source of water for irrigation in Tiruppur district, accounting for about 59.97 percent of the total area irrigated in this district. Tube wells accounting for about 9.48 percent of the total area irrigated in this district. Of the net area irrigated, the canal irrigated area is only 29.45 percent. The area irrigated under tank is 1.10 percent.

### **3.6 FAUNA**

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

#### **3.6.1. Fauna methodology**

The study of fauna takes substantial amount of time to understand the specific faunal characteristics of the area. The assessment of fauna has been done on the bases of primary data collected from the lease sites. The presence was also confirmed from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area. In addition officials, local peoples were another source of information for studying the fauna of the area. Field activities are physical/active search, covering rocks, burrows, hollow inspection and location of nesting sites and habitat assessment etc. Taxonomical identification was done by the field guide book and wildlife envis data base ([wiienviis.nic.in/Database/Schedule Species Database](http://wiienviis.nic.in/Database/Schedule%20Species%20Database)) and Zoological Survey of India (ZSI). Detailed faunas methodology is mentioned in the Table 3.31

**Table 3.31 Methodology applied during survey of fauna**

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

### **3.6.2. Fauna Composition in the Core Zone**

A total of 19 varieties of species were observed in the Core zone of Keeranur Village, Rough stone and gravel quarry (Table No.3.32) among them numbers of Insects 8 (42%), Reptiles 2 (11%), Mammals 2 (10%) and Avian 7 (37%). A total of 19 species belonging to 16 families have been recorded from the core mining lease area. None of these species are threatened or endemic in the study area and surroundings. There is no Schedule I species, and seven species are under schedule IV according to the Indian wildlife Act 1972. A total of 7 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 core zone with the scientific name were mentioned in Table 3.32

**Table 3.32 Fauna in Core zone**

<b>Sl. No</b>	<b>Common name/English Name</b>	<b>Family Name</b>	<b>Scientific Name</b>	<b>Schedule list wildlife Protection act 1972</b>	<b>IUCN Red List data</b>
<b>Insects</b>					
1	Mottled emigrant	Peridae	<i>Catopsilia pyranthe</i>	NL	LC
2	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
3	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	NL	NL
4	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
5	Common grass yellow	Pieridae	<i>Eurema hecabe</i>	Schedule IV	LC
6	Plain Tiger	Nymphalidae	<i>Danane schryppus</i>	NL	NE
7	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
8	Termite	Blattodea	<i>Hamitermes silvestri</i>	NE	LC
<b>Reptiles</b>					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Common skink	Scincidae	<i>Mabuya carinatus</i>	NL	LC
<b>Mammals</b>					
1	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	NL
2	Common rat	Muridae	<i>Rattus rattus</i>	Schedule IV	LC
<b>Aves</b>					
1	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
2	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
3	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
4	Koel	Cuculidae	<i>Eudynamis</i>	Schedule IV	LC
5	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
6	Asian green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
7	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC

**\*NL- Not listed, LC- Least Concern**

**(Sources:** Species observation in the field study)

### 3.6.3. Fauna Composition in the Buffer Zone

Taxonomically a total of 36 species belonging to 28 families have been recorded from the buffer zone area. Based on habitat classification the majority of species were Birds 13 (36%), followed by Insects 12 (33%), Reptiles 7 (20%), Mammals 3 (6%), and amphibians 1 (3%). There are four Schedule II species and thirteen species are under schedule IV according to the Indian wildlife Act 1972. A total of 13 species of bird were sighted in the study area. There are no critically endangered, endangered, vulnerable, and endemic species were observed.

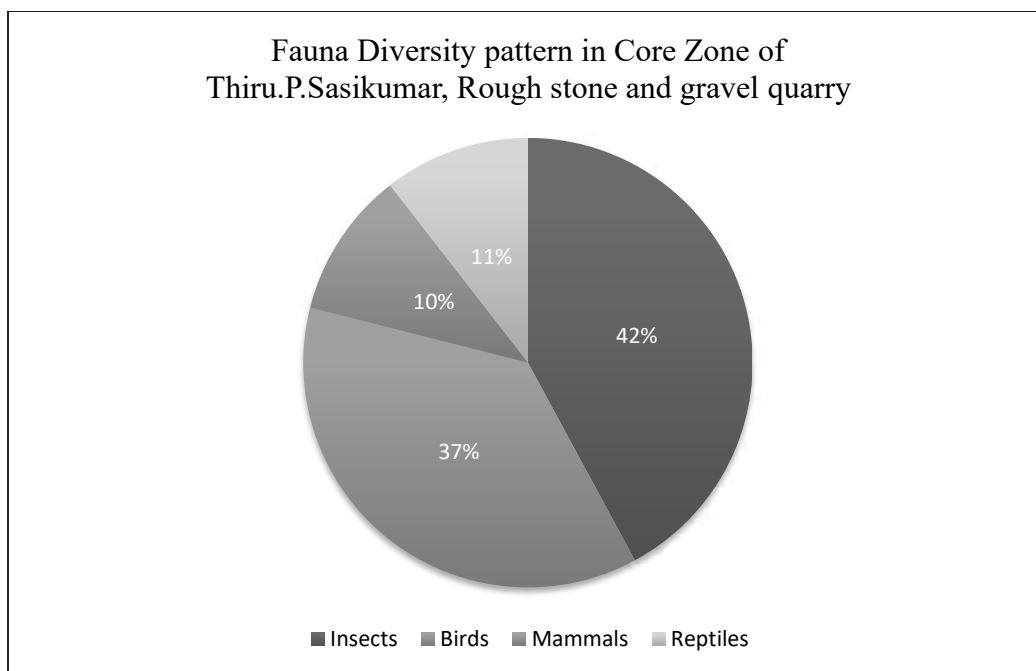
Dominant species are mostly birds and insects and one amphibian was observed during the extensive field visit *Sphaerotheca breviceps*. The result of the Buffer zone of faunastudies shows that Nymphalidae, Ardeidae, Scincidae are the main dominating species in the study area; it is mentioned in Table 3.33 There is no schedule I Species in the study area. A detail of the fauna diversity of family's pattern is given in Figure 3.31 There are no critically endangered, endangered, vulnerable, and endemic species were observed. Details of faunal diversity in the buffer zone are given in Table 3.33

**Table 3.33 Fauna in Buffer zone**

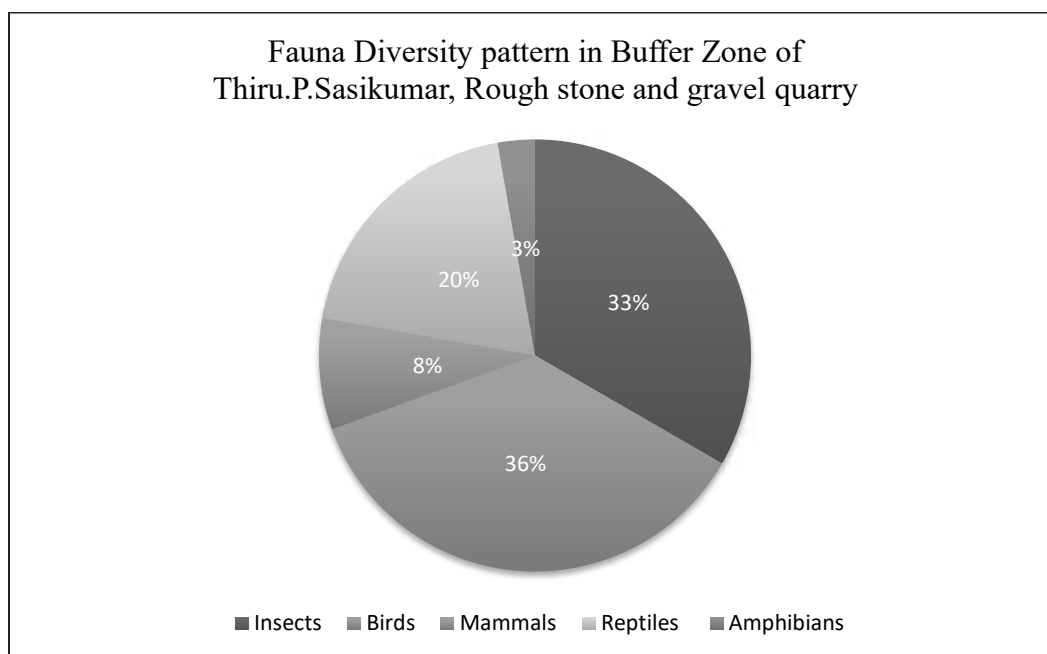
Sl.No	Common Name/English Name	Family Name	Scientific Name	Schedule list wildlife Protection act 1972	IUCN Red List data
<b>Insects</b>					
1	Indian honey bee	Apidae	<i>Apis cerana</i>	Schedule IV	LC
2	Striped tiger	Nymphalidae	<i>Danaus plexippus</i>	Schedule IV	LC
3	Tawny coster	Nymphalidae	<i>Danaus chrysippus</i>	Schedule IV	LC
4	Grasshopper	Acrididae	<i>Hieroglyphus sp</i>	NL	LC
6	Red-veined darter	Libellulidae	<i>Sympetrum fonscolombii</i>	NL	LC
7	Ant	Formicidae	<i>Camponotus Vicinus</i>	NL	NL
8	Common Tiger	Nymphalidae	<i>Danaus genutia</i>	Schedule IV	LC
9	Dragonfly	Gomphidae	<i>Ceratogomphus pictus</i>	Schedule IV	LC
10	Milkweed butterfly	Nymphalidae	<i>Danainae</i>	NL	LC
11	Common Indian crow	Nymphalidae	<i>Euploea core</i>	Schedule IV	LC
12	Lesser grass blue	Lycaenidae	<i>Zizina Otis indica</i>	Schedule IV	LC
<b>Reptiles</b>					
1	Garden lizard	Agamidae	<i>Calotes versicolor</i>	NL	LC
2	Fan-Throated Lizard	Agamidae	<i>Sitanaponticeriana</i>	NL	LC
3	Indian wall lizard	Gekkonidae	<i>Hemidactylus flaviviridis</i>	Schedule IV	NL
4	Rat snake	Colubridae	<i>Ptyas mucosa</i>	Sch II (Part II)	LC
5	Russell's viper	Viperidae	<i>Vipera russeli</i>	Sch II (Part II)	LC
6	Saw scaled viper	Elapidae	<i>Echis carinatus</i>	Sch II (Part II)	LC

7	Common skink	Scincidae	<i>Mabuya carinatus</i>	NL	LC
<b>Mammals</b>					
1	Indian palm squirrel	Sciuridae	<i>Funambulus palmarum</i>	Schedule IV	LC
2	Indian Field Mouse	Muridae	<i>Mus booduga</i>	Schedule IV	LC
3	Asian Small Mongoose	Herpestidae	<i>Herpestes javanicus</i>	Schedule (Part II)	LC
<b>Aves</b>					
1	Koel	Cuculidae	<i>Eudynamys</i>	Schedule IV	LC
2	Cattle egret	Ardeidae	<i>Bubulcus ibis</i>	NL	LC
3	Common myna	Sturnidae	<i>Acridotheres tristis</i>	NL	LC
4	House crow	Corvidae	<i>Corvus splendens</i>	NL	LC
5	Asian green bee-eater	Meropidae	<i>Merops orientalis</i>	NL	LC
6	Small blue Kingfisher	Alcedinidae	<i>Alcedo atthis</i>	Schedule IV	LC
7	Rose-ringed parakeet	Psittaculidae	<i>Psittacula krameri</i>	NL	LC
8	Common quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
9	Small Sunbird	Nectariniidae	<i>Nectarinia asiatica</i>	Schedule IV	LC
10	Black drongo	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
11	Two-tailed Sparrow	Dicruridae	<i>Dicrurus macrocercus</i>	Schedule IV	LC
12	Grey Francolin	Phasianidae	<i>Francolinus pondicerianus</i>	Schedule IV	LC
13	Common Quail	Phasianidae	<i>Coturnix coturnix</i>	Schedule IV	LC
<b>Amphibians</b>					
1	Indian Burrowing frog	Dicroglossidae	<i>Sphaerotheca breviceps</i>	Schedule IV	LC

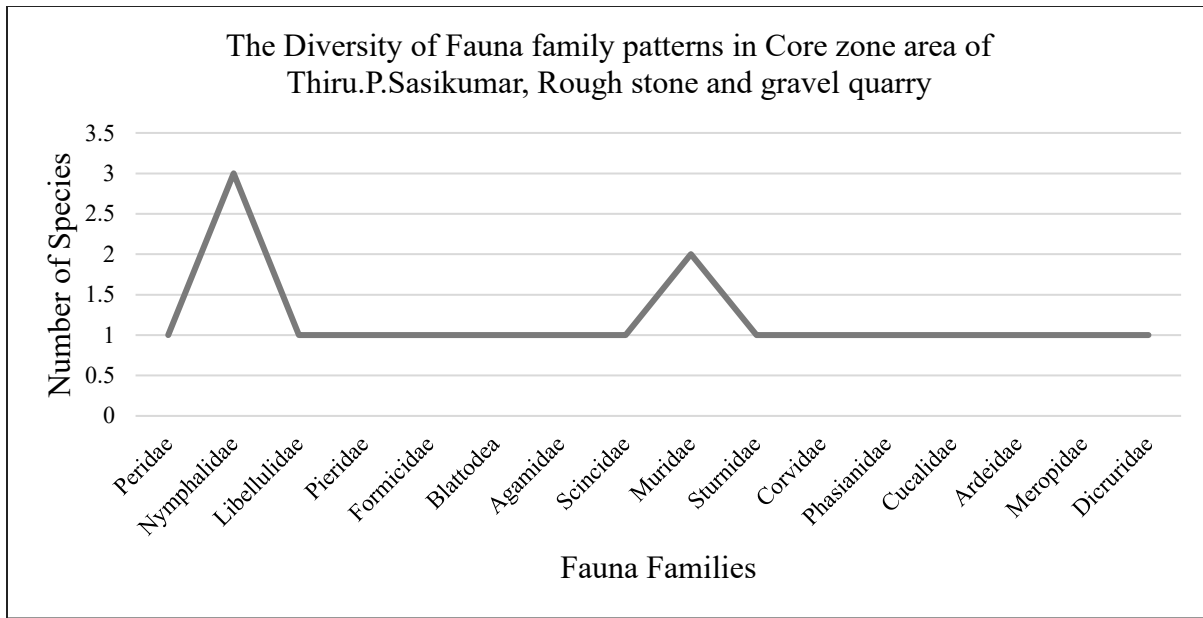
\*NL- Not listed, LC- Least concern, NT- Near threatened



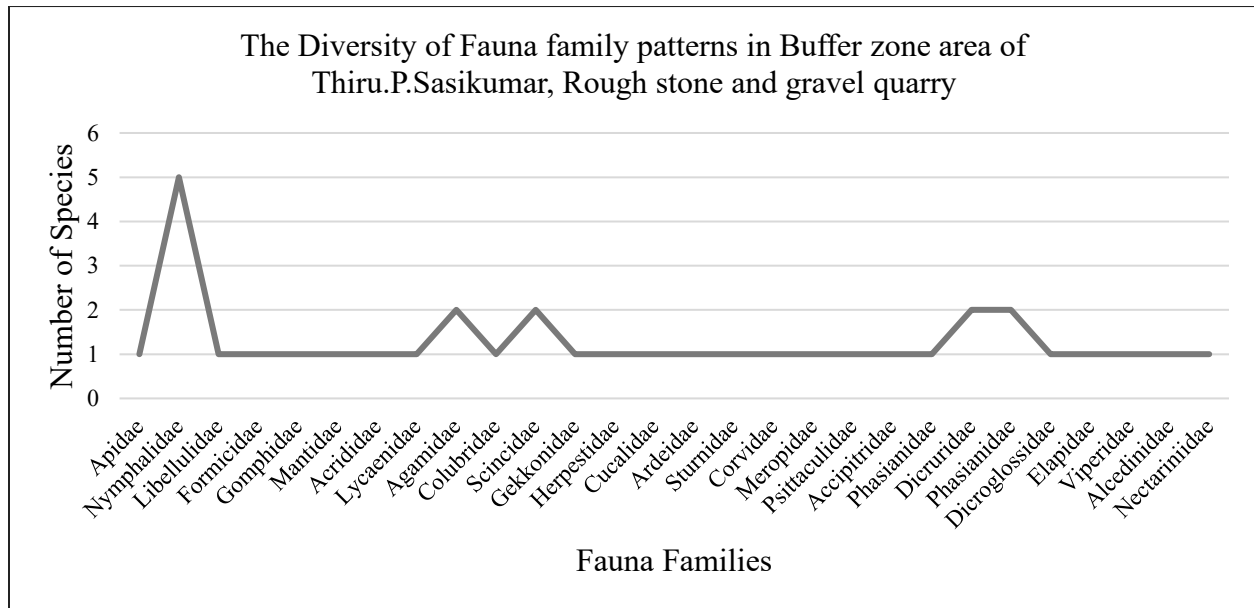
***Figure 3.30 Fauna Diversity pattern in Core Zone***



***Figure 3.31 Fauna Diversity pattern in Buffer Zone***



**Figure 3.32 The Diversity of Fauna family patterns in Core zone**



**Figure 3.33 The Diversity of Fauna family patterns in Buffer zone area**

**Tor No: 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost Implications and submitted.**

Out of the total mine lease area of 1.60.0 Ha, just about 2.00 Ha is proposed to be used for mining activity during the first five years as per the mining plan. Blasting, noise and vibrations



and other disturbances including dust generation are likely to have an adverse impact on wildlife. But these impacts are unlikely to extend beyond 500 m from the actual mine area. There are four Schedule II species and 19 are under schedule IV according to Indian wildlife Act 1972. A total 13 species of bird were sighted in the buffer zone area. There are no critically endangered, endangered, vulnerable and endemic species were observed. As the rainfall in the area is scanty and as no toxic wastes are produced or discharged on account of mining, the proposed mining activity is not going to have any additional and adverse impacts on these RET species. There are no ecologically sensitive areas or protected areas within the 10 Km radius. Hence no specific conservation for conservation of any RET species or Wildlife is envisaged.

**Tor No: 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.**

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

**Tor No: 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.**

A detailed biological study of the study area [core zone and buffer zone of 10 km radius of the periphery of the mine lease] has been carried out and the results are presented under in Tables 3.25 to 3.26 There are four Schedule II species, and 19 species are under schedule IV according to Indian wildlife Act 1972. A total 13 species of bird were sighted in the study area. The main threat to the bird is the use of pesticides in agriculture. There is no endangered, endemic and RET

Species. There is no Schedule I species in study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] The proposed project is not going to have any direct or indirect adverse impact on the species mentioned above.

**Tor No: 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species, and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.**

Only about 0.22.0 Ha of the mine lease area is going to be used for Greenbelt Development during the first five years. Regional trees like Neem, Pongamia Pinnata, Casuarina will be planted along the Lease boundary and avenues as well as over Non-active dumps. Afforestation Plan is given in Table 4.13 and preparation of green belt details are given in Table 4.14.

#### **3.6.4. Conclusion**

The observations and assessment of overall ecological scenario involves details such as classification of Bio geographic zone, eco-region, habitat types and land cover, distances from natural habitats, vegetation/forest types, 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.

### **3.7 SOCIO-ECONOMIC ENVIRONMENT**

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

It is expected that the socio-economic status of the area will substantially improve because of this proposed project. As the proposed project will provide direct and indirect employment and improve the infrastructural facilities in that area, thus leading to the improvement of their standard of living.

#### **3.7.1 Objectives of the Study**

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

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

#### **3.7.2 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

#### **3.7.3 District Profile**

An official Census 2011 detail of Tiruppur a district of Tamil Nadu has been released by Directorate of Census Operations in Tamil Nadu. Enumeration of key persons was also done by census officials in Tiruppur District of Tamil Nadu. In 2011, Tiruppur had population of 2,479,052 of which male and female were 1,246,159 and 1,232,893 respectively. In 2001 census, Tiruppur had a population of 1,920,154 of which males were 978,349 and remaining 941,805 were females. Tiruppur District population constituted 3.44 percent of total Maharashtra population. In 2001 census, this figure for Tiruppur District was at 3.08 percent of Maharashtra population.

**Table 3.34 Keeranur Village Population Facts**

Particulars	Total	Male	Female
Total No. of Houses	873	-	-
Population	2,680	1,364	1,316
Child (0-6)	198	103	95
Schedule Caste	647	331	316
Schedule Tribe	0	0	0
Literacy	63.30 %	74.46 %	51.76 %
Total Workers	1,732	956	776
Main Worker	1,677	-	-
Marginal Worker	55	30	25

Source: <https://www.census2011.co.in/data/village/644614-keeranur-tamil-nadu.html>

### 3.7.3.1 Sex Ratio of Keeranur Village -Census 2011

Average Sex Ratio of Keeranur village is 965 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Keeranur as per census is 922, lower than Tamil Nadu average of 943.

**Table 3.35 Demographics Population of Village Keeranur**

Total Population	Male Population	Female Population
2680	1,364	1,316

Source: <https://www.census2011.co.in/data/village/644614-keeranur-tamil-nadu.html>

### 3.7.3.2 Literacy of Keeranur Village

Keeranur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Keeranur village was 63.30 % compared to 80.09 % of Tamil Nadu. In Keeranur Male literacy stands at 74.46 % while female literacy rate was 51.76 %.

### 3.7.3.3 Worker's profile of Keeranur Village

Keeranur village out of total population, 1732 were engaged in work activities. 96.82 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 3.18 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1732 workers engaged in Main Work, 426 were cultivators (owner or co-owner) while 662 were Agricultural labourer.

**Table 3.36 Population and Literacy Data of Study Area**

S. No.	Parameters/ Village Name	Total populatio n of village	Total populati on male	Total populatio n female	Populat ion in the age group 0-6 Male	Population in the age group 0-6 Female	ST Popul ation	SC Popu lation	Total Literac y	Female		
										ST	SC	Lite racy
1	Agrahara Kathaganni	508	270	238	35	20	0	3	297	0	2	108
2	Alambadi	2714	1376	1338	114	84	1	731	1726	1	361	746
3	Ganapathipalayam	1087	547	540	27	47	0	224	524	0	112	224
4	Ichipalayam	1158	591	567	50	48	13	401	732	6	201	310
5	Kadaiyur	3520	1790	1730	164	122	2	756	2117	1	348	889
6	Kandiankoil	6953	3453	3500	272	271	0	1898	4255	0	962	1847
7	Kathanganni	2221	1119	1102	96	87	0	536	1260	0	281	523
8	Keeranur	2680	1364	1316	103	95	0	647	1571	0	316	632
9	Maravapalayam	2679	1328	1351	124	95	0	830	1695	0	404	740
10	Marudurai	1980	989	991	56	52	0	293	1271	0	147	550
11	Nachipalayam	2815	1436	1379	134	113	0	585	1918	0	298	857
12	Nathakadaiyur	6574	3293	3281	238	197	19	968	4536	7	476	1977
13	Padiyur	2628	1315	1313	126	110	0	855	1750	0	423	798
14	Palayakottai	2618	1328	1290	106	88	0	355	1722	0	182	723
15	Pappini	3990	1995	1995	135	138	0	751	2455	0	362	1015
16	Peranjervali	3876	1973	1903	147	135	1	936	2460	0	463	1036

17	Peruntholuvu	4631	2344	2287	218	196	1	995	2929	1	495	1291
18	Sircar Kathaganni	1220	637	583	65	47	0	216	694	0	103	276
19	Sivanmalai	7927	3972	3955	350	296	7	2010	5078	3	1016	2226
20	Thammareddipalaya yam	1001	479	522	37	35	0	301	637	0	157	274
21	Vadasinnaripalaya m	1952	983	969	59	48	0	202	1402	0	99	628

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

**Table 3.37 Educational, Drainage, Communication & transport Facilities in the study area**

S. N. o.	Village Name	Govt Primary School	Govt Vocational Training School	Primary Health Sub Centre	Tap Water Untreated	River /Canal	Is the Area Covered under Total Sanitation Campaign	Telephone (landlines)	Public Bus Service	Gravel (kuccha) Roads	Commercial Bank	Agricultural Credit Societies	Self - Help Group (SHG)	Nutritional Centres - Anganwadi Centre	Community Centre with/without TV	Power Supply For Domestic Use
1	Agrahara Kathaganni	2	2	0	1	2	2	1	1	1	1	1	1	2	2	1
2	Alambadi	1	2	1	1	2	2	1	1	1	2	1	1	1	1	1
3	Ganapathipalayam	1	2	0	2	2	2	1	1	1	2	2	1	1	1	1
4	Ichipalayam	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
5	Kadaiyur	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1
6	Kandiankoil	1	2	1	1	2	1	1	1	1	2	1	1	1	2	1
7	Kathanganni	2	2	0	1	2	2	1	1	1	2	2	1	1	1	1
8	Keeranur	1	2	0	1	2	2	1	1	1	2	2	1	1	2	1
9	Maravapalayam	1	2	1	1	2	2	1	1	1	1	2	1	1	2	1
10	Marudurai	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
11	Nachipalayam	1	2	1	1	2	2	1	1	1	2	2	1	1	2	1
12	Nathakadaiyur	1	2	1	1	2	1	1	1	1	1	1	1	1	2	1
13	Padiyur	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1
14	Palayakottai	1	2	1	1	2	2	1	1	1	2	2	1	1	1	1
15	Pappini	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1

16	Peranjervali	1	2	1	1	2	1	1	1	1	2	2	1	1	1	1
17	Peruntholuvu	1	2	1	1	2	2	1	1	1	1	2	1	1	2	1
18	Sircar Kathaganni	1	2	1	2	2	2	1	1	1	2	2	1	1	2	1
19	Sivanmalai	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1
20	Thammareddipalayam	1	2	0	1	2	1	1	1	1	2	2	1	1	2	1
21	Vadasinnaripalayam	1	2	0	1	2	2	1	1	1	2	2	1	1	1	1

**Table 3.38 Other Facilities in The Study Area**

S.No.	Village Name	Tractors (Status)	Carts Driven by Animals	Black Topped (pucca) Road	ATM	Commercial Bank	Cooperative Bank	Agricultural Credit Societies	Public Distribution System (PDS) Shop	Mandis/Regular Market	Weekly Haat	Agricultural Marketing Society	Power Supply For Agriculture Use	Power Supply For Commercial Use	Agricultural Commodities (First)	Manufacturers Commodities (First)	Handicrafts Commodities (First)	Forest Area (in Hectares)	Net Area Sown (in Hectares)
1	Agrahara Kathaganni	2	2	2	1	1	1	1	1	2	2	2	1	1		2	2	0	146.72
2	Alambadi	2	2	1	2	2	1	1	1	2	2	1	1	1	coconut	2	2	0	411.19
3	Ganapathipalayam	2	2	1	2	2	1	2	1	2	2	2	1	1	maize	2	2	0	114
4	Ichipalayam	2	2	2	2	2	2	2	1	2	2	2	1	1	2	2	2	0	358.43
5	Kadaiyur	2	2	1	2	1	2	1	1	2	2	2	1	1	coconut	coconut oil	2	0	733.42
6	Kandiankoil	2	2	1	2	2	2	1	1	2	1	2	1	1	coconut	dry coconut	2	0	1583.42
7	Kathanganni	2	2	1	2	2	2	2	1	2	2	2	1	1	maize		2	0	559.36
8	Keeranur	2	2	1	2	2	1	2	1	2	2	2	1	1	sugarcane	jaggery	2	0	442.34
9	Maravapalayam	2	2	1	2	1	2	2	1	2	2	2	1	1	sugarcane	jaggery	2	0	754.16
10	Marudurai	2	2	1	2	2	2	2	1	2	2	2	1	1	coconut	coconut oil	2	0	701.8
11	Nachipalayam	2	2	1	2	2	2	2	1	2	1	2	1	1			2	0	273.94
12	Nathakadaiyur	2	2	1	1	1	1	1	1	1	1	1	1	1	coconut	dry coconut	2	0	600.31
13	Padiyur	2	2	1	1	1	2	2	1	2	2	2	1	1	cotton	silk	2	0	309.5

14	Palayakottai	2	2	1	2	2	2	2	1	2	1	2	1	1	tapioca	handlooms	2	0	848.09
15	Pappini	2	2	1	2	2	2	1	1	2	2	2	1	1	coconut	dry coconut	2	0	667.48
16	Peranjervali	2	2	1	2	2	2	2	1	2	2	2	1	1	coconut	coconut oil	2	0	789.91
17	Peruntholuvu	2	2	1	2	1	2	2	1	2	1	2	1	1	coconut		2	0	812.34
18	Sircar Kathaganni	2	2	2	2	2	2	2	1	2	2	2	1	1	2	2	2	0	517.87
19	Sivanmalai	2	2	1	1	1	1	1	1	2	2	2	1	1	coconut	dry coconut	2	21.64	801.3
20	Thammared dipalayam	2	2	1	2	2	2	2	1	2	2	2	1	2	maize	2	2	0	235.97
21	Vadasinnari palayam	2	2	1	2	2	2	2	1	2	2	2	1	1	coconut	dry coconut	22	0	382.79



#### **3.7.4 Recommendation and Suggestion**

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

#### **3.7.5 Summary & Conclusion**

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

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

## **CHAPTER IV**

### **ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

#### **4.0 GENERAL**

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

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

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

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

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

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

#### **4.1 LAND ENVIRONMENT**

##### **4.1.1 Anticipated Impact**

- ❖ Permanent or temporary change on land use and land cover.
- ❖ Change in topography of the mine lease area will change at the end of the life of the

mine.

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

#### **4.1.2 Common Mitigation Measures from proposed project**

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

## **4.2 SOIL ENVIRONMENT**

### **4.2.1 Anticipated Impact on Soil Environment**

Following impacts are anticipated due to mining operations:

- ❖ 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
- ❖ Exposure of subsurface materials which are unsuitable for vegetation establishment

#### **4.2.2 Common Mitigation Measures from proposed project**

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

#### **4.2.3 Waste Dump Management**

There is no waste anticipated in this rough stone quarrying operation. The entire quarried out materials will be utilized.

### **4.3 WATER ENVIRONMENT**

#### **4.3.1 Anticipated Impact**

The impact of mining on the water quality is insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as the proposed depth is first five years plan of period 17m below ground level and water table is found at depths of 50-55m below ground level.

There is no intersection of surface water bodies in the project area. As there is no proposal for rough stone processing or workshop within the project area there will be no effluent anticipated from the mines.

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

- ❖ Generation of wastewater 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

#### 4.3.1.1 Details of water requirements in KLD

**Table 4.1 Water Requirements**

Purpose	Quantity	Source
Dust Suppression	2.0 KLD	Existing bore wells from nearby area
Green Belt development	1.5 KLD	Existing bore wells from nearby area
Drinking & Domestic purpose	0.8 KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
<b>Total</b>	<b>4.3 KLD</b>	

\*Water for drinking purpose will be brought from approved water vendors

Source: Approved Mining Plan and Pre-Feasibility Report

#### 4.3.2 Common Mitigation Measures for the Proposed Project

- ❖ Garland drainage system and settling tank will be constructed along the proposed mining lease area. The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ❖ Rainwater from the mining pits will be collected in sump and will be allowed to store and pumped out to surface settling tank of 15 m x 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
- ❖ Benches will be provided with inner slopes and through a system of drains and channels, rain water will be allowed to descent into surrounding drains to minimize the effects of erosion and water logging arising out of uncontrolled descent of water
- ❖ The water collected will be reused during storm for dust suppression and greenbelt development within the mines
- ❖ Interceptor traps/oil separators will be installed to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will be passed through interceptor traps/oil separators prior to its reuse
- ❖ Flocculating or coagulating agents will be used to assist in the settling of suspended solids during monsoon seasons
- ❖ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted.

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

#### 4.4 AIR ENVIRONMENT

##### 4.4.1 Anticipated Impact from proposed project

- ❖ During mining at various stages of 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

##### 4.4.1.1 Emission Estimation

Emission resulting from different mining activities is estimated using relevant empirical formulae developed by Chauhya et al.,2001. The equations used for SPM, SO<sub>2</sub>, and NO<sub>x</sub> emission estimation have been given in Table 4.2.

**Table 4.2 Empirical Formula for Emission Rate from Overall Mine**

Activity	Pollutant	Source Type	Empirical Equation	Parameters
Overall Mine	SPM	Area	$E = [u^{0.4} a^{0.2} \{9.7 + 0.01p + b/(4 + 0.3b)\}]$	u = Wind speed(m/s); p = Mineral production (Mt/yr); b = Overburden handling (Mm <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).
Overall Mine	SO <sub>2</sub>	Area	$E = a^{0.14} \{u/(1.83 + 0.93u)\} [ \{p/(0.48 + 0.57p)\} + \{b/(14.37 + 1.15b)\}]$	u = Wind speed(m/s); p = Mineral

				production (Mt/yr); b = Overburden handling (Mm <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).
Overall Mine	NO <sub>x</sub>	Area	$E = a0.25 \{u/(4.3+32.5u)\} [1.5p + \{b/(0.06+0.08b)\}]$	u = Wind speed(m/s); p = Mineral production (Mt/yr); b= Overburden handling (Mm <sup>3</sup> /yr); a = Lease area(km <sup>2</sup> ); E = Emission rate(g/s).

#### 4.4.1.2 Frame Work of Computation and Model Details

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

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

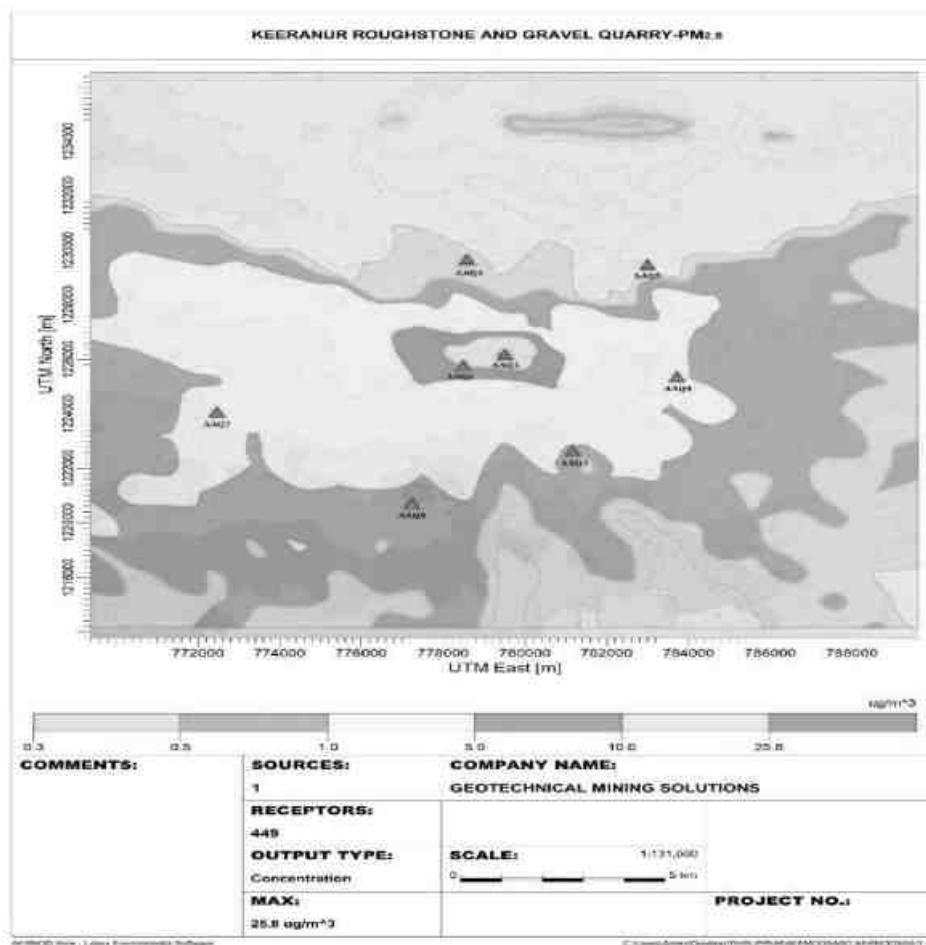
The model was used to predict the impact on the ambient air environment at each receptor at various localities within 10km radius around the project site and the maximum incremental GLC at the project site. All the prediction models in Figures 4.1- 4.5 shows the maximum concentrations of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, and fugitive dust close to the proposed project site due to low to moderate wind speeds.

**Table 4.3 Estimated Emission Rate**

Activity	Pollutant	Calculated Value (g/s)	Mine Lease Area in m <sup>2</sup>	Calculated Value (g/s/m <sup>2</sup> )
Overall Mine	PM <sub>10</sub>	1.15965	20000	0.0000579823
Overall Mine	SO <sub>2</sub>	0.057252534	20000	0.00000286263
Overall Mine	NO <sub>x</sub>	0.011425484	20000	0.000000571274

#### 4.4.1.3 Modelling of Incremental Concentration

The air borne particulate matter such as PM<sub>10</sub> and PM<sub>2.5</sub> generated by quarrying operation, transportation, and wind erosion of the exposed areas and emissions of sulphur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>) due to excavation and loading equipment and vehicles plying on haul roads are the significant air pollutants arising from mining operation, leading to an adverse impact on the ambient air environment in and around the project area. Anticipated incremental concentration and net increase in emissions due to quarrying activities within 500m around the project area is predicted by open pit source modelling using AERMOD Software and the incremental values of the air pollutants were added to the base line data monitored at the proposed site to predict total GLC of the pollutants, as shown in Tables 4.4-4.8.



**Figure 4.1 Predicted incremental concentration of PM<sub>2.5</sub>**



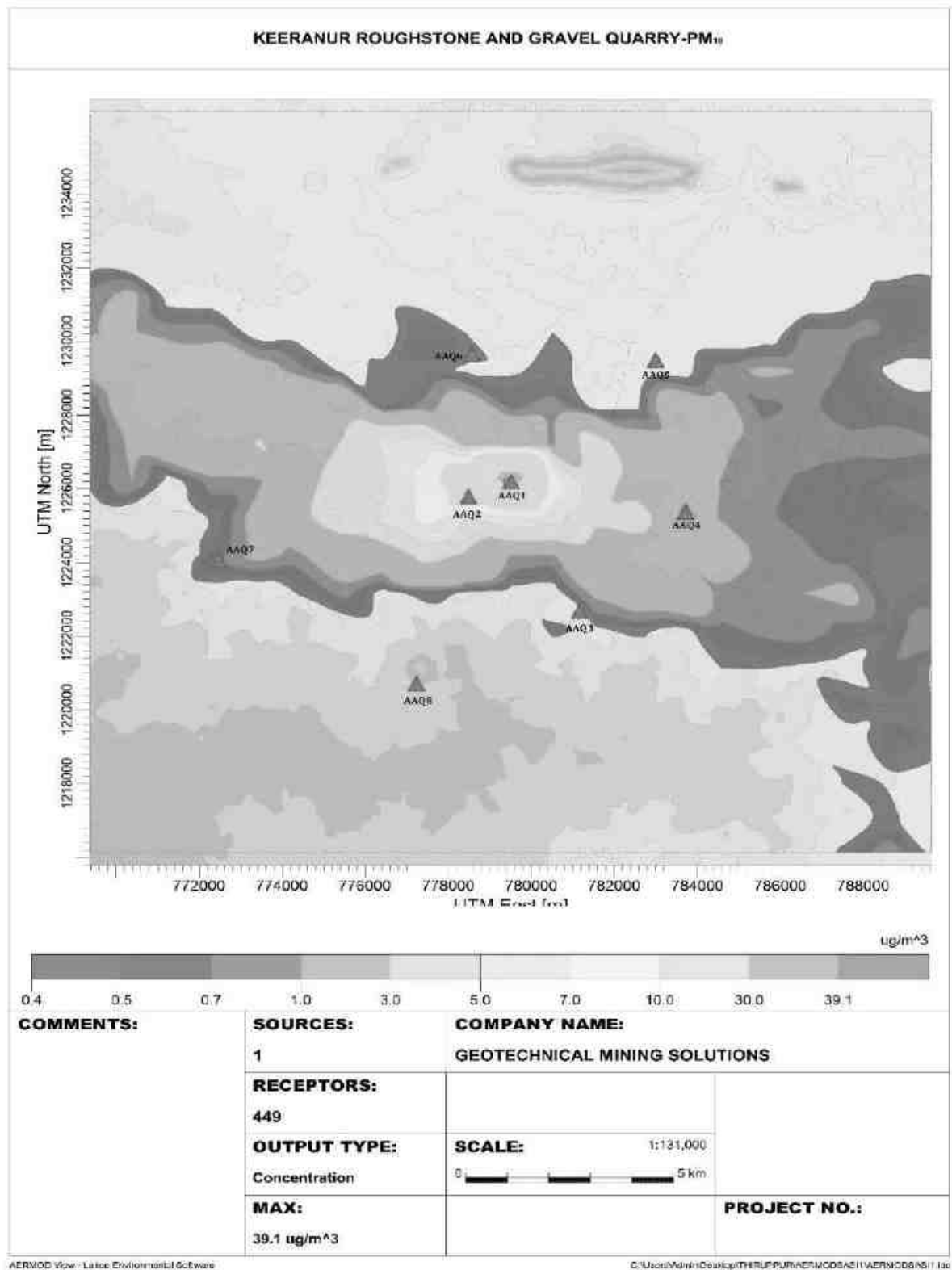
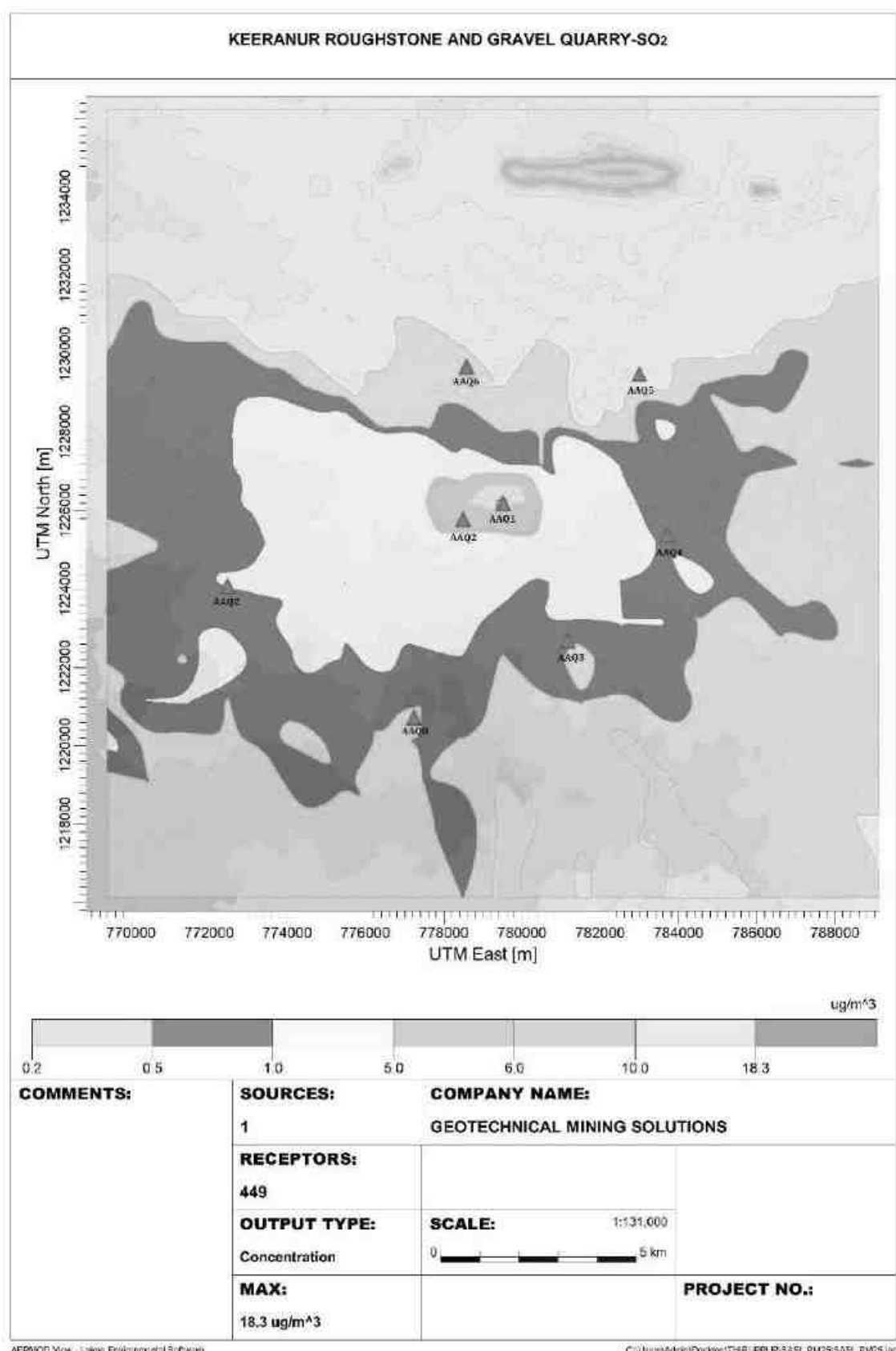
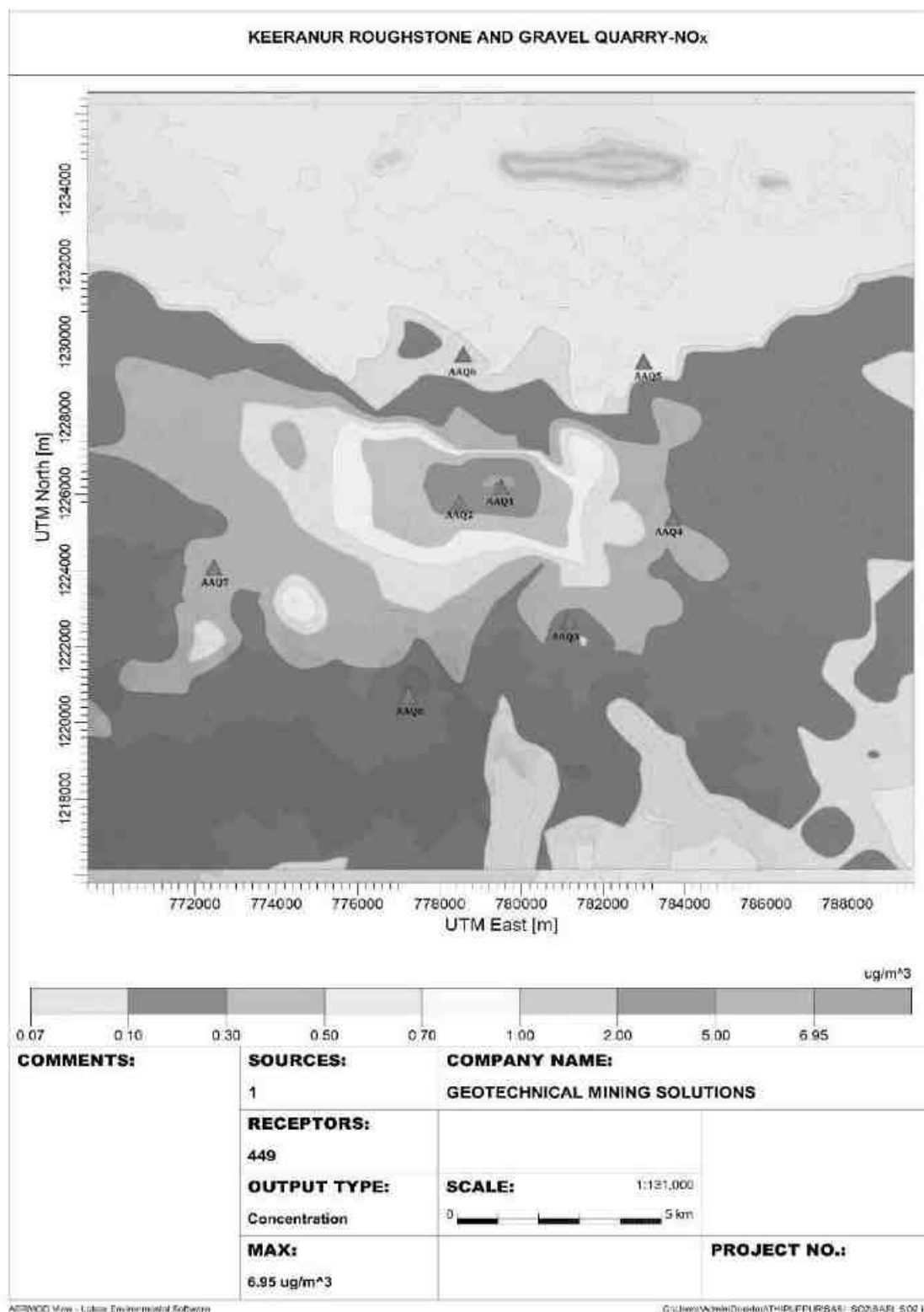


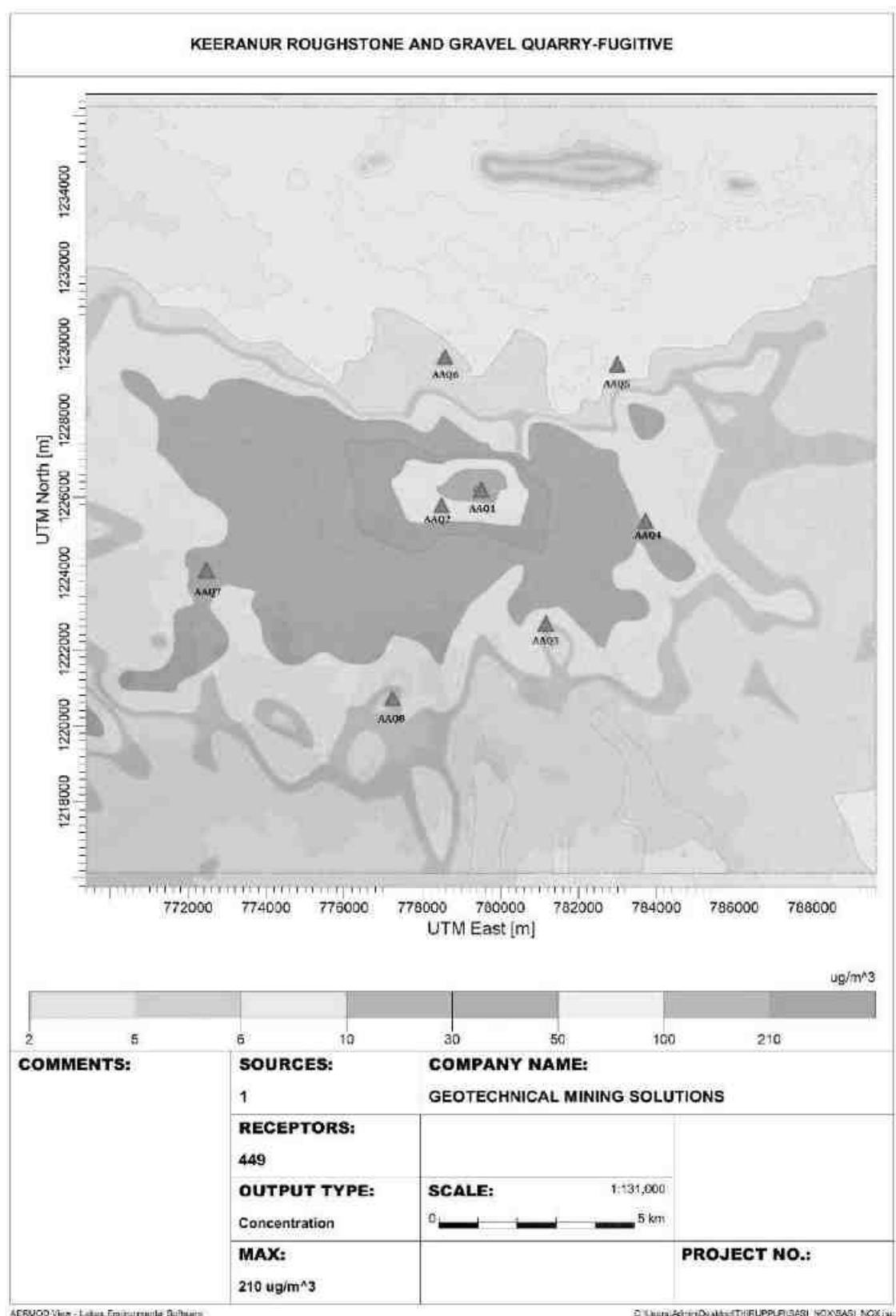
Figure 4.2 Predicted incremental concentration of PM<sub>10</sub>



**Figure 4.3 Predicted incremental concentration of SO<sub>2</sub>**



**Figure 4.4 Predicted incremental concentration of NO<sub>x</sub>**



**Figure 4.5 Predicted incremental concentration of fugitive dust**

#### 4.4.1.4 Model Results

The post project resultant concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> & NO<sub>x</sub> are given in Tables 4.4 to 4.8.

**Table 4.4 Incremental & Resultant GLC of PM<sub>2.5</sub>**

Station Code	Location (WGS1984)	Average Baseline PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Incremental Value of PM <sub>2.5</sub> due to Mining (µg/m <sup>3</sup> )	Total PM <sub>2.5</sub> (µg/m <sup>3</sup> )
AAQ1	11° 4'53.80"N 77°33'30.63"E	21.77	10	31.77
AAQ2	11° 4'41.76"N 77°32'57.05"E	19.64	10	29.64
AAQ3	11° 2'58.93"N 77°34'24.02"E	18.53	0.5	19.03
AAQ4	11° 4'25.95"N 77°35'48.90"E	20.83	1	21.83
AAQ5	11° 6'40.06"N 77°35'26.29"E	19.34	0	19.34
AAQ6	11° 6'47.29"N 77°33'1.02"E	17.75	0.3	18.05
AAQ7	11° 3'46.88"N 77°29'38.15"E	19.17	1	20.17
AAQ8	11° 1'56.35"N 77°32'14.12"E	21.40	0.5	21.9

**Table 4.5 Incremental and Resultant GLC of PM<sub>10</sub>**

Station Code	Location (WGS1984)	Average Baseline PM <sub>10</sub> (µg/m <sup>3</sup> )	Incremental Value of PM <sub>10</sub> due to Mining (µg/m <sup>3</sup> )	Total PM <sub>10</sub> (µg/m <sup>3</sup> )
AAQ1	11° 4'53.80"N 77°33'30.63"E	44.66	39.1	83.76
AAQ2	11° 4'41.76"N 77°32'57.05"E	41.48	30	71.48
AAQ3	11° 2'58.93"N 77°34'24.02"E	38.90	0	38.9
AAQ4	11° 4'25.95"N 77°35'48.90"E	44.59	1	45.59
AAQ5	11° 6'40.06"N 77°35'26.29"E	40.58	0	40.58
AAQ6	11° 6'47.29"N 77°33'1.02"E	39.39	0.39	39.78
AAQ7	11° 3'46.88"N 77°29'38.15"E	39.55	0.7	40.25
AAQ8	11° 1'56.35"N 77°32'14.12"E	42.69	0	42.69

**Table 4.6 Incremental & Resultant GLC of SO<sub>2</sub>**

Station Code	Location (WGS1984)	Average Baseline SO <sub>2</sub> (µg/m <sup>3</sup> )	Incremental Value due to Mining (µg/m <sup>3</sup> )	Total SO <sub>2</sub> (µg/m <sup>3</sup> )
AAQ1	11° 4'53.80"N 77°33'30.63"E	8.90	10	18.9
AAQ2	11° 4'41.76"N 77°32'57.05"E	6.38	6	12.38
AAQ3	11° 2'58.93"N 77°34'24.02"E	8.98	0.5	9.48
AAQ4	11° 4'25.95"N 77°35'48.90"E	10.47	0.5	10.97
AAQ5	11° 6'40.06"N 77°35'26.29"E	7.60	0	7.6
AAQ6	11° 6'47.29"N 77°33'1.02"E	6.55	0.2	6.75
AAQ7	11° 3'46.88"N 77°29'38.15"E	6.63	1	7.63
AAQ8	11° 1'56.35"N 77°32'14.12"E	7.18	0.2	7.38

**Table 4.7 Incremental & Resultant GLC of NO<sub>x</sub>**

Station Code	Location (WGS1984)	Average Baseline NO <sub>x</sub> (µg/m <sup>3</sup> )	Incremental Value due to Mining (µg/m <sup>3</sup> )	Total NO <sub>x</sub> (µg/m <sup>3</sup> )
AAQ1	11° 4'53.80"N 77°33'30.63"E	20.31	5	25.31
AAQ2	11° 4'41.76"N 77°32'57.05"E	18.85	2	20.85
AAQ3	11° 2'58.93"N 77°34'24.02"E	16.81	0.1	16.91
AAQ4	11° 4'25.95"N 77°35'48.90"E	25.50	0.1	25.6
AAQ5	11° 6'40.06"N 77°35'26.29"E	17.60	0	17.60
AAQ6	11° 6'47.29"N 77°33'1.02"E	16.99	0.07	17.06
AAQ7	11° 3'46.88"N 77°29'38.15"E	17.34	0.3	17.37
AAQ8	11° 1'56.35"N 77°32'14.12"E	18.99	0.1	19.09

**Table 4.8 Incremental & Resultant GLC of Fugitive Dust**

Station Code	Location (WGS1984)	Average Baseline Fugitive (µg/m <sup>3</sup> )	Incremental Value due to Mining (µg/m <sup>3</sup> )	Total Fugitive Dust (µg/m <sup>3</sup> )
AAQ1	11° 4'53.80"N 77°33'30.63"E	63.65	100	163.65
AAQ2	11° 4'41.76"N 77°32'57.05"E	56.97	50	106.97
AAQ3	11° 2'58.93"N 77°34'24.02"E	53.52	6	59.52
AAQ4	11° 4'25.95"N 77°35'48.90"E	63.96	6	69.96
AAQ5	11° 6'40.06"N 77°35'26.29"E	54.95	0	54.95
AAQ6	11° 6'47.29"N 77°33'1.02"E	53.85	2	55.85
AAQ7	11° 3'46.88"N 77°29'38.15"E	56.80	10	66.8
AAQ8	11° 1'56.35"N 77°32'14.12"E	60.76	2	62.76

From the results of cumulative concentration, i.e., Background + Incremental concentration of pollutants in all the receptor locations are within the prescribed NAAQ limits of 100, 60,80 & 80 µg/m<sup>3</sup> for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> & NO<sub>x</sub> respectively.

#### 4.4.2 Common Mitigation Measures

##### 4.4.2.1 Drilling

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

##### *Advantages of Wet Drilling*

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

- ❖ Due to the dust free atmosphere visibility will be improved resulting in safer working conditions

#### **4.4.2.2 Blasting**

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

#### **4.4.2.3 Haul Road and Transportation**

- ❖ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin.
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ❖ Water sprinkling on haul roads and loading points will be carried out twice a day
- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process and reduces pollution
- ❖ The un-metalled haul roads will be compacted weekly before being put into use
- ❖ Overloading of tippers will be avoided to prevent spillage
- ❖ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ❖ Haul roads and service roads will be graded to clear accumulation of loose materials

#### **4.4.2.4 Green Belt**

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

#### **4.4.2.5 Occupational Health**

- ❖ Dust mask will be provided to the workers and their use will be strictly monitored

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

#### 4.5 NOISE ENVIRONMENT

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

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

Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed of 1,100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

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

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

Where,

$L_{p1}$  &  $L_{p2}$  are sound levels at points located at distances  $r_1$  and  $r_2$  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.

$$L_{p \text{ total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

##### 4.5.1 Anticipated Impact

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

- ❖ Source data



- ❖ Receptor data
- ❖ Attenuation factor

Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.9.

**Table 4.9 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
<b>Total Noise Produced</b>			<b>95.8</b>

\*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 4.10 Composite Noise Levels in Monitoring Locations**

Noise Monitoring Location	Distance From Project Site(m)	Baseline Noise Level (dBA) During Day Time	Predicted Noise Level(dBA)	Baseline + Predicted Noise Level(dBA)	Total Noise Level(dBA) (dBA)
Core Zone(N1)	100	45.80	57.15	45.80+57.15	57.28
Keeranur (N2)	960	41.70	37.50	41.70+37.50	43.10
Alambadi (N3)	3760	41.10	25.65	41.10+25.65	41.22
Peranjervali (N4)	4230	43.30	24.63	43.30+24.63	43.35
Ekkattampalayam (N5)	4720	41.60	23.68	41.60+23.68	41.66
Tippampalayam (N6)	3480	40.50	26.32	40.50+26.32	40.66
Padiyur (N7)	7310	41.80	19.88	41.80+19.88	41.82
Sivanmalai (N8)	5780	42.00	21.92	42.00+21.92	42.04

The predicted noise level is found to be 57.15 dB (A) in core zone and ranges between 19.88 and 37.50 dB (A) in buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise

attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000(The Principal Rules were published in the Gazette of India, vide S.O.123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E),dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment(Protection) Act, 1986.).

#### **4.5.2 Common Mitigation Measures**

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

- ❖ Usage of sharp drill bits while drilling which will help in reducing noise
- ❖ Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders
- ❖ Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained
- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise
- ❖ Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise
- ❖ Silencers / mufflers will be installed in all machineries
- ❖ 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

#### **4.5.3 Ground Vibrations**

Ground vibrations due to the proposed mining activities are anticipated due to operation of mining machines like excavators, drilling and blasting, transportation vehicles, etc.,

However, the major source of ground vibration from the quarry is blasting. The major impact of the ground vibrations is observed on the domestic houses located in the villages nearby the mine lease area. The kuchha houses are more prone to cracks and damage due to the vibrations induced by blasting whereas RCC framed structures can withstand more ground vibrations. Apart from this, the ground vibrations may develop a fear factor in the nearby settlements.

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

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

Where,

**V** = peak particle velocity (mm/s); **K** = site and rock factor constant; **Q** = maximum instantaneous charge (kg); **B** = constant related to the rock and site (usually 1.6); **R** = distance from charge (m)

**Table 4.11 Predicted PPV Values Due to Blasting**

<b>Location ID</b>	<b>Maximum Charge in kgs</b>	<b>Nearest Habitation in m</b>	<b>PPV in mm/s</b>
Proposed Quarry (P1)	32	960	0.31

The charge per blast of 32 kg is well below the Peak Particle Velocity of 0.31 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. But the all the project proponent ensures 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.

#### **4.5.3.1 Common Mitigation Measures**

- ❖ The blasting operations in the cluster quarries are carried out without deep hole drilling and blasting using delay detonators which reduce the ground vibrations
- ❖ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be adopted to avoid overcharging and for safe blasting
- ❖ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ❖ Blasting shelter will be provided as per DGMS guidelines

- ❖ Blasting operations will be carried out only during day time
- ❖ The charge per delay will be minimized and preferably a greater number of delays will be used per blasts
- ❖ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ❖ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ❖ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2<sup>nd</sup> Class Mines Manager/ 1<sup>st</sup> Class Mines Manager) will be appointed
- ❖ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ❖ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire
- ❖ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ❖ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ❖ Appropriate blasting techniques shall be adopted in such a way that the predicted peak particle velocity shall not exceed 0.251mm/s
- ❖ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices

## **4.6 ECOLOGY AND BIODIVERSITY**

### **4.6.1 Impact on Ecology and Biodiversity**

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 Keeranur 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.

#### **4.6.1.1 Anticipated Impact on Flora**

- ❖ None of the plants will be cut during operational phase of the mine
- ❖ There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region

#### **4.6.2 Common Mitigation Measures for the Proposed Project**

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 considering 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 the areas falling in the cluster 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.

#### 4.6.2.1. Species Recommendation for Plantation granted by ToR

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

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

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

#### 4.6.2.2. Afforestation

More number of trees has been observed along the approach road in the lease area, which is developed by the lease owner. The 7.5m 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. As given in Table 4.12, regional trees like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia* and *Tectona grandis* will be planted along the lease boundary and avenues at a rate of 50 trees per annum with an interval of 3m in between. The rate of survival expected to be 80% in this area.

**Table 4.12 Recommended Species for Greenbelt Development Plan**

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Dust Capturing Efficiency Features
1	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree	Well distinct thick at both the layer Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series
2	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree	
3	<i>Polyalthia longifolia</i>	Annonaceae	Nettilingam	Tree	
4	<i>Albizia lebbeck</i>	Fabaceae	Vagai	Tree	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir-konrai	Tree	
6	<i>Borassus flabellifer</i>	Arecaceae	Panai	Tree	
7	<i>Morinda pubescens</i>	Rubiaceae	Nuna	Tree	
8	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree	
9	<i>Thespesia Populnea</i>	Malvaceae	Puvarasu	Tree	

10	<i>Syrygium cumini</i>	Myrtaceae	Naval	Tree	
11	<i>Saraca asoca</i>	Fabaceae	Asoca	Tree	
12	<i>Limonia acidissima</i>	Rutaceae	Odhiam	Tree	
13	<i>Lannea coromandelica</i>	Anacardiaceae	Vila maram	Tree	
14	<i>Cassia roxburghii</i>	Fabaceae	Sengondrai	Tree	
15	<i>Pterocarpus marsupium</i>	Fabaceae	Vengai	Tree	
16	<i>Nerium indicum</i>	Apocynaceae	Arali	Shrub	Both upper & lower epidermis cells are present, Mesophyll is present between upper & Lower epidermis, Vascular tissues are present though the leaf in parallel.
17	<i>Bougainvillea glavra</i>	Nycaginaceae	Kakithapoo	Shrub	
18	<i>Hibiscus rosa sinensis</i>	Malvaceae	seamparuthi	shrub	

Greenbelt Development Plan and budget for the green belt development plan are given in Tables 4.13 and 4.14, respectively.

**Table 4.13 Greenbelt Development Plan**

Year	No. of trees proposed to be planted	Survival %	Area to be covered in m <sup>2</sup>	Name of the species	No. of trees expected to be grown
	Plantation under safety zone (In Nos.)				
I	50	80%	450	<i>Azadirachta indica Albizia lebbeck Delonix regia Tectona grandis Nerium indicum, etc.,</i>	40
II	50		450		40
III	50		450		40
IV	50		450		40
V	50		450		40
Year	Plantation in quarried out of benches and approach road Side & Village Road Side (In Nos)				40
I	50	80%	450		40
II	50		450		40
III	50		450		40
IV	50		450		40
V	50		450	40	

**Table 4.14 Budget for Greenbelt Development Plan**

S. No .	Details of work	Year wise details of plantation for each area						
		I	II	III	IV	V	(approximat ely @ 100 Rs./sapling)	Total Cost (Rs.)
1	Plantatio n under 7.5m safety zone (In Nos.)	50	50	50	50	50	250	25000.00
		5000	5000	5000	5000	5000		
2	Plantatio n in quarry approach road side & village road side (in Nos.)	50	50	50	50	50	250	25000.00
		5000	5000	5000	5000	5000		
3	Maintena nce (Rs.) (Manurin g, Fertilizer, Insecticid e applicatio n, watchma n etc.)	Cost (Rs. 30000/-) per year for five-year period						150,000.00
Total								2,00,000.00

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

#### **4.6.3. Anticipated Impact on Fauna**

- ❖ There is no Wildlife Sanctuary and Biosphere Reserve within 10 km radius of the project site.
- ❖ No rare, endemic & endangered species are reported in the buffer zone. However, during the course of mining, the management will practice scientific method of mining



with proper Environmental Management Plan including pollution control measures especially for air and noise, to avoid any adverse impact on the surrounding wildlife.

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

#### **4.6.3.1. Measures For Protection and Conservation of Wildlife Species**

- ❖ Topsoil has a large number of seeds of native plant species in the mining area.
- ❖ Topsoil will be used for restoration and suitable surface for planted seedlings.
- ❖ Checks and controls on the movement of vehicles in and out of the mine.
- ❖ Undertaking mitigative measures for conducive environment to the flora and fauna in consultation with Forest Department.
- ❖ Dust suppression system will be installed within mine and periphery of mine.
- ❖ Plantation around mine area will help in creating habitats for small faunal species and to create better environment for various fauna. Creating and developing awareness for nature and wildlife in the adjoining villages.

#### **4.6.3.2. Mitigation Measures**

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

#### **4.6.4. Impact on Aquatic Biodiversity**

Mining activities will not disturb the aquatic ecology as there is no effluent discharge proposed from the rough stone and gravel quarry. There is no natural perennial surface water body within the mine lease area, like wetlands, rivers streams, lakes, and farmer sites. There is no impact on fish habitats and the food WEB/ food chain in the water body and Reservoir. Aquatic biodiversity is not observed in the study area.

#### **4.6.5. Impact Assessment on Biological Environment**

This chapter highlights the various impacts on ecology and biodiversity due to mining activity. It addresses the baseline data and its effect on flora and wild life fauna especially threatened species (Critically Endangered, Endangered, and Vulnerable) in core mining lease area. A detail of impact and assessments was mentioned in Table 4.15.

**Table 4.15 Ecological Impact Assessments**

<b>Sl. No</b>	<b>Attributes</b>	<b>Assessment</b>
1	Activities of the project affects the breeding/nesting sites of birds and animals	No breeding and nesting site was identified in mining lease site. The fauna sighted mostly migrated from buffer area.
2	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area.
3	Proximity to national park/wildlife sanctuary/reserve forest /mangroves/ coastline/estuary/sea	No national park or eco-sensitive zone around 10km radius. A small hill is located about 5.5km on the Northwest side.
4	Proposed project restricts access to waterholes for wildlife	‘NO’
5	Proposed mining project impact surface water quality that also provide water to wildlife	‘NO’ ‘scheduled or threatened wildlife animal sighted regularly core in core area.
6	Proposed mining project increase siltation that would affect nearby biodiversity area.	Surface runoff management such as drains is constructed properly so there will be no siltation affect in nearby mining area.
7	Risk of fall/slip or cause death to wild animals due to project activities	‘NO’
8	The project release effluents into a water body that also supplies water to a wildlife	No water body near to core zone so chances of water become polluted is low.
9	Mining project effect the forest-based livelihood/ any specific forest product on which local livelihood depended	‘NO’
10	Project likely to affect migration routes	‘NO’ ‘migration route observed during monitoring period.
11	Project likely to affect flora of an area, which have medicinal value	‘NO’
12	Forestland is to be diverted, has carbon high sequestration	‘NO’. There was no forest land diverted.
13	The project likely to affect wetlands, Fish breeding grounds, marine ecology	‘NO’. Wetland was not present in near core Mining lease area. No breeding and nesting ground present in core mining area.

**Table 4.16 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 of SO <sub>2</sub> , NO <sub>2</sub> , CO etc.	Impact on surrounding agriculture and associated fauna due to deposition of dust and Emission of CO. (Indirect impact)	Impact is less as the agricultural land far from core area.	Less severe	All vehicles will be certified for appropriate Emission levels. More plantation has been suggested Upgrade the vehicles with alternative fuel such biodiesel, methanol and biofuel around the mining area.

#### **4.6.6. Impact of Mining Activity on Agricultural Land**

The project proponent has followed the CPCB Guideline for plantation consult with the State Forest Department/ Agriculture Department to be selected the native species plantations or as per the ToR recommend plants around the mining lease area to stop the dust particle from the sources. it will not affect the nearby agricultural land & Horticulture associated with ecology & biodiversity. Adequate budgetary provision has been made for the protection and care of trees.

The project proponent has provided training to the farmer for modern technology in the agricultural practice of cropping methods.

The project proponent has done a soil test for the nearby agricultural land every six months to check the soil quality and fertility.

Vehicular movement for transportation of materials will result in the generation of dust (Particulate matter) due to haul roads and emission of Sulphur Dioxide, Nitrogen Dioxide, and Carbon monoxide all the parameters under the permissible limit so, there is no impact on the nearby area and Afforestation on the roadside.

### **4.7 SOCIO ECONOMIC**

#### **4.7.1 Anticipated Impact from proposed and existing Projects**

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

#### **4.7.2 Common Mitigation Measures for proposed project**

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

- ❖ From above details, the quarry operations will have highly beneficial positive impact in the area

#### **4.8 OCCUPATIONAL HEALTH AND SAFETY**

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

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

##### **4.8.1 Respiratory Hazards**

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

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

##### **4.8.2 Noise**

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

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

##### **4.8.3 Physical Hazards**

The following measures are proposed for control of physical hazards

- ❖ Specific personnel training on work-site safety management will be taken up;
- ❖ 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.

#### **4.8.4 Occupational Health Survey**

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

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

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

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

#### **4.9 MINE WASTE MANAGEMENT**

No waste is anticipated from any of the proposed quarries.

#### **4.10 MINE CLOSURE**

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

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

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

##### **4.10.1 Mine Closure Criteria**

The criteria involved in mine closure are discussed below:

#### **4.10.1.1 Physical Stability**

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

#### **4.10.1.2 Chemical Stability**

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

#### **4.10.1.3 Biological Stability**

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

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

- ❖ Where the nutrient level of spread topsoil is lower than material in-situ 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.

## **CHAPTER V**

### **ANALYSES OF ALTERNATIVES (TECHNOLOGY AND SITE)**

#### **5.0 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.

#### **5.1 FACTORS BEHIND THE SELECTION OF PROJECT SITE**

Sasikumar's Rough Stone and Gravel Quarry Project at Keeranur Village is site specific. The project area has the following advantages:

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

#### **5.2 ANALYSIS OF ALTERNATIVE SITE**

No alternatives are suggested as the site is mineral specific.

#### **5.3 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. The proposed mining lease areas have following advantages:

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

#### **5.4 ANALYSIS OF ALTERNATIVE TECHNOLOGY**

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



## **CHAPTER VI**

### **ENVIRONMENTAL MONITORING PROGRAMME**

#### **6.0 GENERAL**

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections.

The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA-TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

#### **6.1 METHODOLOGY OF MONITORING MECHANISM**

Implementation of EMP and periodic monitoring will be carried out by respective project proponents. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project; Environmental protection measures like dust suppression, control of noise and blast vibrations, maintenance of machinery and vehicles, housekeeping in the mine premises, plantation, implementation of Environmental Management Plan and environmental clearance conditions will be monitored by the respective mine management. On the other hand, implementation of area level protection measures like green belt development, environmental quality monitoring etc., are taken up by a senior executive who reports to their Mine Management. An Environment monitoring cell (EMC), as shown in Figure 6.1 will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry.

The responsibilities of this cell will be:

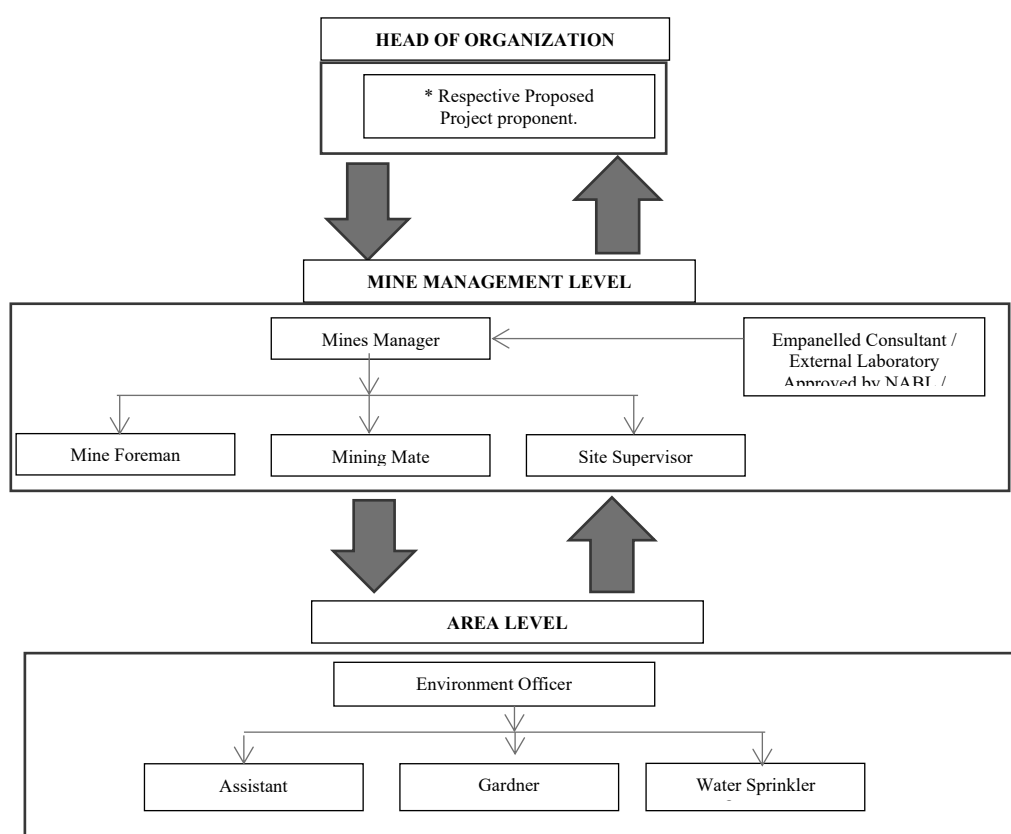
- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

❖ Seeking expert's advice when needed.

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

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

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC).



**Figure 6.1 Proposed environmental monitoring chart**

\*The Environmental Monitoring Cell will be formed in the proposed project

## 6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

**Table 6.1 Implementation Schedule for Proposed Project**

<b>Sl No.</b>	<b>Recommendations</b>	<b>Time Period</b>	<b>Schedule</b>
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 are detailed in Table 6.2.

**Table 6.2 Proposed Monitoring Schedule Post EC for the Proposed Quarry**

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
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 3,80,000/- 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. 3,80,000/-	Rs. 76,000/-
2	Meteorology		
3	Water Quality		
4	Hydrology		
5	Soil Quality		
6	Noise Quality		
7	Vibration Study		
<b>Total</b>		<b>Rs 3,80,000/-</b>	<b>Rs 76,000/-</b>

Source: Approved Mining Plan

## 6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

## **CHAPTER VII**

### **7 ADDITIONAL STUDIES**

#### **7.0 GENERAL**

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

- ❖ Public Consultation
- ❖ Risk Assessment
- ❖ Disaster Management Plan
- ❖ Cumulative Impact Study
- ❖ Plastic Waste Management
- ❖ Post-COVID Health Management Plan

#### **7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT**

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

#### **7.2 RISK ASSESSMENT FOR PROPOSED PROJECT**

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

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

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

**Table 7.1 Risk Assessment& Control Measures for Proposed Project**

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

		Drill Rod may break	<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 &amp; 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 &amp; 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 &amp; overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p>	<p>Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.</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	Escape Routes will be provided to prevent inundation of storm water



			Fire Extinguishers & Sand Buckets
7	Failure of Mine Benches and Pit Slope	Slope geometry, Geological structure	Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m height.

Source: Analysed and Proposed by FAE & EC

### 7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT

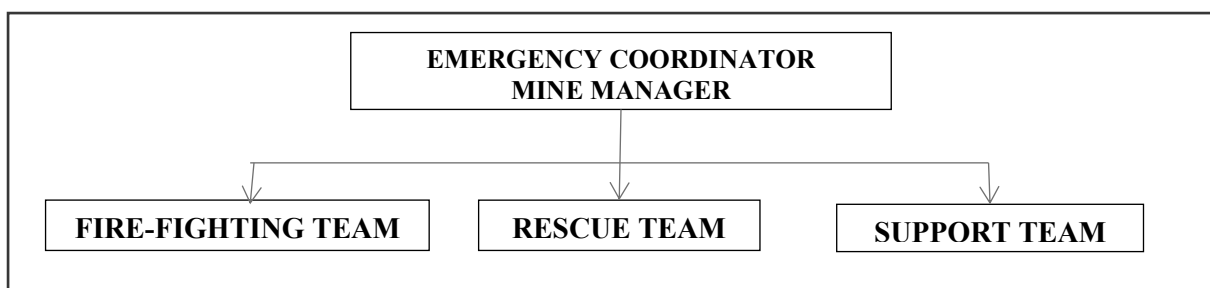
Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated

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

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

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

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



**Figure 7.1 Disaster management team layout for proposed project**

Emergency coordinator who will be qualified competent mines manager shall head the emergency organization. In his absence, senior most people available at the mine shall be emergency coordinator until 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
<b>FIRE-FIGHTING TEAM</b>	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member	Mines Foreman
Team Member	Mining Mate
<b>RESCUE TEAM</b>	
Team Leader/ Emergency Coordinator (EC)	Mines Manager
Team Member/ Incident Controller (IC)	Environment Officer
Team Member	Mining Foreman
<b>SUPPORT TEAM</b>	
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 neighbouring industrial units/mines and Mine Emergency Control Room (MECR) to control various departments of the mine, fire station.

### **7.3.1 Roles and Responsibilities of Emergency Team**

#### *(a) Emergency coordinator (EC)*

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

#### *(b) Incident controller (IC)*

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

#### *(c) Communication and advisory team*

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

#### *(d) Roll call coordinator*

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

#### *(e) Search and rescue team*

There shall be a group of people trained and equipped to carry out rescue operation of trapped personnel. The people trained in first aid and firefighting shall be included in search and rescue team.

#### *(f) Emergency security controller*

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

### **7.3.2 Emergency Control Procedure**

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

- ❖ On site fire, crew led by a firefighter 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 in Proposed Project**

<b>Location</b>	<b>Type Of Fire Extinguishers</b>
Electrical Equipment's	CO <sub>2</sub> type, foam type, dry chemical powder type
Fuel Storage Area	CO <sub>2</sub> type, foam type, dry chemical powder type, Sand bucket
Office Area	Dry chemical type, foam type

### **7.3.3 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 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 mining operations.
- ❖ Observance of all safety precautions for blasting and storage of explosives as per MMR 1961.
- ❖ Entry of unauthorized persons into allied areas & mine 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, earplugs etc. are made available to the employees and the use of it 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.
- ❖ Only qualified persons following SOP. Carry out handling of explosives, charging and blasting.
- ❖ 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, 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	Village	S.F. Nos.	Extent in Hectares	Collector proceedings no.& date	Status
P1	P. Sasikumar	Keeranur	442	2.00.0 ha	—	ToR obtained vide Letter No: SEIAA-TN/F.No.8549/SEAC/ToR-1139/2020 Dated:08.04.2022
TOTAL				2.00.0 ha		
EXISTING QUARRIES						
CODE	Name of the Owner		S.F. Nos.	Extent in Hectares	Collector proceedings No.& date	Status
E1	P. Sasikumar	Keeranur	449 part, 450	4.44.0	61/mines/2015 dated 21.9.2016	21.09.2016 to 20.09.2021
E2	S.P.Bala subramaniam	Keeranur	603/3 (P), 603/4(P)	2.01.17	125/mines/2017 dated 1.10.2018	01.10.2018 -30.09.2023

TOTAL 6.45.17 hectares						
TOTAL CLUSTER EXTENT 8.45.17 hectares						
Abandoned / expired quarries						
CODE	Name of the Owner	Village	S.F. Nos	Extent in Hectares	Collector proceedings no.& date	Status
EX1	AM. Palanisamy	Keeranur	484/1,2	2.41.0	1009/2009/min`es dated 17.3.2010	17.03.2010 - 16.3.2015 expired
EX2	B.Vijaya lakshmi	Keeranur	441/A1, 441 /A2, 441	2.78.0	166/mines/2011 date 3.7.2012	03.07.2012-02.07.2017 expired
EX3	N. Subramaniam	Keeranur	442(P) 450 (P)	2.15.0	40374/2004/x-1 dated 27.09.2004	27.09.2004–26.09.2009 expired

**Source: i).** AD Letter – Rc.No.1475/2020/Mines/ dated 26.02.2021.

**Note:**

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

**Table 7.5 Salient Features of Proposed Project Site**

Name of the Quarry	<b>Thiru. P. Sasikumar Rough stone and gravel quarry</b>	
Toposheet No	58 - E/12	
Latitude between	11°04'52.40"N to 11°04'57.75"N	
Longitude between	77°33'27.41"E to 77°33'33.38"E	
Highest Elevation	267m AMSL	
Ultimate depth of Mining	The ultimate depth of mining is 42m (2m Gravel + 40m Rough stone) for a period of Ten years.	
Geological Resources	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	7,98,080	39,904
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	2,87,800	30,888
Proposed reserve for five years up to the depth of 17m bgl	1,44,275	30888
Ultimate Pit Dimension	157m (L) x 101m (W) x 42m (D) bgl	
Water Level in the surrounds area	50 to 55m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease-applied area is exhibits plain topography. The area has gentle sloping towards Northeast side. The altitude of the area is	

	267m (max) above Mean Sea level. The area is covered by 2m thickness of Gravel and formation.	
Machinery proposed	Jack Hammer	4 Nos
	Compressor	1 Nos
	Excavator with Bucket / Rock Breaker	1 Nos
	Tippers	3Nos
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	24 Nos	
Project Cost	Rs.74,25,000/-	
CER Cost @ 2% of Project Cost	Rs.1,65,000/-	
Nearby Water Bodies	Orathuppalayam Reservoir	3.5km-NW
	Noyyal River	3 km-N
Greenbelt Development Plan	Proposed to plant 300 trees in 2200 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	4.3 KLD	
Nearest Habitation	960m – SW	

Source: Approved Mining Plan & obtained ToR

**Table 7.6 Salient Features of Existing Quarry “E1”**

Name of the Quarry	<b>Thiru. P. Sasikumar Rough stone and gravel quarry</b>	
Toposheet No	58 - E/12	
Latitude between	11°04'4"N to 11°04'54"N	
Longitude between	77°33'20"E to 77°33'29"E	
Proposed Depth of Mining	12 m bgl	
Geological Resources	Rough Stone in m <sup>3</sup>	Gravel in m <sup>3</sup>
	454840	90968
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel in m <sup>3</sup>
	142250	25764
Method of Mining	Opencast Semi Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer, Compressor	2 Nos
	Hydraulic Excavator	1 Nos
	Tippers	1 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	12 Nos
Project Cost	Rs. 58,32,000/-
CER Cost @ 2% of Project Cost	Rs 1,16,640/-

Source: Approved Mining Plan

**Table 7.7 Salient Features of Existing Quarry “E2”**

Name of the Quarry	<b>S.P. Bala subramaniam rough stone and gravel quarry</b>	
Toposheet No	58 - E/12	
Latitude between	11° 4'51.49"N to 11° 4'58.18"N	
Longitude between	77°33'18.33"E to 77°33'26.32"E	
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	96560	9656
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer&Compressor	3 Nos
	Hydraulic Excavator	1 Nos
	Tippers	2 Nos
Blasting Method	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.	
Proposed Manpower Deployment	18 Nos	
Project Cost	Rs. 54,18,400/-	
CER Cost @ 2% of Project Cost	Rs 1,08,300/-	

Source: Approved Mining Plan

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



#### 7.4.1 Air Environment

Calculating the Cumulative Load of Mining within the cluster is as shown in table 7.8 to 7.9.

**Table 7.8 Cumulative Production Load of Rough Stone**

<b>PROPOSED PRODUCTION DETAILS</b>				
<b>Quarry</b>	<b>5 Years in m<sup>3</sup></b>	<b>Per Year in m<sup>3</sup></b>	<b>Per Day in m<sup>3</sup></b>	<b>Number of Lorry Load Per Day</b>
P1	1,44,275	28,855	96	16
E1	1,42,250	28,450	95	16
E2	96,560	19,312	64	11
<b>Grand Total</b>	<b>3,83,085</b>	<b>76,617</b>	<b>250</b>	<b>43</b>

**Table 7.9 Cumulative Production Load of Gravel**

<b>PROPOSED PRODUCTION DETAILS</b>				
<b>Quarry</b>	<b>2 - 3 Years in m<sup>3</sup></b>	<b>Per Year in m<sup>3</sup></b>	<b>Per Day in m<sup>3</sup></b>	<b>Number of Lorry Load Per Day</b>
P1	30,888	10,296	34	6
E1	25,764	8,588	29	5
E2	9,656	4,828	16	3
<b>Grand Total</b>	<b>66,308</b>	<b>23,712</b>	<b>79</b>	<b>14</b>

On a cumulative basis considering the three quarries it can be seen that the overall production of Rough Stone is 250 m<sup>3</sup> per day and overall production of Gravel is 79m<sup>3</sup> per day with a capacity of 43 trips of Rough Stone per day and 14 Trips per day of Gravel from the cluster.

Note: Per day production of Rough Stone is calculated for 5 Years Lease Period and for Gravel production with 1, 2, 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 3 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 7.10, followed by predicted GLCs from quarries in the cluster in Table 7.11.

**Table 7.10 Emission Estimation from Quarries within 500 Meter Radius**

<b>Emission Estimation for the Proposed Project</b>				
<b>Activity</b>	<b>Pollutant</b>	<b>Calculated Value (g/s)</b>	<b>Lease Area in m<sup>2</sup></b>	<b>Calculated Value (g/s/m<sup>2</sup>)</b>
Overall Mine	PM <sub>10</sub>	1.15965	20000	0.0000579823
Overall Mine	SO <sub>2</sub>	0.057252534	20000	0.00000286263
Overall Mine	NO <sub>x</sub>	0.011425484	20000	0.000000571274
<b>Emission Estimation for Quarry “E1”</b>				
<b>Activity</b>	<b>Pollutant</b>	<b>Calculated Value (g/s)</b>	<b>Lease Area in m<sup>2</sup></b>	<b>Calculated Value (g/s/m<sup>2</sup>)</b>
Overall Mine	PM <sub>10</sub>	1.360175297	44400	0.0000306346
Overall Mine	SO <sub>2</sub>	0.062066723	44400	0.0000013979
Overall Mine	NO <sub>x</sub>	0.013930859	44400	0.000000313758
<b>Emission Estimation for Quarry “E2”</b>				
<b>Activity</b>	<b>Pollutant</b>	<b>Calculated Value (g/s)</b>	<b>Lease Area in m<sup>2</sup></b>	<b>Calculated Value (g/s/m<sup>2</sup>)</b>
Overall Mine	PM <sub>10</sub>	1.178722	20117	0.000054319
Overall Mine	SO <sub>2</sub>	0.057550735	20117	0.00000129619
Overall Mine	NO <sub>x</sub>	0.011658238	20117	0.000000262573

Source: Emission Calculations using empirical formula

**Table 7.11 Incremental and Resultant Ground Level Concentration from the Quarries within Cluster**

<b>Incremental and resultant ground level concentration from the proposed project-P1</b>			
<b>Pollutants</b>	<b>Average Baseline Value (µg/m<sup>3</sup>)</b>	<b>Incremental Value (µg/m<sup>3</sup>)</b>	<b>Total Value (µg/m<sup>3</sup>)</b>
PM <sub>2.5</sub>	21.77	10	31.77
PM <sub>10</sub>	44.66	39.1	83.76
SO <sub>2</sub>	8.90	10	18.9
NO <sub>x</sub>	20.31	5	25.31
<b>Incremental and resultant ground level concentration from the project area-E1</b>			
PM <sub>2.5</sub>	21.77	9.59	31.36
PM <sub>10</sub>	44.66	37.50	82.16
SO <sub>2</sub>	8.90	9.59	18.49
NO <sub>x</sub>	20.31	4.80	25.11
<b>Incremental and resultant ground level concentration from the project area-E2</b>			
PM <sub>2.5</sub>	21.77	6.06	27.83
PM <sub>10</sub>	44.66	23.71	68.37
SO <sub>2</sub>	8.90	6.06	14.96
NO <sub>x</sub>	20.31	3.03	23.34

#### 7.4.2 Noise Environment

Noise pollution is mainly due to operation like drilling & blasting and plying of trucks & HEMM. Cumulative Noise modelling has been carried out considering blasting and compressor operation (drilling) and transportation activities. Predictions have been carried out

to compute the noise level at various distances around the different quarries within the 500 m radius.

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.

$$L_{p\text{total}} = 10 \log \{10^{(L_{p1}/10)} + 10^{(L_{p2}/10)} + 10^{(L_{p3}/10)} + \dots\}$$

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 7.12 Predicted Noise Incremental Values from Cluster**

Location ID	Distance (m)	Direction	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	960	SW	41.70	37.51	43.10	55
Habitation Near E1	640	SW	41.70	41.03	44.39	
Habitation Near E2	730	SW	41.70	39.89	43.90	

Source: Lab Monitoring Data

The incremental noise level is found within the range of 43.1– 44.39 dB (A) in Buffer zone. The noise level at different receptors in buffer zone is lower due to the distance involved and other topographical features adding to the noise attenuation. The resultant Noise level due to monitored values and calculated values at the receptors are based on the mathematical formula considering attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. From the above table, it can be seen that the ambient noise levels at all the locations near habitations are within permissible limits of Residential Area (buffer zone) as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000(The Principal Rules were published in the

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

### 7.4.3 Ground Vibrations

Ground vibrations due to mining activities in the all the three Mines within cluster are anticipated due to operation of Mining Machines like Excavators, drilling and blasting, transportation vehicles, etc. 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 3 respectively are as in below Table 7.13.

**Table 7.13 Nearest Habitation from Each Mine**

Location ID	Distance in meters
Habitation Near P1	960
Habitation Near E1	640
Habitation Near E2	730

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 7.14 Ground Vibrations at three Mines**

Location ID	Distance & Direction	Maximum Charge in kgs	PPV in mm/s
P1	960 SW	32	0.31
E1	640 SW	31	0.57
E2	730 SW	21	0.34

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.

#### 7.4.4 Socio Economic Environment

The 3 Mines shall contribute towards CER and the community shall develop.

**Table 7.15 Socio Economic Benefits from three Mines**

Code	Project Cost	CER @ 2%
P1	Rs 74,25,000	Rs.1,65,000
E1	Rs. 58,32,000	Rs 1,16,640
E2	Rs. 54,18,400	Rs. 1,08,300
<b>Total</b>	<b>Rs. 1,86,75,400</b>	<b>Rs. 3,89,940</b>

As per para 6 (II) of the office memorandum, all the mines 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 1,65,000/-
- ❖ Existing project shall fund towards CER – Rs 2,24,940/-
- ❖ Three Projects in Cluster shall fund towards CER – Rs 3,89,940/-

**Table 7.16 Employment Benefits from Three Mines**

Code	Employment
P1	24
E1	12
E2	18
<b>Total</b>	<b>54</b>

A total of 24 people will get employment due to proposed mine in cluster and 30 people are already employed at existing mines.

**Table 7.17 Greenbelt Development Benefits from three Mines**

Code	No of Trees proposed to be planted	Survival %	Area Covered Sq.m	Name of the Species	No. of Trees expected to be grown
P1	500	80%	2200	<i>Azadirachta indica</i> <i>Albizia lebbeck</i> <i>Delonix regia</i> <i>Tectona grandis</i> <i>Nerium indicum</i> , etc.,	400
E1	460	80%	4200		368
E2	310	80%	2300		248
<b>Total</b>	<b>1270</b>	<b>80%</b>	<b>8,700</b>		<b>1016</b>

Based on the Proposed Mining Plans it's anticipated that there shall growth of native species of Neem, Casuarina, and Azadirachta indica, Albizia lebbeck, Delonix regia, Techtona grandis, Nerium indicum, etc in the Cluster at a rate of 500 Trees Planted over a period of 5 Years with Survival Rate of 80% and expected growth is around 400 Trees over an area of 2200 Sq.m cumulative of proposed quarries and 1270 Trees Planted over a period of 5 Years with Survival Rate of 80% and expected growth is around 1016 Trees over an area of 8,700 Sq.m cumulative of all existing quarries.

## 7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

### 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 7.18 Action Plan to Manage Plastic Waste**

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

Source: Proposed by FAE's and EC

## **7.6 POST COVID HEALTH MANAGEMENT PLAN FOR PROPOSED PROJECT**

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

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

### **7.6.1 Post-COVID Follow Up Protocol –**

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

- ❖ Pre-order sufficient supplies and materials, including tissues and hand sanitizer for all employees. Have surgical masks available to offer anyone who develops respiratory symptoms.
- ❖ It is also suggested by the Ministry of AYUSH that the use of Chyawanprash in the morning (1 teaspoonful) with luke warm water/milk is highly recommended (under the direction of Registered Ayurveda physician) as in the clinical practice Chyawanprash is believed to be effective in post-recovery period.
- ❖ If there is persistent dry cough / sore throat, do saline gargles and take steam inhalation. The addition of herbs/spices for gargling/steam inhalation. Cough medications, should be taken on advice of medical doctor or qualified practitioner of Ayush.
- ❖ Look for early warning signs like high grade fever, breathlessness, SpO<sub>2</sub> < 95%, unexplained chest pain, new onset of confusion, focal weakness.
- ❖ Avoid smoking and consumption of alcohol.
- ❖ Communicate to your employees and contractors about the plan and make sure they are aware of what they need to do – or not do – under the plan. Emphasize key points such as the importance of staying away from work even if they have only mild symptoms or have had to take simple medications (e.g., paracetamol, ibuprofen) which may mask the symptoms.
- ❖ The plan should address how to keep your business running even if a significant number of employees, contractors and suppliers cannot come to your place of business - either due to local restrictions on travel or due to illness.



## **CHAPTER VIII**

### **PROJECT BENEFITS**

#### **8.0 GENERAL**

**Thiru.P.Sasikumar** Proposed Project for Rough Stone and Gravel Quarry at Keeranur Village aims to produce cumulatively 1,44,275 m<sup>3</sup> Rough Stone & 30888 m<sup>3</sup> of Gravel over a period of 5 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

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

#### **8.1 EMPLOYMENT POTENTIAL**

It is proposed to provide employment to about 24 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 Keeranur Village, Kangayam Taluk and Tiruppur 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 workers employed in the mine.

#### **8.4 IMPROVEMENT IN SOCIAL INFRASTRUCTURE**

Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily

temporary or contractual and involvement of unskilled labour will be more. A major part of the labour force will be mainly from local villagers who are expected to engage themselves both in agriculture and mining activities. This will enhance their income and lead to overall economic growth of the area.

## **8.5 OTHER TANGIBLE BENEFITS**

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

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

### **8.5.1 Corporate Social Responsibility**

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

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

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

#### ***CSR Cost Estimation***

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

### 8.5.2 Corporate Environment Responsibility

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III, Dated: 01.05.2018.

As per para 6 (II) of the office memorandum, being a green field project & Capital Investment is  $\leq 100$  crores, the proposed and existing projects shall contribute 2% of Capital Investment towards CER as per directions of EAC/SEAC. Cumulative Capital cost is Rs. 74, 25,000/- and 2% of the same works out to Rs. 1, 65,000/

**Table 8.1 CER – Action Plan**

<b>Activity</b>	<b>Total</b>
The applicant indents to involve corporate environment responsibilities (CER) activity like Water Purifier, Medicine Storage rack and Cot and Bed facilities to the Dispensary and Water Purifier to the near Govt. School at 2.0% from the total project cost.	Rs. 1,65,000/-
<b>TOTAL</b>	<b>Rs. 1,65,000/-</b>

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

## **CHAPTER IX**

### **ENVIRONMENTAL COST BENEFIT ANALYSIS**

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

## **CHAPTER X**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.0 GENERAL**

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects 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.

##### **10.1.1 The Proponent Thiru. P. Sasikumar 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

##### **10.1.2 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 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
Refuelling to be undertaken in a safe location, away from vehicle movement pathways & 100 m away of any watercourse Refuelling activity to be under visual observation at all times. Drainage of refuelling 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 mines office.

The quarrying operation depth of 17m BGL for the first five years plan period. The water table in the area is 50m – 55m below ground level. Hence, the proposed project 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**

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

Source: Proposed by 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**

<b>Control</b>	<b>Responsibility</b>
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 are carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	Mines Manager
Reduce maximum instantaneous charge using delays while blasting	Mining Mate
Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination	Mines Manager
Undertake noise or vibration monitoring	Mines Manager

Source: Proposed by FAE's & EIA Coordinator



## 10.7 GROUND VIBRATION AND FLY ROCK CONTROL

The Rough stone and gravel 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 Coordinator

## 10.8 BIOLOGICAL ENVIRONMENT MANAGEMENT

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

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

- ❖ Greenbelt development all along the safety barrier of the project area
- ❖ It is also proposed to implement the greenbelt development 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 500nos. of saplings is proposed to be planted for the 5 years 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 Green Belt Activities for 5 Years**

Year	No. of trees proposed to be planted	Survival %	Area to be covered in m <sup>2</sup>	Name of the species	No. of trees expected to be grown
	Plantation under safety zone (In Nos.)				
I	50	80%	450	<i>Azadirachta indica</i> <i>Albizia lebbeck</i> <i>Delonix regia</i> <i>Tectona grandis</i> <i>Nerium indicum</i> , etc.,	40
II	50		450		40
III	50		450		40
IV	50		450		40
V	50		450		40
Year	Plantation in quarried out of benches and approach road Side & Village Road Side (In Nos)				40
I	50	80%	450		40
II	50		450		40
III	50		450		40
IV	50		450		40
V	50		450		40

Source: Conceptual Plan of Approved Mining plan & 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 Green Belt**

S. No	Botanical Name of the Plant	Family Name	Common Name	Category	Efficiency of Dust Removal (%)	Dust Capturing Efficiency Features
1	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree	25.54	Well distinct thick at both the layer Well distinct in Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles arranged almost parallel series
2	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree	14.94	
3	<i>Polyalthia longifolia</i>	Annonaceae	Nettilingam	Tree	29.84	
4	<i>Albizia lebbeck</i>	Fabaceae	Vagai	Tree	23.03	
5	<i>Delonix regia</i>	Fabaceae	Cemmayir-konrai	Tree	18.05	
6	<i>Nerium indicum</i>	Apocynaceae	Arali	Shrub	12.3	Both upper & lower epidermis cells are present, Mesophyll is present between upper & Lower epidermis, Vascular tissues are present through the leaf in parallel.
7	<i>Bougainvillea glabra</i>	Nycaginaceae	Kakithapoo	Shrub	21.35	
8	<i>Hibiscus rosa sinensis</i>	Malvaceae	seamparuthi	shrub	21.09	

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 detailed 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**

Sl.No	Activities	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> 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 mineworkers**

### 10.9.3 Health and Safety Training Programme

The Proponent 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

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**

Attribute	Activity	Mitigation measures	Provision for Implementation	Capital Cost INR	Recurring Cost INR Per annum
Air Quality	Haul Road Dust Suppression	Compaction, gradation and drainage on both sides	Rental dozer & drainage construction on haul road length of <b>560 m @ 300 RS/ meter</b>	1,68,000 /-	33300 /-
		Fixed water sprinkling arrangements + water sprinkling by own water tankers twice a day	Water @ Rs 100/- per tanker	6,00000/-	60000/-
		Air Quality will be regularly monitored as per norms within ML area & Ambient Area	Yearly Compliance as per CPCB norms	0	80000/-
	Mine Pit Operations	Wet drilling will be practiced	Provision made in Operating Cost	0	0
		Controlled delay blasting will be used			
	Truck Loading	No overloading of trucks/tippers/tractors	Manual Monitoring through Security guard	0	15,000/-
		Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere	Monitoring if trucks will be covered by tarpaulin	0	10,000/-
		Enforcing speed limits of 20 km/hr within ML area	Manual Monitoring through Security guard	0	15,000/-
		Regular monitoring of exhaust fumes as per RTO norms	Monitoring of Exhaust Fumes	0	10,000/-
	Road Maintenance	Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance	Provision for 2 labours @ Rs.30,000/labour (Contractual)	0	60,000/-
		Installing wheel wash system near exit gate of quarry	Installation + Maintenance + Supervision	60,000/-	10,000/-



Attribute	Activity	Mitigation measure	Provision for Implementation	Cost of EMP INR	
				Capital Cost INR	Recurring Cost INR
Noise Management	Mine Pit Operations	Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals.	Provision made in Operating Cost	0	0
		Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	Provision made in Operating Cost	0	0
		Adequate silencers will be provided in all the diesel engines of vehicles.	Provision made in Operating Cost	0	0
		It will be ensured that all transportation vehicles carry a fitness certificate.	Provision made in Operating Cost	0	0
		Plantation along periphery of lease area will act as attenuation barrier.	Provision made in Operating Cost	0	0
Vibrations	Drilling & Blasting	Safety tools and implementations that are required will be kept adequately near blasting site at the time of charging.	Provision made in OHS part	0	0
		Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	Installation of warning system	30,000/-	3,000/-
		Provision for Portable blaster shed	Installation of Portable blasting shelter	70,000/-	4,000/-

Attribute	Activity	Mitigation measures	Provision for Implementation	Cost of EMP INR	
				Capital Cost INR	Recurring Cost INR
<b>Surface Water</b>	Water collected during Monsoon period	During monsoon period surface runoff around the quarry will follow the garland drains/storm water drains as per natural drain pattern. Eroded sediments through a garland drain will be entrapped before being discharged to the natural drainage system. Otherwise, the water from garland drains shall be collected in temporary pit reservoirs. After settling, this collected water shall be used for a plantation and dust suppression.	Provision for garland drains @ Rs. 300/ meter (provision for peripheral length of <b>460m</b> ) + recurring cost for maintenance	1,38,000/-	13,800/-
<b>Solid Waste</b>	Mine Pit Operations	Any domestic waste generated due to human activity will be collected and handed over to solid waste handling agency.	Provision for domestic waste collection and disposal through authorized agency (Capital Cost Member ship fee + recurring cost for collection /disposal charges)	35,000/-	25,000/-
		Provision for dust bins etc.	Installation of dust bins	10,000/-	2,000/-
<b>Toilets/ Sanitation</b>	Mine Pit Operations	Bio toilets will be made available outside mine lease on the land of owner itself	Provision made in Operating Cost	0	0
<b>EC Condition</b>	Display Board		Fixed Display Board at the Quarry Entrance as permanent structure	25,000/-	1,000/-

Attribute	Activity	Mitigation measure	Provision for Implementation	Cost of EMP INR	
				Capital Cost INR	Recurring Cost INR
<b>Occupational Health and Safety</b>	Mine Pit Operations	Workers will be provided with Personal Protective Equipment	Provision of 24 kits	0	96,000/-
		Health checkup for workers will be provisioned	IME & PME Health check up	0	88,000/-
		First aid facility will be provided	Provision of 10 kits	0	30,000/-
		Mine will have safety precaution signages, boards.	Provision for signages and boards made	20,000/-	2,000/-
		Barbed Wire Fencing to quarry area will be provisioned.	Wire fencing @ 300 per meter for <b>560 m</b>	1,68,000/-	16,800/-
<b>Development of Green Belt</b>	Mine Pit Operations Transportation over roads	About 500 trees along peripheral length within 7.5 m safety zone of quarry will be planted in five years. (Two Tier Plantation)	Site clearance, preparation of land, digging of pits / trenches, soil amendments, transplantation of saplings @ 100 RS per plant and maintenance@ 30,000/- every year	2,00,000/-	30,000/-
<b>Mine Closure Activity</b>	Mine Pit Operations	Closure includes Greenbelt development, wire fencing, drains	Provision made in Closure Cost	0	0
<b>Traffic Management</b>	Mine Pit Operations Transportation over roads	No parking will be provided on the transport routes. Separate provision on the Northern part of ML will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management	Parking area with shelter and flags	1,00,000/-	10,000/-
<b>TOTAL EMP BUDGET</b>				<b>16,24,000/-</b>	<b>6,15,200/-</b>

In order to implement the environmental protection measures, an amount of Rs.16,24,000 as capital cost and recurring cost as Rs. 6,15,200 as recurring cost is proposed considering present market price considering present market scenario for the proposed project.

## **10.10 CONCLUSION**

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

## CHAPTER XI

### SUMMARY AND CONCLUSION

#### 11.0 INTRODUCTION

This EIA report is prepared by considering Cumulative load proposed & existing quarries of Keeranur Rough Stone & Gravel Cluster Quarries consisting of One Proposed and Two Existing Quarries with total extent of Cluster of 8.45.17ha in Keeranur Village, Kangeyam Taluk, Tiruppur District and Tamil Nadu State, cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1<sup>st</sup> July 2016.

This EIA Report is prepared in compliance with ToR obtained –

Lr.No. SEIAA-TN/F.No.8549/ToR-1139/2020, Dated: 08.04.2022,  
and the Baseline Monitoring study has been carried out during the period of March to May 2022.

#### 11.1 PROJECT DESCRIPTION

**Table 11.1 Salient Features – Proposed Quarry**

Name of the Quarry	Thiru. P.Sasikumar Rough stone and gravel quarry	
Toposheet No	58 - E/12	
Latitude between	11°04'52.40"N to 11°04'57.75"N	
Longitude between	77°33'27.41"E to 77°33'33.38"E	
Highest Elevation	267m AMSL	
Ultimate depth of Mining	The ultimate depth of mining is 42m (2m Gravel + 40m Rough stone) for a period of Ten years.	
Geological Resources	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	7,98,080	39,904
Mineable Reserves	Rough Stone in m <sup>3</sup>	Gravel m <sup>3</sup>
	2,87,800	30,888
Proposed reserve for five years up to the depth of 17m bgl	1,44,275	30888
Ultimate Pit Dimension	157m (L) x 101m (W) x 42m (D) bgl	
Water Level in the surrounds area	50 to 55m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Topography	The lease-applied area is exhibits plain topography. The area has gentle sloping towards Northeast side. The altitude of the area is	

	267m (max) above Mean Sea level. The area is covered by 2m thickness of Gravel and formation.	
Machinery proposed	Jack Hammer	4 Nos
	Compressor	1 Nos
	Excavator with Bucket / Rock Breaker	1 Nos
	Tippers	3Nos
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	24 Nos	
Project Cost	Rs.74,25,000/-	
CER Cost @ 2% of Project Cost	Rs.1,65,000/-	
Nearby Water Bodies	Orathuppalayam Reservoir	3.5km-NW
	Noyyal River	3 km-N
Greenbelt Development Plan	Proposed to plant 300 trees in 2200 Sq.m area in the 7.5 m Safety Zone	
Proposed Water Requirement	4.3 KLD	
Nearest Habitation	960m – SW	

Source: Approved Mining Plan and Survey of India Toposheet

**Table 11.2 Land Use Pattern of the Proposed Project**

Land Use Pattern-P1		
Description	Present area in (Ha)	Area at the end of Life of Quarry (Ha)
Area under quarry	Nil	1.60.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.22.0
Un – utilized area	2.00.0	0.15.0
<b>TOTAL</b>	<b>2.00.0</b>	<b>2.00.0</b>

Source: Approved Mining plan

**Table 11.3 Resources and Reserves of Proposed Project**

Particulars	Details	
	Rough Stone	Gravel
Geological Resources in m <sup>3</sup>	7,98,080	39,904
Mineable Reserves in m <sup>3</sup>	2,87,800	30,888
Proposed production for Five years plan period	<b>1,44,275</b>	<b>30,888</b>
Mining Plan Period	5 Years	
Number of Working Days	300 Days	
Production per day in m <sup>3</sup>	96	34
No of Lorry loads (6m <sup>3</sup> per load)	15	3
Total Depth of Mining first years plan period	17m (D) (2m Gravel + 15m Rough stone)	

**Table 11.4 Ultimate Pit Dimension**

PROPOSAL-P1			
Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max)
I	157	101	42m bgl

Source: Approved Mining plan

**Table 11.5 Water Requirement of the Proposed Project**

Purpose	Quantity	Sources
Drinking & Domestic Purpose	0.8KLD	From Existing, bore wells and drinking water will be sourced from Approved Water vendors.
Dust suppression	2.0KLD	From Existing bore wells from nearby area
Green belt	1.5KLD	From Existing bore wells from nearby area
Total	4.3KLD	

Source: Prefeasibility report

## 11.2 DESCRIPTION OF THE ENVIRONMENT

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

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

- ❖ Land
- ❖ Water
- ❖ Air
- ❖ Noise

- ❖ Biological
- ❖ Socio-economic status

### 11.2.1 Land Environment

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

**Table 11.6 Land Use / Land Cover Table 10 Km Radius**

S. No.	CLASSIFICATION	AREA (hectare)	AREA (%)
1	Crop land	27159	90.33
2	Land with or without scrub	403	1.34
3	Mining / Industrial wastelands	54	0.18
4	Dense forest	191	0.63
5	Man-made features	378	1.26
6	Fallow land	32	0.11
7	Settlement	378	1.26
8	Water bodies	105	0.35
9	Plantations	1258	4.18
10	Barren Rocky / stony waste / sheet rock area	108	0.36
<b>Total Area</b>		<b>30067</b>	<b>100.00</b>

Source: Survey of India Toposheet and Landsat Satellite Imagery

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

### 11.2.2 Soil Characteristics

#### 11.2.2.1 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 0.86-1.53 g/cc. The Water Holding Capacity of the soil in the study area varied between 42.2-48.3%.

#### 11.2.2.2 Chemical Characteristics

- ❖ The nature of soil is slightly alkaline to strongly alkaline with pH range 7.13 to 8.72
- ❖ The Exchangeable Calcium (Ca) content range varied between 121 to 182 mg/kg
- ❖ The Exchangeable Magnesium (Mg) content range varied between 22 to 38.7 mg/kg
- ❖ The available Potassium (K) content range varied between 21.5 to 38.2 mg/kg
- ❖ The Soluble Chloride content range varied between 119 to 164 mg/kg
- ❖ The Available Nitrogen content range varied between 165 to 212 kg/ha



### 11.2.3 Water Environment

#### 11.2.3.1 Surface Water

The pH value of the water varied from 7 to 9 and turbidity varied from 4.9 to 6.8 found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH). Total Dissolved Solid varied from 396 to 415 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter. Chloride content varied from 67.9 to 70.9 mg/l. sulphates varied from 19.7 to 23.8 mg/l. Total hardness varied from 184 to 194 mg/l.

#### 11.2.3.2 Ground Water

The pH of the water samples collected ranged from 6.56 to 7.65 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 364 - 455 mg/l in all samples. The Total hardness varied between 116– 184 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.

### 11.2.4 Air Environment

#### 11.2.4.1 Site Specific Meteorology

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

**Table 11.7 Meteorological Data Recorded at Site**

S.No.	Parameters		March-2022	April– 2022	May- 2022
1	Temperature (°C)	Max	33	36	37
		Min	19	21	22
		Avg	27	28.5	29
2	Relative Humidity (%)	Avg	50	52	58
3	Wind Speed (m/s)	Max	5.22	5.83	6.67
		Min	0.83	1.12	1.67
		Avg	2.47	2.85	3.08
4	Cloud Cover (OKTAS)		0-8	0-8	0-8

Source: On-site monitoring/sampling by Richardson & Cruddas (1972) Ltd, in association with GTMS

#### **11.2.4.2 Ambient Air Quality Results**

The results of ambient air quality monitoring for the period (March 2022 – May 2022) are presented in the report. Data has been complied for three months.

As per the monitoring data, PM<sub>10</sub> ranges from 39.21 µg/m<sup>3</sup> to 43.71 µg/m<sup>3</sup>; PM<sub>2.5</sub> from 17.73 µg/m<sup>3</sup> to 21.65 µg/m<sup>3</sup>; SO<sub>2</sub> from 6.34 µg/m<sup>3</sup> to 8.73 µg/m<sup>3</sup>; NO<sub>2</sub> from 17.23 µg/m<sup>3</sup> to 20.83 µg/m<sup>3</sup>. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

#### **11.2.5 Noise Environment**

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 45.8 dB (A) Leq and during night time were from 36.2 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 40.5 to 43.3 dB (A) Leq and during night time were from 31.4 to 35.7 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

#### **11.2.6 Biological Environment**

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

#### **11.2.7 Socio-Economic Environment**

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

### 11.3 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES FOR PROPOSED PROJECT

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

**Table 11.8 Anticipated Impacts & Mitigation Measures**

Impact	Mitigation Measure
Land Environment	
Destruction of natural landscapes Changes in soil characteristics Soil erosion and slope instability	Mining will be carried out as per approved mine plan in scientific and systematic way Safety Zone or Buffer area will be maintained and will not be mined and instead plantation will be carried out in the safety zone Barbed wire fencing will be provided all along the proposed mine boundary At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir Construction of garland Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
Water Environment	
Decrease in aquifer recharge and increase in surface runoff; Disturbance to land drainage, overload and erosion of watercourses; Changes to the surface over which water flows; Changes to surface and groundwater resources quantity and quality due to stream blockage and contamination by particulate matter or waste; Contamination of aquifers due to removal of the natural filter medium.	Construction of garland drains all around the quarry pit and construction of settling traps at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area De-silting will be carried out before and immediately after the monsoon season and the settling tank and drains will be cleaned weekly, especially during monsoons Domestic sewage from site office & urinals/latrines provided in project area will be discharged through septic tank followed by soak pit system. Tippers & HEMM will be washed in a designated area and the washed water will be routed through drains to a settling tank, which has an oil & grease trap, only clear water will be reused for greenbelt development.
Air Environment	

<p>Generation of Fugitive Dust</p> <p>Dust will be generated mainly during excavation, loading &amp; unloading activities.</p> <p>Gaseous pollutants will be generated mostly by the traffic.</p> <p>Reduction in visibility due to dust plumes.</p> <p>Coating of surfaces leading to annoyance and loss of amenity.</p> <p>Physical and/or chemical contamination and corrosion.</p> <p>Increase in the concentration of suspended particles in runoff water.</p> <p>Coating of vegetation leading to reduced photosynthesis,</p> <p>Inhibited growth, destroying of foliage, degradation of crops;</p> <p>Increase in health hazards due to inhalation of dust.</p>	<p>Haul roads will be well maintained by sprinkling water twice a day</p> <p>The access road will be cleaned and brushed to ensure that mud and dust deposits do not accumulate.</p> <p>To ensure that dust and debris is minimised on the access road, all the tipper drivers will be instructed to use water spray system on all the tyres and spray water on the loaded material that is provided at the compound area before leaving the site</p> <p>Speed restrictions will be imposed to avoid spillage of loaded materials upon the road and to reduce wear and tear of the road.</p> <p>Weekly inspections of the condition of the access road by competent person employed, and immediate action will be taken to address any potholes or damage to the road surface.</p> <p>Dust wetting agents can be mixed with the water applied to haul roads during hot, dry weather conditions to increase the duration that the road surface remains damp.</p> <p>Personal Protective Equipment's will be provided to all workers</p> <p>All drilling rods used will have dust suppression systems fitted which injects water into the hole.</p> <p>Wet gunny bags will be used as a cover while drilling.</p> <p>The blast zone will be kept damp by the application of water from the rain gun fitted to the water tanker prior to each blast to control any fugitive dust emissions that could arise from the surface during detonation.</p> <p>A daily visual inspection shall be conducted by the site manager who will keep a daily log of all process operations and site activities and note any malfunctions which could lead to abnormal emissions from the quarry operations.</p> <p>A site speed limit of 20 km/h will be set to minimise the potential for dust generation</p> <p>Weekly maintenance programme to identify machinery due for maintenance, based on the number of hours it has been in operation.</p>
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	<p>Air filters are renewed after every 1000 hours of use, unless otherwise indicated by an on-board computer system.</p> <p>All site machineries &amp; tippers will be serviced and maintained 6 months once and drivers will report any defects immediately to the site manager to enable repairs to be carried out promptly.</p>
Noise & Vibration	
<p>Annoyance and deterioration of the quality of life;</p> <p>Propelling of rocks fragments by blasting.</p> <p>Shaking of buildings and people due to blasting;</p>	<p>Usage of sharp drill bits while drilling which will help in reducing noise;</p> <p>Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;</p> <p>Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;</p> <p>The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;</p> <p>Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;</p> <p>Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;</p> <p>Silencers / mufflers will be installed in all machineries;</p> <p>Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;</p> <p>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.</p>
Biological Environment	
<p>Direct impacts include land clearance and excavation causing destruction of flora and fauna and loss of habitats;</p> <p>Indirect impacts include habitat degradation due to noise, dust, and human activity.</p>	<p>Only some common herbs, shrubs and grass will be cleared. So there will be no impact on the biodiversity.</p> <p>Green belt development with suitable species will enhance the biodiversity of the project area.</p> <p>The core zone or buffer zone does not encompass any threatened flora or fauna species.</p>
Socio-Economic Environment	

<p>Health and safety of workers and the general public;</p> <p>Increase in traffic volumes and sizes of road vehicles;</p> <p>Economic issues, including the increase in employment opportunities;</p>	<p>The mining activity puts negligible change in the socio-economic profile.</p> <p>Around 24 local workers will get employment opportunities along with periodical training to generate local skills.</p> <p>New patterns of indirect employment/ income will generate.</p> <p>Regular health check-up camp.</p> <p>Assistance to schools and scholarship to children will be provided.</p>
<b>Occupational Health &amp; Safety</b>	
<p>Exposure to Dust</p> <p>Noise and Vibration Exposure</p> <p>Physical Hazards</p> <p>Respiratory hazards due to Dust exposure</p>	<p>Provision of rest shelters for mine workers with amenities like drinking water etc.</p> <p>All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.</p> <p>Training of employees for use of safety appliances and first aid in vocational training center.</p> <p>Weekly maintenance and testing of all equipment as per manufacturers' guidelines.</p> <p>Pre placement and Yearly Medical Examination of all workers by a medical Officer</p> <p>First Aid facility will be provided at the mine site.</p> <p>Close surveillance of the factors in working environment and work practices which may affect environment and worker's health by the mine's manager employed.</p> <p>Working of mine as per approved mining plan and environmental plans</p>

#### 11.4 ANALYSIS OF ALTERNATIVES

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

- ❖ The mineral deposit occurs in a non-forest area.
- ❖ There is no habitation within the applied lease area; hence no R & R issues exist.
- ❖ There is no river, stream, nallas and water bodies in the or passing through the applied mine lease areas.
- ❖ Availability of skilled, semi-skilled and unskilled workers in this region.
- ❖ All the basic amenities such as medical, firefighting, education, transportation, communication and infrastructural facilities are accessible.
- ❖ Mine connectivity through road and rail is good.

- ❖ The proposed mining operations do not intersect the ground water level. Hence, no impact on ground water environment.

## 11.5 ENVIRONMENTAL MONITORING PROGRAM

Environmental Monitoring program will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

**Table 11.9 Post Project Monitoring Program for Proposed Project**

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

## 11.6 ADDITIONAL STUDIES

### 11.6.1 Public Consultation for proposed project

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

### **11.6.2 Risk Analysis & Disaster Management Plan for proposed project**

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup>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 time table are recorded along with pinpointed responsibilities.

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

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

### **11.7 PROJECT BENEFITS FOR PROPOSED PROJECT**

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

- ❖ Improved road communication
- ❖ Rain water harvesting structures to augment the water availability for irrigation and plantation and ground water recharge
- ❖ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ❖ Strengthening of existing community facilities through the Community Development Programme
- ❖ Skill development & capacity building like vocational training
- ❖ Awareness program and community activities, like health camps, medical aids, sports & cultural activities, plantation etc.,



In order to implement the environmental protection measures, budget is proposed considering present market price considering present market scenario in the below table for respective proposed project.

In order to implement the environmental protection measures, an amount of Rs. 16,24,000 as capital cost and Rs. 6,15,200 as recurring cost have been proposed considering present market scenario for the proposed project.

## **11.8 CONCLUSION**

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

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

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

## CHAPTER XII DISCLOSURES OF CONSULTANT

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

### Name and address of the consultancy

#### GEO TECHNICAL MINING SOLUTIONS

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

Email: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com)

Web: [www.gtmsind.com](http://www.gtmsind.com)

Phone: 04342 232777.

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

S.N o.	Name of the expert	In house/ Empanelled	FAE		
			Sector	Functional Area	Cate gory
Approved Functional Area Experts					
1.	Shri G. Vageesan	EIA Coordinator (EC) In-house	1(a)(i)	Mining	B
2.	Dr.S. Karuppannan	In-house FAE	1(a)(i)	LU, HG, GEO	B
3.	Dr.M. VijayPrabhu	In-house FAE	1(a)(i)	HG, LU, GEO	B
4.	Dr.J. Rajarajeswari	In-house	1(a)(i)	EB, SC	B
5.	Dr.G. Prabakaran	In-house	1(a)(i)	SE	B
6.	Dr.R. ArunBalaji	In-house FAE	1(a)(i)	AP, AQ, NV	B
7.	Mr.J.N. Manikandan	Empanelled	1(a)(i)	RH, SHW, AP	B
8.	Dr.S. Malar	In-house	1(a)(i)	WP	B

		FAE			
9.	Mr.G. UmaMaheswaran	In-house FAE	1(a)(i)	HG, LU, GEO	B
10.	Mr. S. GopalaKrishnan	In-house FAE	1(a)(i)	HG, GEO	B
<b>Approved Functional Area Associates</b>					
11.	Mr.G. Prithiviraj	FAA	1(a)(i)	LU, HG	B
12.	Mr.C. Kumaresan	FAA	1(a)(i)	NV	B
13.	Mr.N. GokulPraveen	FAA	1(a)(i)	HG	B
14.	Mr.S. Dinesh	FAA	1(a)(i)	HG, GEO	B
15.	Mr.P. Vellaian	FAA	1(a)(i)	HG, GEO	B
<b>Supportive Team Members</b>					
16.	Dr.A. Kalaiyarasi	Team Member	-	HG	-
17.	Mr.M. Saravanan	Team Member	-	LU, HG,GEO	-
18.	Mr.P. Venkatesh	Team Member	-	SHW, AP, RH	-
19.	Mr. SriKrishna	Team Member	-	LU, HG	-
20.	Mr.G.Moorthy	Team Member	-	LU, HG,GEO	-
21.	Mr.R.Elavarasan	Team Member	-	EB	-
22.	Dr.E.Manikandan	Team Member	-	LU, HG,GEO	-
23.	Ms.R.Suganya	Team Member	-	SE	-
<b>Abbreviations</b>					
EC	EIA Coordinator	NV	Noise and Vibration		
FAE	Functional Area Expert	SE	Socio Economics		
FAA	Functional Area Associates	HG	Hydrology, ground water and water conservation		
TM	Team Member	SC	Soil conservation		
GEO	Geology	RH	Risk assessment and hazard management		
WP	Water pollution monitoring, prevention and control	SHW	Solid and hazardous wastes		
AP	Air pollution monitoring, prevention and control	MS W	Municipal Solid Wastes		

LU	Land Use	ISW	Industrial Solid Wastes
AQ	Meteorology, air quality modeling, and prediction	HW	Hazardous Wastes
EB	Ecology and bio-diversity	GIS	Geographical Information System

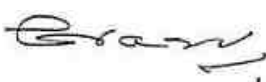
### **DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA & EMP**

Declaration by experts contributing to the Cluster EIA/EMP for Keeranur Village Rough Stone and gravel Quarry project over a Cluster Extent of **8.45.17 hectares** in Keeranur Village, Kangayam Taluk, Tiruppur District of Tamil Nadu. It is also certified that information furnished in the above EIA study are true and correct to the best of our knowledge.

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

Name : **Shri. G. VAGEESAN**

Designation : **EIA Coordinator**

Date & Signature : 

Period of Involvement: **January 2021 to till date**

### **FUNCTIONAL AREA EXPERTS ENGAGED IN THE PROJECT**


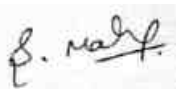


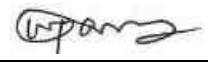


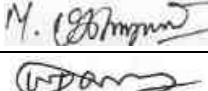

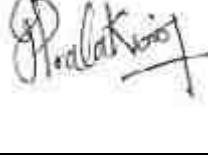









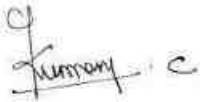


Sl. No.	Functional Area	Involvement	Name of the Expert/s	Signature
1	AP	<ul style="list-style-type: none"> <li>Identification of different sources of air pollution due to the proposed mine activity</li> <li>Prediction of air pollution and propose mitigation measures / control measures</li> </ul>	Mr.J.N. Manikandan	
2	WP	<ul style="list-style-type: none"> <li>Suggesting water treatment systems, drainage facilities</li> <li>Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.</li> </ul>	Dr.S. Malar	
3	HG	<ul style="list-style-type: none"> <li>Interpretation of ground water</li> </ul>	Dr.M. Vijay Prabhu	

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

		measures for EMP		
11	SC	<ul style="list-style-type: none"> <li>Assessing the impact on soil environment and proposed mitigation measures for soil conservation</li> </ul>	Dr.J. Rajarajeshwari	
12	SHW	<ul style="list-style-type: none"> <li>Identify source of generation of non-hazardous solid waste and hazardous waste.</li> <li>Suggesting measures for minimization of generation of waste and how it can be reused or recycled.</li> </ul>	Mr.J.N. Manikandan	

#### LIST OF FUNCTIONAL AREAS ASSOCIATE ENGAGED IN THIS PROJECT

S.No.	Name	Functional Area	Involvement	Signature
1	Mr.G. Prithiviraj	AQ, AP, LU, HG	<ul style="list-style-type: none"> <li>Site visit with FAE</li> <li>Provide inputs &amp; Assisting FAE with sources of Air Pollution, its impact and suggest control measures</li> <li>Analyse &amp; provide inputs and assist FAE with meteorological data, emission estimation, AERMOD modelling and suggesting control measures</li> </ul>	
2	Mr.N. GokulPraveen	HG	<ul style="list-style-type: none"> <li>Site visit with FAE</li> <li>Assisting FAE on sources of water pollution, its impacts and suggest control measures</li> <li>Assisting FAE in preparation of land use maps</li> </ul>	
3	Mr.C. Kumaresan	NV	<ul style="list-style-type: none"> <li>Assist in Resources &amp; Reserve Calculation and preparation of Production Plan &amp; Conceptual Plan</li> </ul>	
4	Mr. S. Dinesh	HG; GEO	<ul style="list-style-type: none"> <li>Site visit with FAE</li> <li>Provide inputs on Geological Aspects</li> <li>Assist in Resources &amp; Reserve calculation and</li> </ul>	

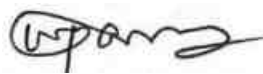
			preparation of production Plan & Conceptual Plan	
5	Mr.P. Vellaiyan	HG; GEO	<ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Assist FAE with collection of data</li> <li>○ Provide inputs by analysing primary and secondary data</li> </ul>	

**DECLARATION BY THE HEAD OF THE ACCREDITED CONSULTANT ORGANIZATION**

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned Functional Area Experts and Team Members prepared the Cluster EIA/EMP for Keeranur village Rough Stone and gravel quarry project over a cluster extent of 8.45.17 hectares in Keeranur Village, Kangayam Taluk, Tiruppur District of Tamil Nadu. It is also certified that information furnished in the EIA report is true and correct to the best of our knowledge.

Signature& Date

:



Name

: **Dr. S. Karuppannan**

Designation

: **Managing Partner**

Name of the EIA Consultant Organization

: **Geo Technical Mining Solutions**

NABET Certificate No & Issue Date

: **NABET/EIA/2023/IA0067 & March 30, 2021**

Validity

: **Valid till 29.12.2023**

Minutes of 254<sup>th</sup> Accreditation Committee Meeting for Initial Accreditation held on 29.01.2021.



TMT.P.RAJESWARI, I.F.S.,  
MEMBER SECRETARY

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

**TERMS OF REFERENCE (ToR)**

**Lr No.SEIAA-TN/F.No.8549/ToR-1139/2020 Dated: 08.04.2022.**

To

Thiru.P.Sasikumar  
S/o.Palanisamy  
No.5/257, Keeranur Village  
Kangeyam Taluk  
Tiruppur -638701

Sir / Madam,

**Sub:** SEIAA, Tamil Nadu – Terms of Reference with public Hearing (ToR) for the proposed Rough Stone & gravel Quarry over an extent of 2.00.0Ha in SF.No.442(Part), Keeranur Village, Kangeyam Taluk, Tiruppur District by Thiru.P.Sasikumar - under project category – “B1” and Schedule S.No.1 (a) – ToR issued along with Public Hearing - preparation of EIA report – Regarding.

- Ref:**
1. Online proposal No.SIA/TN/MIN/62944/2021 Dt. 6.9.2021
  2. Your application submitted for Terms of Reference dated: 04.05.2021.
  3. Minutes of the 253<sup>rd</sup> SEAC Meeting held on 11.3.2022
  4. Minutes of the 497<sup>th</sup> Authority meeting held on 07.04.2022.

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

The proponent, Thiru.P.Sasikumar has submitted application for Terms of Reference (ToR) dated: 04.05.2021, in Form-I, Pre- Feasibility report for the proposed Rough Stone & gravel Quarry

  
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over an extent of 2.00.0Ha in SF.No.442 (Part), Keeranur Village, Kangeyam Taluk, Tiruppur District, Tamil Nadu.

**Discussion by SEAC and the Remarks:-**

**Proposed Rough Stone & gravel Quarry over an extent of 2.00.0 Ha in SF.No.442(Part), Keeranur Village, Kangeyam Taluk, Tiruppur District by Thiru.P.Sasikumar- For Terms of Reference.**

**(SIA/TN/MIN/62944/2021 Dt. 6.9.2021)**

The proposal was placed in the 253<sup>rd</sup> EAC Meeting held on 11.3.2022. The project proponent gave a detailed presentation. The details of the project furnished by the proponent are given on the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, Thiru.P.Sasikumar has applied for Terms of Reference for the Proposed Rough Stone & gravel Quarry over an extent of 2.00.0 Ha in SF.No. 442(Part), Keeranur Village, Kangeyam Taluk, Tiruppur District Tamil Nadu.
2. The project/activity is covered under Category "B1" of Item 1(a) " Mining of mineral of the Schedule to the EIA Notification, 2006.
3. The proponent has furnished a mining plan for the period of 10 years and the production for 5 years not exceeds 144275 m<sup>3</sup> of rough stone and 30888 m<sup>3</sup> of gravel granite with proposed depth – 17m.

Based on the presentation made by the proponent and the documents furnished, SEAC decided to recommend the proposal for the **grant of Terms of Reference (TOR) with Public Hearing** for the production for 5 years not exceeds 144275 m<sup>3</sup> of rough stone and 30888 m<sup>3</sup> of gravel with proposed depth – 17m below ground level, Subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The Proponent shall include the details of existing quarry operated by same proponent in the EIA report along with compliance report.
2. The Proponent shall carry out the cumulative & comprehensive impact study due to mining operations carried out in the quarry cluster specifically with reference to the environment in terms of air pollution, water pollution, & health impacts, accordingly the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.

  
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3. The entire Cluster of mine lease area shall be video graphed through Drone and submit the same along with EIA report.
4. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
  - a) What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
  - b) Quantity of minerals mined out.
  - c) Highest production achieved in any one year
  - d) Detail of approved depth of mining.
  - e) Actual depth of the mining achieved earlier.
  - f) Name of the person already mined in that leases area.
  - g) If EC and CTO already obtained, the copy of the same shall be submitted.
  - h) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
5. 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).
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.
7. The proponent shall furnish the action plan for plantation of 500 Nos of Trees and the same shall be included in EMP report.
8. 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.
9. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.

  
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10. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
11. 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.
12. 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.
13. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
14. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
15. The recommendation for the issue of "Terms of Reference" is subjected 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).
16. 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.
17. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted in proper espacement as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall

  
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- 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.
18. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
19. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.
20. 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.
21. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCCB.
22. 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.

#### Appendix

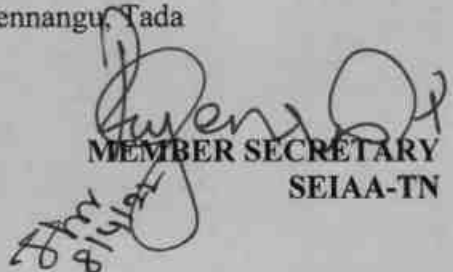
##### List of Native Trees Suggested for Planting

1. *Aegle marmelos* – Vilvam
2. *Adenanthura pavonina* - Manjadi
3. *Albizia lebbek* – Vaagai
4. *Albizia amara* - Usil
5. *Bauhinia purpurea* - Mantharai
6. *Bauhinia racemosa* - Aathi
7. *Bauhinia tomentosa* – Iruvathi
8. *Buchanania aillaris* - Kattuma
9. *Borassus flabellifer* - Panai
10. *Butea monosperma* - Murukka maram
11. *Bobax ceiba* – Ilavu, Sevvilavu
12. *Calophyllum inophyllum* - Punnai
13. *Cassia fistula* - Sarakondrai

  
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14. *Cassia roxburghii*- Sengondrai
15. *Chloroxylon sweitenia* - Purasa maram
16. *Cochlospermum religiosum* – Kongu, Manjal Ilavu
17. *Cordia dichotoma* – Mookuchali maram
18. *Creteva adansonii* – Mavalingum
19. *Dillenia indica* – Uva, Uzha
20. *Dillenia pentagyna* – Siru Uva, Sitruzha
21. *Diospyros ebenum* - Karungali
22. *Diospyros chloroxylon* – Vaganai
23. *Ficus amplissima* – Kal Itchi
24. *Hibiscus tiliaceous* – Aatru poovarasu
25. *Hardwickia binata* – Aacha
26. *Holoptelia integrifolia* - Aayili
27. *Lannea coromandelica* - Odhiam
28. *Lagerstroemia speciosa* - Poo Marudhu
29. *Lepisanthus tetraphylla* - Neikottai maram
30. *Limonia acidissima* - Vila maram
31. *Litsea glutinosa* –Pisin pattai
32. *Madhuca longifolia* - Illuppai
33. *Manilkara hexandra* – Ulakkai Paalai
34. *Mimusops elengi* - Magizha maram
35. *Mitragyna parvifolia* - Kadambu
36. *Morinda pubescens* – Nuna
37. *Morinda citrifolia* – Vellai Nuna
38. *Phoenix sylvestre* - Eachai
39. *Pongamia pinnata* – Pungam
40. *Premna mollissima* – Munnai
41. *Premna serratifolia* – Narumunnai
42. *Premna tomentosa* - Purangai Naari, Pudanga Naari
43. *Prosopis cinerea* - Vanni maram
44. *Pterocarpus marsupium* - Vengai
45. *Pterospermum canescens* – Vennangu, Tada

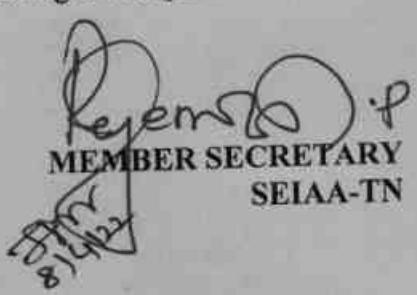
  
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46. *Pterospermum xylocarpum* - Polavu
47. *Puthranjiva roxburghii* - Puthranjivi
48. *Salvadora persica* - Ugaa Maram
49. *Sapindus emarginatus* - Manipungan, Soapu kai
50. *Saraca asoca* - Asoca
51. *Streblus asper* - Piraya maram
52. *Strychnos nuxvomica* - Yetti
53. *Strychnos potatorum* - Therthang Kottai
54. *Syzygium cumini* - Naval
55. *Terminalia bellerica* - Thandri
56. *Terminalia arjuna* - Ven marudhu
57. *Toona ciliate* - Sandhana vembu
58. *Thespesia populnea* - Puvarasu
59. *Walsura trifoliata* - valsura
60. *Wrightia tinctoria* - Vep

**Discussion by SEIAA and the Remarks:-**

The subject was placed in the 497<sup>th</sup> Authority meeting held on 07.04.2022. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal condition in addition to the following conditions:

1. The project proponent shall submit the details of habitation for 300m radius from the proposed mining lease area from the competent authority.
2. 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.
3. 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

  
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- and temperature reduction including control of other emission and climate mitigation activities.
4. 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.
  5. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
  6. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
  7. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
  8. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
  9. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
  10. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
  11. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.
  12. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.
  13. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.
  14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.
  15. The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.
  16. 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.
  17. 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 &

  
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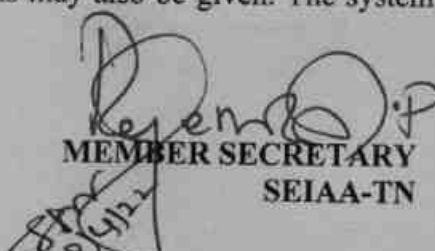
microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

18. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.

19. The project proponent shall study on impact of different pathways and migration.

#### **A. STANDARD TERMS OF REFERENCE**

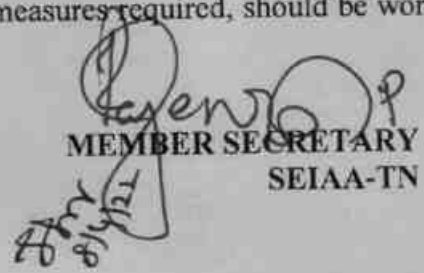
- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production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

  
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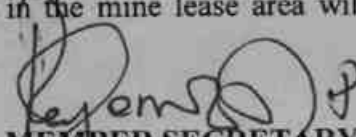
reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked

  
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out with cost implications and submitted.

- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be

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

- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers

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

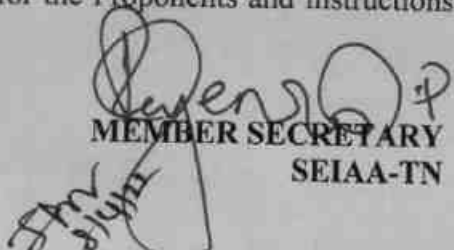
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL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

  
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zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
  - a) Executive Summary of the EIA/EMP Report
  - b) All documents to be properly referenced with index and continuous page numbering.
  - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
  - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
  - e) Where the documents provided are in a language other than English, an English translation should be provided.
  - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
  - g) While preparing the EIA report, the instructions for the Proponents and instructions for

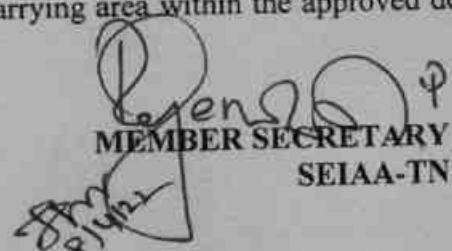
  
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- the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.


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

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

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

  
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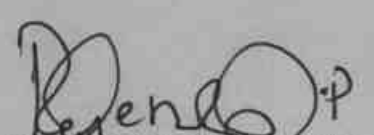
- of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
  11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
  12. The EIA study report shall include the surrounding mining activity, if any.
  13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
  14. A study on the geological resources available shall be carried out and reported.
  15. A specific study on agriculture & livelihood shall be carried out and reported.
  16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
  17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
  18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
  19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
  20. Likely impact of the project on air, water, land, flora-fauna and nearby population
  21. Emergency preparedness plan in case of natural or in plant emergencies
  22. Issues raised during public hearing (if applicable) and response given
  23. CER plan with proposed expenditure.
  24. Occupational Health Measures
  25. Post project monitoring plan
  26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
  27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
  28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.

  
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29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

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

  
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- 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 29<sup>th</sup> August, 2017.

  
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SEIAA-TN

**Copy to:**

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> 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, Tiruppur District.
7. The EO/BDO, Keeranur Village, Kangeyam Taluk, Tiruppur District
8. Stock File.

From

Dr. S.Vediappan, M.Sc., Ph.D.,  
Deputy Director,  
Dept. of Geology and Mining,  
Tiruppur.

To

Thiru. P. Sasikumar,  
S/o. Palanisamy,  
No. 5/257, Keeranur village,  
Kangeyam Taluk,  
Tiruppur District – 638 701

**R.c. No. 1475/2020/Mines Dated : 26.02.2021.**

Sub: Mines and Minerals – Minor Mineral – Rough Stone and Gravel – Tiruppur District – Kangeyam Taluk – Keeranur Village – Patta land in S.F.No. 442 (Part) over an extent of 2.00.0 Hectares – Quarry lease application preferred by Thiru. P. Sasikumar, S/o. Palanisamy - Precise area communicated - Draft mining plan submitted – Approved – Other quarries situated in 500m radius details - Requested - Regarding.

Ref: 1. Thiru. P. Sasikumar, S/o. Palanisamy, No. 5/257, Keeranur village, Kangeyam Taluk, Tiruppur District quarry lease application dated: 20.11.2020 and 19.02.2021.  
2. The Deputy Director, Geology and Mining, Tiruppur letter R.C. No. 1475/Mines/2020 dated 23.02.2021.  
3. Mining Plan submitted by Thiru. P. Sasikumar, S/o. Palanisamy letter dated 25.02.2021 enclosed with mining plan.

\*\*\*\*\*

1. Thiru. P. Sasikumar, S/o. Palanisamy has preferred application for the grant of Rough Stone and Gravel quarry lease in Patta land in S.F.No. 442 (Part) over an extent of 2.00.0 Hectares of Keeranur Village of Kangeyam Taluk of Tiruppur District for a period of 10 years.

2. Based on reports and records available, precise area has been communicated to the applicant with a direction to submit mining plan and also to submit environmental clearance as stipulated in rule 41 and 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 vide memo dated 23.02.2021.

3. Accordingly Thiru. P. Sasikumar, S/o. Palanisamy has submitted the draft mining plan and the same has been approved by the Deputy Director (Geology & Mining) on 26.02.2021 and also 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.

4. In this connection the details of existing / abandoned quarries located within 500m radius from the proposed area are as follows.

a. Existing quarries

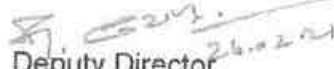
S. No	Name of the lessee	Village	S.F. No	Extent Hect.	Collector's proceedings No. & Date	Lease period
1	P. Sasikumar	Keeranur	449 part, 450	4.44.0	61 / Mines / 2015 dated 21.9.2016	21.09.2016 to 20.09.2021
2	S.P. Bala subramaniam	Keeranur	603/3 (P), 603/4 (P)	2.01.17	125 / Mines / 2017 dated 1.10.2018	01.10.2018 - 30.9.2023

b. Abandoned / expired quarries

S. No	Name of the lessee	Village	S.F. No	Extent Hect.	Collector's proceedings No. & Date	Lease period
1.	A.M. Palanisamy	Keeranur	484/1,2	2.41.0	1009 / 2009 / Mines dated 17.3.2010	17.03.2010 - 16.3.2015 (expired)
2	B.Vijaya lakshmi	Keeranur	441/A1, 441/A2, 441/A3	2.78.0 Hect	166/Mines/2011 DATE 3.7.2012	03.07.2012-02.07.2017 (expired)
3	N. Subramaniam	Keeranur	442 (P), 450 (P)	2.15.0	40374/2004/X-1 dated 27.09.2004	27.09.2004 - 26.09.2009 (expired)

c. Present proposed quarries

S. No	Name of the lessee	Village	S.F. No	Extent Hect.	Collector's proceedings No. & Date	Lease period
1.	P. Sasikumar	Keeranur	442	2.00.0	--	Proposed area.

  
Deputy Director,  
Geology and Mining,  
Tiruppur.

  
26.02.2021

Copy to

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



# **MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR KEERANUR ROUGH STONE AND GRAVEL QUARRY**

(PREPARED UNDER RULES 41 & 42 AS AMENDED IN TAMILNADU MINOR MINERAL CONCESSION RULES, 1959)

*Patta Land / Lease Period = Ten Years*

IN

## **LOCATION OF THE QUARRY LEASE APPLIED AREA**

EXTENT : 2.00.0ha  
S.F.NO : 442 (PART)  
VILLAGE : KEERANUR  
TALUK : KANGAYAM  
DISTRICT : TIRUPPUR  
STATE : TAMIL NADU

FOR

## **APPLICANT**

**Thiru.P.Sasikumar,**

S/o. Palanisamy,

No.5/257, Keeranur Village,

Kangayam Taluk, Tiruppur District,

Tamil Nadu State – 638 701.

## **PREPARED BY**

**Dr. P. Thangaraju, M.Sc., Ph.D.,**

Qualified Person

Regd. Off. No.17, Advaita Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: +91 94422 78601 & 94433 56539.

E-mail: infogeoexploration@gmail.com

**P.Sasikumar,**  
S/o. Palanisamy,  
No.5/257, Keeranur Village,  
Kangayam Taluk, Tiruppur District,  
Tamil Nadu State – 638 701.



**CONSENT LETTER FROM APPLICANT**

The Mining Plan and Progressive Quarry Closure Plan in Respect of Keeranur Rough stone and Gravel Quarry in S.F.No.442 (Part) over an extent of 2.00.0ha of Patta land in Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State has been prepared by

**Dr.P.Thangaraju, M.Sc., Ph.D.,**

Qualified Person

I request to the Deputy Director, Department of Geology and Mining, Tiruppur District to make further correspondence regarding the modification of the Mining Plan with the said Qualified Person at his following address.

**Dr.P.Thangaraju, M.Sc., Ph.D.,**

Regd. Off. No. 17,

Advaitha Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: +91 94422 78601 & 94433 56539.

I hereby undertake that all the modifications, if any 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.

Signature of the Applicant

P.Sasikumar

Place: Tiruppur

Date: 24.02.2021

**P.Sasikumar,**

S/o. Palanisamy,

No.5/257, Keeranur Village,

Kangayam Taluk, Tiruppur District,

Tamil Nadu State – 638 701.



**DECLARATION OF THE APPLICANT**

The Mining Plan and Progressive Quarry Closure Plan in Respect of Keeranur Rough stone and Gravel Quarry in S.F.No.442 (Part) over an extent of 2.00.0ha of Patta land in Keeranur Village, Kangayam Taluk, Tiruppur 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.

Signature of the Applicant

  
P.Sasikumar

Place: Tiruppur

Date: 24.02.2021



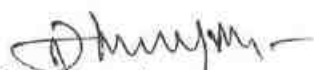
### CERTIFICATE

Certified that I am, **Dr. P. THANGARAJU**, M.Sc., Ph.D., having an office at Regd. Off. No. 17, Advaita Ashram Road, Alagapuram, Salem – 636 004, holding a Post Graduate Degree in Geology (M.Sc. Geology) from Madras University, Chennai and I worked in the field of Geology 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 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 Mining Plans for both Major and Minor Minerals.

Accordingly, I am prepare this Mining Plan and Progressive Quarry Closure Plan in Respect of Keeranur Rough stone and Gravel Quarry in S.F.No.442 (Part) over an extent of 2.00.0ha of Patta land in Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State for **Thiru.P.Sasikumar**, S/o. Palanisamy, No.5/257, Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State – 638 701. 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

  
Dr.P.Thangaraju, M.Sc., Ph.D.,

Place: Salem

Date: 25.02.2021

**Dr.P.Thangaraju, M.Sc., Ph.D.,**

Regd. Off. No. 17,

Advaitha Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: +91 94422 78601 & 94433 56539.



**CERTIFICATE FROM THE QUALIFIED PERSON**

This is to certify that the Provisions of under Rules 41 & 42 as per the Amended under Tamil Nadu Minor Mineral Concession Rules, 1959 have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Keeranur Rough stone and Gravel Quarry in S.F.No.442 (Part) over an extent of 2.00.0ha of Patta land in Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State has been prepared for

**Thiru.P.Sasikumar,**

S/o. Palanisamy,

No.5/257, Keeranur Village,

Kangayam Taluk, Tiruppur District,

Tamil Nadu State – 638 701.

Whenever specific permissions/ exemptions/ relaxations and approvals are required, the Applicant will approach the concerned authorities of the Deputy Director, Department of Geology and Mining, Tiruppur District, Tamil Nadu 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

Dr.P.Thangaraju, M.Sc., Ph.D.,

Place: Salem

Date: 25.02.2021





**Dr.P.Thangaraju, M.Sc., Ph.D.,**

Regd. Off. No. 17,

Advaita Ashram Road,

Alagapuram, Salem District – 636 004.

Cell: +91 94422 78601 & 94433 56539.

**CERTIFICATE FROM THE QUALIFIED PERSON**

Certified that the Provisions of Mines Act, Rules and Regulations and Orders made there under have been observed in the preparation of Mining Plan and Progressive Quarry Closure Plan for Keeranur Rough stone and Gravel Quarry in S.F.No.442 (Part) over an extent of 2.00.0ha of Patta land in Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State has been prepared for

**Thiru.P.Sasikumar,**

S/o. Palanisamy,

No.5/257, Keeranur Village,

Kangayam Taluk, Tiruppur District,

Tamil Nadu State – 638 701.

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

  
Dr.P.Thangaraju, M.Sc., Ph.D.,

Place: Salem

Date: 25.02.2021



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**MINING PLAN AND PROGRESSIVE QUARRY CLOSURE PLAN FOR  
KEERANUR ROUGH STONE AND GRAVEL QUARRY OVER AN EXTENT OF  
2.00.0ha IN KEERANUR VILLAGE, KANGAYAM TALUK,  
TIRUPPUR DISTRICT, TAMIL NADU STATE.**

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

**1.0 INTRODUCTION AND EXECUTIVE SUMMARY**

This Mining Plan and Environment Management Plan are prepared for **Thiru.P.Sasikumar**, S/o. Palanisamy, residing at No.5/257, Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State – 638 701.

The applicant applied for Rough stone and Gravel quarry over an extent of 2.00.0ha of Patta land in S.F.No.442 (Part) of Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State under Rules 19 of Tamil Nadu Minor Mineral Concession Rules, 1959.

The application was processed by the Deputy Director, Department of Geology and Mining, Tiruppur District and passed a Precise Area Communication letter vide **Rc.No.1475/Mines/2020, Dated: 23.02.2021** to submit Mining Plan for the approval in Department of Geology and Mining, Tiruppur District and obtain Environmental Clearance from the Competent Authority, Tamil Nadu State, with the conditions to provide:

1. The quarried out minerals should be transported after paid the necessary seniorage fee as per Appendix- II of Tamil Nadu Minor Mineral Concession Rules, 1959.
2. The applicant should leave a safety distance of 7.5m to the adjacent Patta lands.
3. The quarry operation should be carried out with slurry explosives by an authorized explosive agency and no hindrance shall be caused to the adjacent patta lands and Government lands.
4. The applicant shall submit the approved mining plan within the time stipulated in the precise area communication letter.
5. Prior Environment clearance should be obtained from the competent authority in respect of the area applied for quarry lease before grant of quarry lease.

(Please refer Annexure No – I).  
This Mining Plan is approved subject  
to the Conditions Indicated in the  
Mining Plan approved Letter

This Mining Plan is approved as per the  
Powers conferred under rule 41(2) of Tamil  
Nadu Minor Mineral Concession Rules, 1959

No. 1475/ Mines/2020  
Dated 26.02.2021,

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R. G. 2020  
26.02.2021  
DEPUTY DIRECTOR  
Geology and Mining  
Tiruppur



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 irrespective of sizes of the lease would hence forth require prior environmental clearance mining project within the lease applied area up to less than 100ha including projects or minor mineral with lease applied area less then 5ha would be treated as category B as defined in the EIA notification 2006 and will be considered by the state notified by MoEF 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 Competent Authority, Tamil Nadu State, 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 24.01.2019.

**Short Notes of Mining Plan:**

- a. Village Panchayat - Keeranur
- b. Panchayat Union - Kangayam
- c. The Geological Resources are  $7,98,080\text{m}^3$  of Rough stone and  $39,904\text{m}^3$  of Gravel formation in the entire area.
- d. The Total Mineable Reserves are  $2,87,800\text{m}^3$  of Rough stone and  $30,888\text{m}^3$  of Gravel in the entire area.
- e. The proposed quantity of reserves/ (level of production) to be mined are  $2,87,800\text{m}^3$  of Rough stone and  $30,888\text{m}^3$  of Gravel for ten years in the entire area.
- f. Total extent of the lease applied area = 2.00.0ha
- g. Topography of the area = The area exhibits plain topography
- h. Proposed Depth of mining = 42m (2m Gravel + 40m Rough stone) below ground level
- 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.



- l. Type of machineries proposed in the quarrying operation is given below:  
Excavators attached with rock breaker (Rental Basis).  
Jack hammer, Compressor (Diesel drive) (4 Jack hammer capacity) (Rental Basis).
- m. No trees will be uprooted due to this quarrying operation.
- n. The approach road from the main road to quarry road will be constructed and maintained in a good condition for the haulage of Rough stone and Gravel.
- 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, places of worships is marked and enclosed as Plate Nos. IA & IB.
- q. The lease applied area is about 2.00.0ha bounded by six corners; the corners are designated as 1-6 Clockwise from the Southwestern corner the Co – ordinates for the all the corners are clearly marked in the Quarry Lease 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 and IV.
- s. General conditions will not be applicable for the proposed area. The area applied for lease is 10Km away from the,
  - i) *Interstate Boundary,*
  - ii) *Protected area under wild life protection ACT, 1972,*
  - iii) *Critically polluted areas as identified by CPCB,*
  - iv) *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 24 employees are deploying in the quarrying operation.
- v. Total Cost of the project is about **Rs.75,74,000/-**.



w. Infrastructures around the lease applied area given below in the table:

TABLE-1

Particulars	Location	Approximate aerial distance and direction from lease applied area
Nearest Post Office	Arasampalayam	5km – Southwest
Nearest School	Keeranur	1km – Southwest
Nearest Dispensary	Kangayam	8km – South
Nearest Town	Kangayam	8km – South
Nearest Police Station	Kangayam	8km – South
Nearest Hospital	Kangayam	8km – South
Nearest D.S.P. Office	Kangayam	8km – South
Nearest Railway Station	Uthukuli	15km – Northwest
Nearest Airport	Coimbatore	66km – Southwest
Nearest Seaport	Kochi	190km – Southwest
District Head quarters	Tiruppur	24km – Northwest

**2.0 GENERAL INFORMATION**

**2.1 a) Name of the Applicant :** Thiru.P.Sasikumar,  
S/o. Palanisamy,

**b) Address of the Applicant (With Phone No and Aadhaar No)**

Address : No.5/257, Keeranur Village,  
Kangayam Taluk, Tiruppur District.

Pin Code : 638 701

Mobile No : +91 98945 44917

Aadhaar No : 4034 3853 8454

Email ID : sasiinfrastructures@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, Department of Geology and Mining, Tiruppur District vide **Rc.No.1475/Mines/2020, Dated: 23.02.2021** to submit approved mining plan and to obtain Environmental Clearance from the Competent Authority, Tamil Nadu State.

**c) Period of permission / lease to be granted:**

Ten Years.

**d) Name and address of the Qualified Person who preparing the Mining Plan:**

Name : Dr.P.Thangaraju, M.Sc., Ph.D.,  
Qualified Person

Address : Reg. No.17,  
Advaita Ashram Road,  
Alagapuram, Salem District – 636 004.

Telephone : 0427- 2431989 (Office)

Cell No : +91 94422 78601 & 94433 56539

Email : infogeoexploration@gmail.com

(Refer Annexure Nos. VIII and IX).

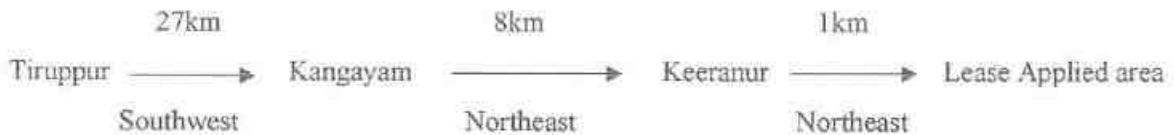




### 3.0 LOCATION

#### a) Details of the area with location map:

The lease applied area is about 24km Southeastern side of Tiruppur town and 8km Northern side of Kangayam town, the lease applied area located along Keeranur Village at a distance of 1km Northeastern side.



**Location Map of the Lease Applied Area**





TABLE-2

District	Taluk	Village	S.F. No.	Lease Applied Area in ha.	Patta No.
Tiruppur	Kangayam	Keeranur	442 (Part)	2.00.0	1341
Total Extent				2.00.0ha	

**b) Classification of the area (Ryotwari/ Poramboke / others):**

It is a Patta land (Barren land) which is not fit for vegetation/ Cultivation.

**c) Ownership / Occupancy of the applied area (surface right):**

It is a Patta land. S.F.No.442 is registered in the name of the applicant (Thiru.P.Sasikumar), vide Patta No.1341. Refer Annexure No. IV.

**d) Topo sheet No. with latitude and longitude:**

The lease applied area falls in the Topo sheet No: 58 - E/12 Latitude between: 11°04'52.40"N to 11°04'57.75"N and Longitude between: 77°33'27.41"E to 77°33'33.38"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 (metal) road is situated on the Western side which connects the Panchayat Road at a distance 440m of the applied area.

Multiple road access is available from the quarry to state highways and National Highway, no villages are enrooted hence the traffic density is not much more due to the transportation of Rough stone.

The approach road from the quarry is constructed and the same will be utilized for haulage and maintained during the entire lease period, tree sapling will be planted on the either side of the road to prevent dust and noise propagation to the nearby areas.

The Nearest Railway line is Coimbatore – Erode which is about 13km on the Northwestern side of the lease applied area.



### PART – A

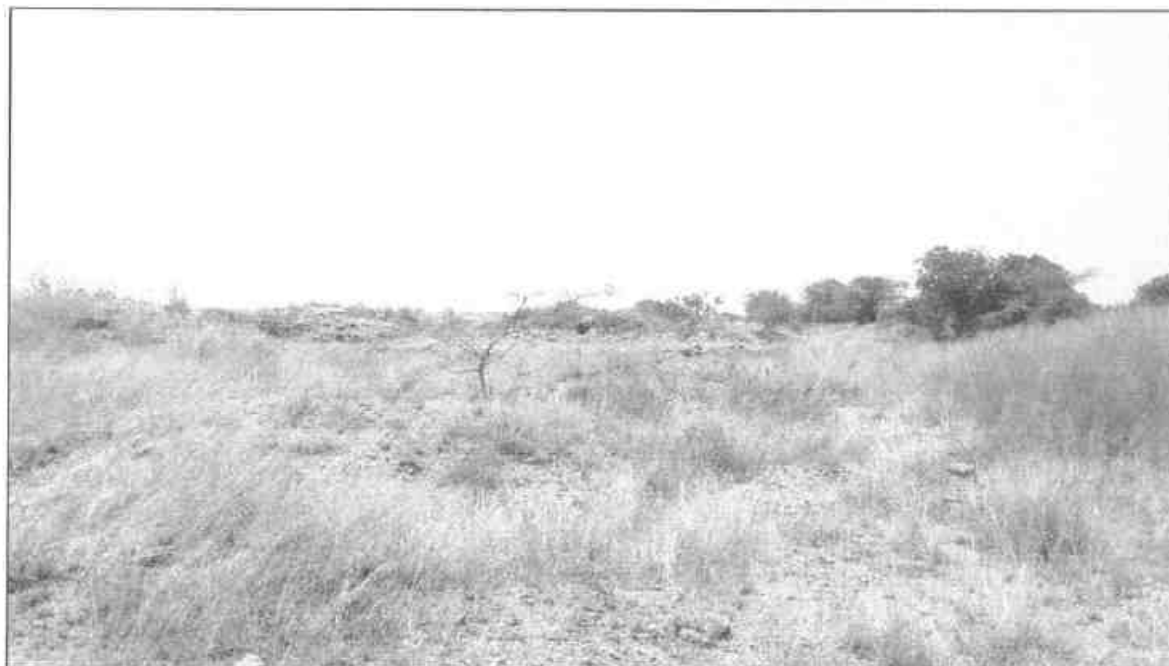
#### **4.0 GEOLOGY AND MINERAL RESERVES**

##### **4.1 Brief description of the Topography and general Geology of the area (with plans):**

The lease applied area exhibits plain topography. The area has gentle sloping towards Northeast side. The altitude of the area is 267m (max) above Mean Sea level. The area is covered by 2m thickness of Gravel and formation. Massive Charnockite is found after 2m (Gravel) which is clearly inferred from the nearby existing quarry pits.

The Water table is found at a depth of 62m in summer and at 58m in rainy seasons. Average annual rainfall is about 618mm.

#### 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 Tiruppur District. Besides, the 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 pits.

#### 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 and commercial aspects etc.,

Totally two sections have been drawn, one section is drawn Length wise as (X-Y) and other one cross section is drawn Width wise as (A-B) to cover the maximum area considered for lease.

The Topographical, Geological Plan and Sections demarcated the commercial marketable Rough stone (Charnockite) deposit has been prepared in 1:1000 scale (please refer the Geological Plan and Sections Plate No. III). As the sale of Rough stone is in terms of cubic meters (Volume) only and not in terms of tonnage.

#### Geological Resources (Plate No. III):

The Geological Resources of Rough stone and Gravel are calculated up to a maximum depth of 42m (2m Gravel + 40m Rough stone) below ground level. **The total Geological resources are calculated by sectional method.** The total geological resources are given below:

**TABLE-3**

GEOLOGICAL RESOURCES						
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Geological Resources in Rough stone (m <sup>3</sup> )	Gravel Formation (m <sup>3</sup> )
XY-AB	I	172	116	2	-	39904
	II	172	116	5	99760	-
	III	172	116	5	99760	-
	IV	172	116	5	99760	-
	V	172	116	5	99760	-
	VI	172	116	5	99760	-
	VII	172	116	5	99760	-
	VIII	172	116	5	99760	-
	IX	172	116	5	99760	-
Total					798080	39904



Total Geological Resources of Gravel formation : 39,904m<sup>3</sup>

Total Geological Resources of Rough stone : 7,98,080m<sup>3</sup>

### Mineable Reserves:

The Mineable reserves are calculated after leaving the safety distance and bench loss to a maximum depth of 42m below ground level.

**TABLE-4**

MINEABLE RESERVES						
Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Mineable Reserves in Rough stone (m <sup>3</sup> )	Gravel (m <sup>3</sup> )
XY-AB	I	156	99	2	-	30888
	II	150	93	5	69750	-
	III	140	83	5	58100	-
	IV	130	73	5	47450	-
	V	120	63	5	37800	-
	VI	110	53	5	29150	-
	VII	100	43	5	21500	-
	VIII	90	33	5	14850	-
	IX	80	23	5	9200	-
Total					287800	30888

The mineable reserves have been computed as 2,87,800m<sup>3</sup> of Rough stone and 30,888m<sup>3</sup> of Gravel at the rate of 100% recovery upto a maximum depth of 42m below ground level for a period of ten years.

## **5.0 MINING**

### **5.1 Method of mining (open cast / 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) 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.

**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 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 jackhammer drilling and slurry explosives 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 Charnockite is hard and compact rock, 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 formation, the Gravel will be directly loaded into Tipper for the filling and levelling of low lying areas, this will be done only after obtaining permission and paying necessary seigniorage fees to the Government. The excavated Rough stone will be directly loaded into Tipper to the needy customers. The Composite year wise Development and production plan and sections indicating the Pit lay out, Green belt development are shown in Plate No-III.



## Yearwise development and Production

TABLE-5

YEARWISE PRODUCTION DETAILS								
Years	Section	Bench	Length in (m)	Width in (m)	Depth in (m)	Recoverable Reserves in Rough stone (m³)	Gravel (m³)	
I	XY-AB	I	44	99	2	-	8712	
		II	38	93	5	17670	-	
		III	28	83	5	11620	-	
		Total				29290	8712	
II		I	33	99	2	-	6534	
		II	33	93	5	15345	-	
		III	33	83	5	13695	-	
		Total				29040	6534	
III		I	79	99	2	-	15642	
		II	62	93	5	28830	-	
		Total				28830	15642	
		IV	II	17	93	5	7905	-
III			50	83	5	20750	-	
Total				28655	-			
V			III	29	83	5	12035	-
		IV	45	73	5	16425	-	
		Total				28460	-	
		VI	IV	85	73	5	31025	-
Total				31025	-			
VII			V	90	63	5	28350	-
			Total				28350	-
		VIII	V	30	63	5	9450	-
			VI	70	53	5	18550	-
Total				28000	-			
IX			VI	40	53	5	10600	-
		VII	85	43	5	18275	-	
		Total				28875	-	
		X	VII	15	43	5	3225	-
VIII			90	33	5	14850	-	
IX			80	23	5	9200	-	
Total				27275	-			
Grand Total						287800	30888	

The Recoverable reserves have been computed as **2,87,800m<sup>3</sup>** of Rough stone and **30,888m<sup>3</sup>** of Gravel for ten years of 100% recovery upto depth of 42m below ground level for a mining period.

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 General of Mine Safety, Chennai** region by submitting relevant documents, appropriate safety plans and its Mitigation measures.





## Mining Plan and PQCP

## Keeranur Rough stone and Gravel Quarry

One lorry load	=	6m <sup>3</sup> (approx.)
Total No of Working days	=	300 Days per year
Total quantity to be removed in this ten years plan period	=	2,87,800m <sup>3</sup>
Hence total lorry loads per day	=	2,87,800m <sup>3</sup> /6m <sup>3</sup>
	=	47967 lorry loads
	=	47967/10 years
	=	4797/300 Days
Rough stone	=	15-16 lorry loads per day
Total quantity to be removed in this three years plan period	=	30,888m <sup>3</sup>
Hence total lorry loads per day	=	30,888m <sup>3</sup> /6m <sup>3</sup>
	=	5148 lorry loads
	=	5147/3 years
	=	1716/300 Days
Gravel	=	5-6 lorry load per day
Working hours = 8.30 am to 5.30 pm (with 12.30-1.30 pm 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	4	30-35	1.2m to 2.0m	Compressed air
2	Compressor	1	-	400 psi	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	Tipper	3	20 tonnes	Diesel Drive



**5.6 Disposal of Overburden/Waste:**

The overburden in the form of Gravel formation. The Gravel will be directly loaded into Tipper for the filling and levelling of low lying areas. The excavated Rough stone (100%) will be directly loaded into Tipper 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 Environment 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

Length in m (Max)	Width in m (Max)	Depth in m (Max)
157	101	42m below ground level

Greenbelt has proposed on the safety zone 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 & IV.

It is propose 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 quarry. After completion of quarry operation, the quarry pit will be allowed to collect the seepage and rainwater, the water storage will be kept as temporary reservoir for charging the nearby wells and the storage water will be used for afforestation purpose. The quarry pit will be fenced with barbed wire fencing to prevent inadvertent entry of public and cattle (Refer Plate No. IV).



## 6.0 BLASTING

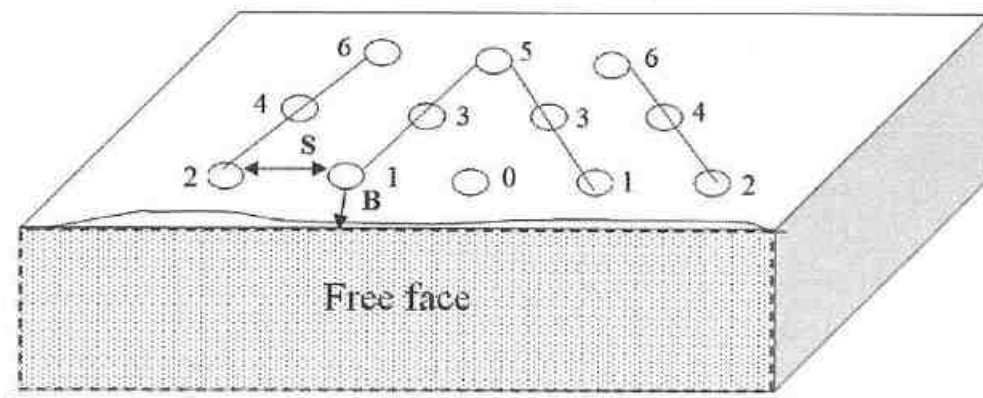
### 6.1 Blasting pattern:

The quarrying operation is proposed to be carried out by Mechanized Opencast Method in conjunction with conventional method of mining using jack hammer drilling and slurry blasting of shattering effect for loosening the Rough stone.

Drilling and blasting parameters are as follows:

Depth of Each hole	:	1.5m
Diameter of hole	:	30-32mm
Spacing between holes	:	1.2m
Burden for hole	:	1.0m
Pattern of hole	:	Zigzag – Multi-rows
Inclination of holes	:	80° from horizontal
Use of delay detonators	:	25millisecond relays
Detonating fuse	:	“Detonating” Cord

### 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=		84 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 primary blasting is proposed.



### 6.3 Measures proposed to minimize ground vibration due to blasting:

The quarry is situated more than 300m from the nearby villages, Controlled blasting measures is being adopt for minimizing ground vibration and fly rock.

Shallow depths jackhammer drilling & blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in Rough stone for easy excavation and to control fly rock.

#### 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	= 84 Holes
Yield	= 249 Tons
Powder factor	= 6 Tons/Kg of explosives
Total explosive required	= 42 Kg-Slurry explosives
Charge/ hole	= 0.5 Kg
Blasting at day time only	= 12.00 – 12.30p.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 have 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 magazine is available at the quarry site to temporarily store the explosives.

**7.0 MINE DRAINAGE****7.1 Depth of water table (based on nearby wells and water bodies):**

The Water Table in the area is 62m in summer season and 58m in rainy season which is observed from the nearby bore wells and the data obtained from existing private boreholes. The lease area is fully covered by Massive Charnockite formation. Hence the Ground Water problem will not arise. If water seepage may occur due to the fracture, the same will be used for Greenbelt.

TABLE-8

Type	Distance & Direction	Location
Bore Well	450m Northern side	11°05'09.75"N 77°33'24.68"E

**7.2 Arrangements and places where the mine water is finally proposed to be discharged:**

Quarry operations are confined well above the water table during the entire lease period. If water is encountered at due to rain water and seepage, the same will be pumped out by 5HP water pumps to the Greenbelt 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)**

**8.1 Habitations/ Villages natham:**

There is no approved habitation within 300m radius from the lease applied area.

**8.2 Power Lines (HT/LT):**

There is no Housing area, EB line (HT & LT Line) within the radius of 50m from the lease applied area.

**8.3 Water bodies (river, ponds, lake, odai, canal, etc.):**

There is no River, Pond, Lake, Odai, Canal located within 50m radius of the lease applied area.

**8.4 Archaeological / historical monuments:**

There is no Archaeological / historical monuments within 300m radius from the lease applied area.

**8.5 Road (NH, SH, others):**

The Nearest National Highway (NH-67) Coimbatore – Trichy is situated about 9km on the Southeastern side of the lease applied area.

The State Highway (SH-96) Erode – Kangayam is situated about 2km on the Southeastern side of the lease applied area.

**8.6 Places of worships:**

There is no place of worships within the radius of 300m from the lease applied area.

**8.7 Reserved forest / forest / social forest / wild life sanctuary etc.,:**

There is no reserved forest / forest / social forest / wild life sanctuary etc., within radius of 500m of the lease applied area.


**SALIENT FEATURES**

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															
1.	Railways, Highways, Reservoirs or Canal	50m	None of the above situated within 50m radius.															
2.	Village Road	10m	No village road is situated within 10m radius of the lease applied area.															
3.	Habitation / Village	300m	There is no approved habitation within 300m radius from the lease applied area (Refer Plate No I-B).															
4.	Adjacent Patta lands / Govt. Land	7.5m/10m	<table><tr><th>Direction</th><th>Classification</th><th>Safety Distance</th></tr><tr><td>North</td><td>Patta land</td><td>7.5m</td></tr><tr><td>East</td><td>Patta land</td><td>7.5m</td></tr><tr><td>South</td><td>Patta land</td><td>7.5m</td></tr><tr><td>West</td><td>Patta land</td><td>7.5m</td></tr></table> <p>(Refer Plate No. II).</p>	Direction	Classification	Safety Distance	North	Patta land	7.5m	East	Patta land	7.5m	South	Patta land	7.5m	West	Patta land	7.5m
Direction	Classification	Safety Distance																
North	Patta land	7.5m																
East	Patta land	7.5m																
South	Patta land	7.5m																
West	Patta land	7.5m																
5.	Housing area, EB line (HT & LT Line)	50m	There is no Housing area, EB line (HT & LT Line) within the radius of 50m from the lease applied area.															
6.	Boundaries of the permitted area	7.5m/10m	The boundaries of the permitted areas is as follows: North – S.F.No.441 East – S.F.No.442 (Part) South – S.F.No.451 West – S.F.Nos.443 & 450 (Refer Plate No. II).															
7.	Reserve forest	60m	There is no reserved forest located within the radius of 60m from the lease applied area. (Refer Plate No. IA and IB).															
8.	Protected area / ECO sensitive area/Wild Life Sanctuary	10km	There is no ECO sensitive Zone/ Wild Life Sanctuary/ 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 & Driver	:	4
Jack hammer operator	:	8

**b. Semi-skilled:**

Security	:	1
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**c. Unskilled:**

Labour & Helper	:	4
Co-operator and Cleaner	:	5
<b>Total</b>	:	<b>24</b>

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 approved water vendors in Keeranur which is about 1km on the Southwestern side of the lease applied area.

**b. Sanitary Facilities:**

Hygienic modern Sanitary Facilities will be constructed as semi permanent structure and it will be maintained periodically as hygienic.

**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 vehicle. Hospital is available in Kangayam located at a distance of 8km on the Southern 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,
- Mine Goggles,
- Ear plugs,
- Ear muffs,
- Dust mask,
- Reflector jackets,
- 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 exhibits plain topography. The area is a dry barren land devoid of Agriculture and Habitations. The lease applied area has utilized only for quarry operation in earlier.

**LAND USE TABLE-9**

<b>Description</b>	<b>Present area in (ha)</b>	<b>Area at the end of this quarrying period (ha)</b>
Quarrying Pit	Nil	1.60.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.22.0
Unutilized Area	2.00.0	0.15.0
<b>Grand Total</b>	<b>2.00.0</b>	<b>2.00.0</b>

**10.2 Water Regime:**






It is a simple opencast quarry operation. The quality of water will not be affected due to this quarrying operation. 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-10

S.No.	Name of the plant (Scientific)	Family Name	Common Name	Habit	Picture
1.	<i>Thespesia populnea</i>	Indian Tulip Tree	Poovarasu	Tree	
2.	<i>Tamarindus indica</i>	Caesalpinaceae	Puli	Tree	
3.	<i>Pongamia pinnata</i>	Fabaceae	Pungai	Tree	
4.	<i>Cassia auriculata</i>	Fabaceae	Aavarampoo	Shurb	
5.	<i>Ziziphus oenoplia.</i>	Rhamnaceae	Suraimullu, Surai ilantai	Shurb	

List of Fauna

S.No.	Scientific Name	Common Name	Picture
1.	<i>Capra hircus</i>	Goat	
2.	<i>Boigaspp</i>	Cat snake	
3.	<i>Athene brama</i>	Spotted owlet	
4.	<i>Passer domesticus</i>	House sparrow	
5.	<i>Precis hierta</i>	Yellow pansy	
6.	<i>Funambulus palmarum</i>	Indian palm squirrel	

**10.4 Climatic Conditions:**

The area receives rainfall of about 618mm/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 23°C.

**10.5 Human settlement:**

There are few villages located in this area within 5km radius; the approximate distance and population are given below:

TABLE-11

S. No	Name of the Village	Approximate distance & Direction from lease applied area	Approximate population
1.	Maravapalayam	2km – Northeast	2,800
2.	Naalroad	2km – Southeast	2,800
3.	Keeranur	1km – Southwest	2,800

Basic human welfare Amenities such as Health Centre, Schools, Communication Facilities, and Commercial Centres etc., are available at Kangayam located at a distance of 8km on the Southern 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 slurry blasting, jack hammer drilling, loading and unloading during the Rough stone quarry operation.

The following Mitigations measures will be carried out:

- 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.

Air quality will be monitored periodically as per Norms and Mitigative 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 Drilling, Blasting, Excavation and Transportation.

**Engineering Noise control:**

Noise will be created due to the usage of Machineries and Vehicles. The Noise will be controlled in the following manner.

- Selection of new low – noise equipment's is proposed to be deployed for the Rough stone quarry operation.
- Modifications of older equipments.
- Implementation of effective preventive maintenance which reduces noise more than 50%.
- Developing Green belts which act as Acoustic barrier, pollution absorbent and noise controller.
- The drivers will be strictly instructed to move the vehicle during the transportation not exceed 40km per hour.
- Sentries with flags & whistle will 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 slurry 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 Environment 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 Environment 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 proposed only to a maximum depth of 42m below ground level has been envisaged as workable depth for safe & economic mining during entire lease applied area. There is no waste generated hence, backfilling is not possible. Hence, 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.1,68,000/-**.

#### 10.11 Programme of Greenbelt development (indicate extend, number, name of species to be afforested):

The safety zone all along the boundary barrier has been identified to be utilized for Greenbelt development. Appropriate native species of Neem, Pongamia Pinnata, Casuarina, etc., trees will be planted in a phased manner as described below.

**TABLE-12**

Years	No. of trees proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	30	80	220	Neem, Pongamia Pinnata, Casuarina, etc.,	24
II	30	80	220		24
III	30	80	220		24
IV	30	80	220		24
V	30	80	220		24
VI	30	80	220		24
VII	30	80	220		24
VIII	30	80	220		24
IX	30	80	220		24
X	30	80	220		24

Nearly 2,200sq.m area is proposed to use under Greenbelt by planting 30 Number of tree saplings during every year with an anticipated survival rate of 80% (Please refer Plate No. III). The estimated budget for plantation and maintenance of Greenbelt development would be around **Rs.30,000/-** for the period of ten years.

The Greenbelt Development will be formed in around the quarried out top bench and approach road. The cost would be around **Rs.45,000/-**.

**10.12 Proposed financial estimate / budget for (EMP) environment management:**

Budget Provision for the entire quarrying period:

**TABLE-13**

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
<b>Total EMP Cost/ year</b>					<b>76,000</b>

The EMP cost would be around **Rs.7,60,000/-** for the period of ten years.**A. Project / investment / Operational cost**

i) Land cost	The Land value as per the Government Guideline land cost is about, Rs.16,56,000/ha, hence the total land cost is calculated about 2.00.0ha X Rs.16,56,000/- = Rs.25,17,120/- i.e., Rs.25,18,000/- (source : <a href="https://tnreginet.gov.in/portal/">https://tnreginet.gov.in/portal/</a> )	= Rs.28,18,000/-
ii) Machinery to be used	The following machineries are proposed to meet out the productions. Excavator attached with rock breaker, Tipper, Tractor mounted compressor with jack hammer and loose tools (Rental Basis)	= Rs.30,00,000/-
iii) Refilling/ Fencing	Fencing will be constructed around the quarry pit to prevent the inadvertent entry of public and cattles cost would be around	= Rs.1,68,000/-
iv) Labourers shed	Labour sheds will be constructed as semi permanent structure. The cost would be around	= Rs.1,00,000/-
v) Sanitary facility	Adequate latrine and urinal accommodation shall be provided at conveniently accessible places the cost would be around	= Rs.90,000/-
vi) Others items	First aid room & accessories	= Rs.75,000/-



Mining Plan and PQCP

Keeranur Rough stone and Gravel Quarry

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	= Rs.2,11,000/-
viii) Sanitary arrangement	The latrine and urinal will keep clean and sanitary condition. The maintenance cost would be around	= Rs.70,000/-
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	= Rs.70,000/-
x) Water sprinkling	Water will be sprinkled in the haul roads by water sprinklers the cost would be around	= Rs.1,50,000/-
xi) Garland drains Construction	Construction of garland drains to divert surface run-off from virgin area away from mining area	= Rs.1,38,000/-
xii) Greenbelt etc.	Greenbelt program will be carried out in the boundary barriers the cost would be around	= Rs.30,000/-
	Greenbelt program will be carried out in the quarried out top bench and approach road	= Rs.45,000/-
	<b>Total Operational Cost</b>	<b>= Rs.66,65,000/-</b>



<b>B. EMP Cost :- (Per year)</b>	
Air Quality monitoring	Rs.52,000/-
Water Quality Sampling	Rs.18,000/-
Noise Monitoring	Rs. 2,000/-
Ground Vibration test	Rs. 4,000/-
<b>Total Cost</b>	<b>Rs.76,000/-</b>
Total EMP Cost for the ten years period is <b>Rs.7,60,000/-</b>	
<b>Description</b>	<b>Amount (Rs.)</b>
<b>A. Operational Cost</b>	<b>66,65,000</b>
<b>B. EMP Cost</b>	<b>7,60,000</b>
<b>Total Project Cost (A+ B)</b>	<b>74,25,000</b>
The applicant indents to involve corporate environment responsibilities (CER) activity like Water Purifier, Medicine Storage rack and Cot and Bed facilities to the Dispensary and Water Purifier to the near Govt. School at 2.0% from the total project cost. The Cost would be around <b>Rs.1,49,000/-</b> .	<b>1,49,000</b>
<b>Total Cost</b>	<b>75,74,000</b>
The Total cost would be around seventy five lakhs and seventy four thousands only.	





## 11.0 PROGRESSIVE QUARRY CLOSURE PLAN

### 11.1 Introduction:

The Progressive Quarry Closure Plan for Rough stone and Gravel quarry over an extent of 2.00.0ha of Patta land in S.F.No.442 (Part) of Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State has been prepared for **Thiru.P.Sasikumar**, S/o. Palanisamy, residing at No.5/257, Keeranur Village, Kangayam Taluk, Tiruppur District, Tamil Nadu State – 638 701.

### 11.2 Present Land use pattern:

LAND USE TABLE-14

Description	Present area in (ha)
Quarrying Pit	Nil
Infrastructure	Nil
Roads	Nil
Green Belt	Nil
Unutilized Area	2.00.0
<b>Grand Total</b>	<b>2.00.0</b>

### 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) 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.

### 11.4 Mineral Processing Operations:

The quarried out Rough stone will be transported by the 20tons capacity Tipper to the needy crushers. Splitting of rock mass of considerable volume from the parent rock mass by jack hammer 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 and sufficient reserves are available to carry on the activities. The reason for closure will be discussed in the ensuing mining plan.



### 11.6 Statutory obligations:

The applicant ensures to comply all the conditions were imposed while granting the precise area communication letter before the execution of lease deed 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 : **Dr.P.Thangaraju, M.Sc., Ph.D.,**  
Qualified Person  
Address : Reg. No.17, Advaita Ashram Road,  
Alagapuram, Salem District – 636 004.  
Telephone : 0427- 2431989 (Office)  
Cell No : +91 94422 78601 & 94433 56539

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 1.60.0ha of area will be mined out. Land use at various stages is given in the table below.

LAND USE TABLE-15

Description	Present area in (ha)	Area at the end of this quarrying period (ha)
Quarrying Pit	Nil	1.60.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.22.0
Unutilized Area	2.00.0	0.15.0
<b>Grand Total</b>	<b>2.00.0</b>	<b>2.00.0</b>



The Greenbelt Development will be formed in around the quarried out top bench and approach road of the lease applied area.

**(ii) Water quality management:**

Following control measures will be adopted for controlling water pollution:

- Construction of garland drains to divert surface run-off from virgin area away from mining area.
- Construction of 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 or 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 engage on rental basis. 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 5.0m 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 provide before blasting time to prevent any accident.
- Security guards will be posted.
- In the event of temporary closer, approaches will be fenced off and notice displayed.

**(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 quarrying 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 bench and approach road of the lease applied area.

**(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, quarrying 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 maximum 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:

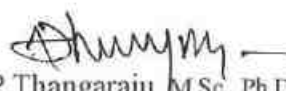
**LAND USE TABLE-16**

ACTIVITY		YEAR										RATE	COST (Rs.)
		I	II	III	IV	V	VI	VII	VIII	IX	X		
Plantation under safety zone	Nos.	30	30	30	30	30	30	30	30	30	30	@100 Rs Per sapling	30,000/-
	Cost	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000		
Plantation in quarried out benches and approach road	Nos.	45	45	45	45	45	45	45	45	45	45	@100 Rs Per sapling	45,000/-
	Cost	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500		
Wire Fencing (In Mtrs) 560 Mtrs		168000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	1,68,000/-
Garland drain (In Mtrs) 460 Mtrs		138000	-	-	-	-	-	-	-	-	-	@300 Rs Per Meter	1,38,000/-
<b>TOTAL</b>													<b>3,81,000/-</b>

**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 as per the guidelines of the Concerned Department.

Prepared by

  
Dr. P. Thangaraju, M.Sc., Ph.D.,  
Qualified person

Place: Salem

Date: 25.02.2021



This Mining Plan is approved subject  
to the Conditions indicated in the  
Mining Plan approved letter  
No. 1475/Mines / 2020  
Dated 26.02.2021

This Mining Plan is approved as per the  
Powers conferred under rule 41 & 42 of Tamil  
Nadu Minor Mineral Concession Rules, 1959.

  
26.02.21  
DEPUTY DIRECTOR  
Geology and Mining  
Tiruppur

  
26/2/2021





ந.க.எண். 1475/கனிமம்/ 2020

புவியியல் மற்றும் சுரங்கத்துறை  
மாவட்ட ஆட்சியர் அலுவலகம்,  
திருப்பூர்.

நாள்: 23.02.2021

குறிப்பாணை

பொருள் : கனிமங்களும் சுரங்கங்களும் - சிறு கனிமம் - - திருப்பூர் மாவட்டம் - காங்கயம் வட்டம் - கீரனூர் கிராமம் - பட்டா புல எண். 442 (பகுதி)-ல் 2.00.0 ஹெக்டர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் மண் குவாரி குத்தகை உரிமம் கோரி திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி என்பவர் விண்ணப்பம் அளித்தது - புலத்தணிக்கை அறிக்கை சமர்ப்பிக்கப்பட்டது - தகுதியான நிலப்பரப்பாக கருதி ஏற்பளிக்கப்பட்ட சுரங்க திட்டம் மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய இசைவினை பெற்று சமர்ப்பிக்கக் கோருதல் - தொடர்பாக.

- பார்வை :
1. திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி, 5/257, கீரனூர் கிராமம், காங்கயம் வட்டம் என்பவரின் விண்ணப்பம் நாள்: 20.11.2020.
  2. இவ்வலுவலக ந.க.எண். 1475/2020/கனிமம் நாள்: 24.11.2020.
  3. இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, சென்னை ந.க. 1870/எம்.எம்.1/2020 நாள்: 10.08.2020 கடிதத்துடன் அரசாணை (பல்வகை) எண். 169, தொழில் (எம்எம்.சி-1) துறை நாள்: 04.08.2020 இணைத்து வரப்பெற்றுள்ளது. (தமிழ்நாடு அரசிதழ் சிறப்பு வெளியீடு எண். 315 நாள்: 04.08.2020).
  4. அரசாணை (பல்வகை) எண். 208, தொழில் (எம்.எம்.சி-1) துறை நாள்: 21.09.2020.
  5. வட்டாட்சியர், காங்கயம் கடிதம் ந.க. எண். 4671/2020/அ2 நாள்: 08.01.2021.
  6. சார் ஆட்சியர், தாராபுரம் கடிதம் ந.க. 3688/2020/இ நாள்: 15.02.2021.
  7. திரு. ப. சசிக்குமார் என்பவர் கடிதம் நாள்: 19.02.2021.
  8. வட்டார வளர்ச்சி அலுவலர் (கி.ஊ), காங்கயம் கடிதம் ந.க. 3265/2021/ஆ4 நாள்: 22.02.2021.
  9. உதவிப் புவியியலாளர் (கனிமம்), திருப்பூர் புலத்தணிக்கை அறிக்கை நாள்: 22.02.2021.
  10. மற்றும் உரிய ஆவணங்கள்

திருப்பூர் மாவட்டம், காங்கயம் வட்டம், கீரனூர் கிராமம், பட்டா புல எண். 442 (பகுதி)-ல் 2.00.0 ஹெக்டர் பரப்பில் 5 வருடங்களுக்கு சாதாரண கற்கள் மற்றும் கிராவல் குவாரிக் குத்தகை உரிமம் வழங்க கோரி திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி என்பவர் பார்வை 1-ல் கண்டுள்ளபடி உரிய ஆவணங்களுடன் விண்ணப்பம் அளித்துள்ளார். மேலும், 19.02.2021 நாளிட்ட கடிதத்தில், தனது குவாரிப் புலமானது இதற்கு முன்பு குவாரி



உரிமம் ஏதும் பெறாத பூமி (Virgin) என்பதால் அரசாணை எண். 208-ன்படி 10 ஆண்டுகளுக்கு குவாரிக் குத்தகை உரிமம் வழங்குமாறும் கேட்டுக் கொண்டுள்ளார்.

2. மேற்படி விண்ணப்பங்கள் தொடர்பாக, வட்டாட்சியர், காங்கயம், சார் ஆட்சியர், தாராபுரம், வட்டார வளர்ச்சி அலுவலர், காங்கயம் மற்றும் உதவிப் புவியியலாளர் (கனிமம்), திருப்பூர் ஆகியோர் புலத்தணிக்கை மேற்கொண்டு திருப்பூர் மாவட்டம், காங்கயம் வட்டம், கீரனூர் கிராமம், பட்டா புல எண். 442 (பகுதி)-ல் 2.00.0 ஹெக்டர் பரப்பில் திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி என்பவருக்கு சாதாரண கற்கள் மற்றும் கிராவல் மண் குவாரி உரிமம் வழங்க கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு அனுமதி வழங்கலாம் என பரிந்துரை செய்துள்ளனர்.

#### நிபந்தனைகள்:

- a. 1959ம் வருடத்திய தமிழ்நாடு சிறு கனிம சலுகை விதிகள், அட்டவணை IIல் கண்டுள்ளபடி குவாரி செய்யப்படும் கனிமங்களுக்குரிய சீனியரேஜ் தொகை அவ்வப்போது செலுத்தி கனிமம் கொண்டு செல்லப்பட வேண்டும்.
- b. அருகிலுள்ள பட்டா நிலங்களுக்கு 7.5 மீ பாதுகாப்பு இடைவெளி விட்டு குவாரிப் பணி மேற்கொள்ள வேண்டும்.
- c. அனுபவம் வாய்ந்த வெடிபொருள் பயன்படுத்துவோர் மூலம் குறைந்த அளவு சக்தி கொண்ட வெடிபொருட்களை பயன்படுத்தி அருகிலுள்ள பட்டாதாரர்களுக்கு எவ்வித இடையூறுமின்றி / அருகிலுள்ள பட்டா மற்றும் அரசு புலங்களில் எவ்வித ஆக்கிரமிப்பும் இன்றி குவாரிப்பணி மேற்கொள்ள வேண்டும்.
- d. விதிகளின் படி ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தினை உரிய காலத்திற்குள் சமர்ப்பிக்க வேண்டும்.
- e. குவாரி உரிமம் வழங்க உள்ள பகுதிக்கு சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் முன் அனுமதி பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும்.

3. எனவே, வட்டாட்சியர், காங்கயம், சார் ஆட்சியர், தாராபுரம், வட்டார வளர்ச்சி அலுவலர், காங்கயம் மற்றும் உதவிப் புவியியலாளர் (கனிமம்), திருப்பூர் ஆகியோரின் பரிந்துரை மற்றும் நிபந்தனைகளின் அடிப்படையில், திருப்பூர் மாவட்டம், காங்கயம் வட்டம், கீரனூர் கிராமம், பட்டா புல எண். 442 (பகுதி)-ல் 2.00.0 ஹெக்டர் பரப்பில் மட்டும் 1959ம் வருட தமிழ்நாடு சிறுகனிம விதிகள், விதி எண்.19-ன் படி மேற்கண்ட நிபந்தனைகளுக்குட்பட்டு 10 (பத்து) வருட காலத்திற்கு திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி என்பவருக்கு சாதாரண கற்கள் மற்றும் கிராவல் மண் குவாரி உரிமம் வழங்குவதற்குரிய தகுதியான நிலப்பரப்பாக கருதப்படுகிறது.



4. மேலும், தமிழ்நாடு சிறு கனிம சலுகை விதிகள்-1959 விதி எண். 41-ன்படி குவாரிப்பணி மேற்கொள்வது தொடர்பாக வரைவு சுரங்க திட்டத்தினை 90 தினங்களுக்குள் சமர்ப்பிக்குமாறு மனுதாரரைக் கேட்டுக்கொள்ளப்படுகிறது. மேலும் ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டத்தின் தொடர்ச்சியாக 1959ம் வருடத்திய தமிழ்நாடு சிறுகனிம சலுகை விதிகள், விதி எண்.42-ன் படி சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணையத்தின் இசைவினைப் பெற்று சமர்ப்பிக்கும் பட்சத்தில் மட்டுமே குவாரி உரிமம் வழங்கப்படும் என இதன் மூலம் தெரிவிக்கப்படுகிறது.

  
துணை இயக்குநர்,  
புவியியல் மற்றும் சுரங்கத்துறை,  
திருப்பூர்.

பெறுநர்:

திரு. ப. சசிக்குமார், த/பெ. பழனிச்சாமி,  
5/257, கீரனூர் கிராமம்,  
காங்கயம் வட்டம்

  
23.02.2021

மாவட்டம் : திருப்பூர்

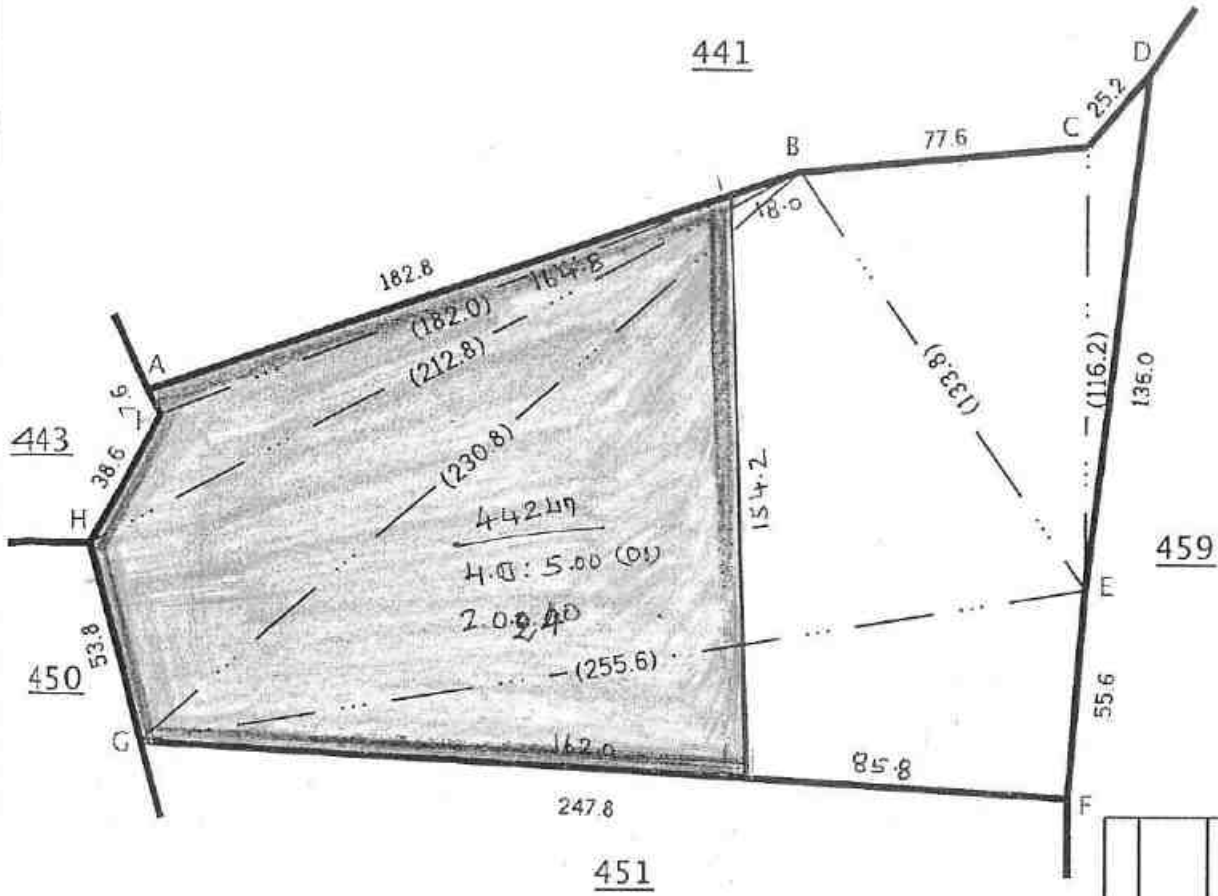
புல எண் : 442

வட்டம் : காங்கயம் [5]

பரப்பளவு : எக்டர் 03 ஏர் 63.50

சிராமம் : கூரனூர் [7]

அளவு : 1 : 2000



Ladder

A  
182.8  
B  
182.0  
I  
7.6  
A  
I  
38.6  
H  
212.8  
B  
230.8  
G  
53.8  
H  
G  
255.6  
E  
133.8  
B  
77.6  
C  
25.2  
D  
136.0  
E  
55.6  
F  
247.8  
G  
C  
116.2  
E

□ புல எண்: 442/P-ன் 4.0: 5.00  
கன்/சிராமம் மண் வெட்டி  
சுருத்தி அளவுக் கணக்கும் பதிவு

சு.சி.சி.சி.சி.சி.

உள்வட்ட அளவு 10/10/2020  
நத்தக்காண்டியூர்

LEASE APPLIED AREA





சென்னை

பக்கம் 7

பெரிய கிராமம்

பரப்பு: இரண்டு

3 ஏ. 63 5

442

441

7.6

26.2

182.8

(182.0)

(212.0)

(230.0)

(8.251)

(116.2)

136.0

459

(255.6)

55.6

247.8

451

வட்டியிருக்காது,  
காங்கயம்.

சென்னை

7.00, கிராமம்,  
சென்னை ம.ப.

சென்னை



14/2/2020

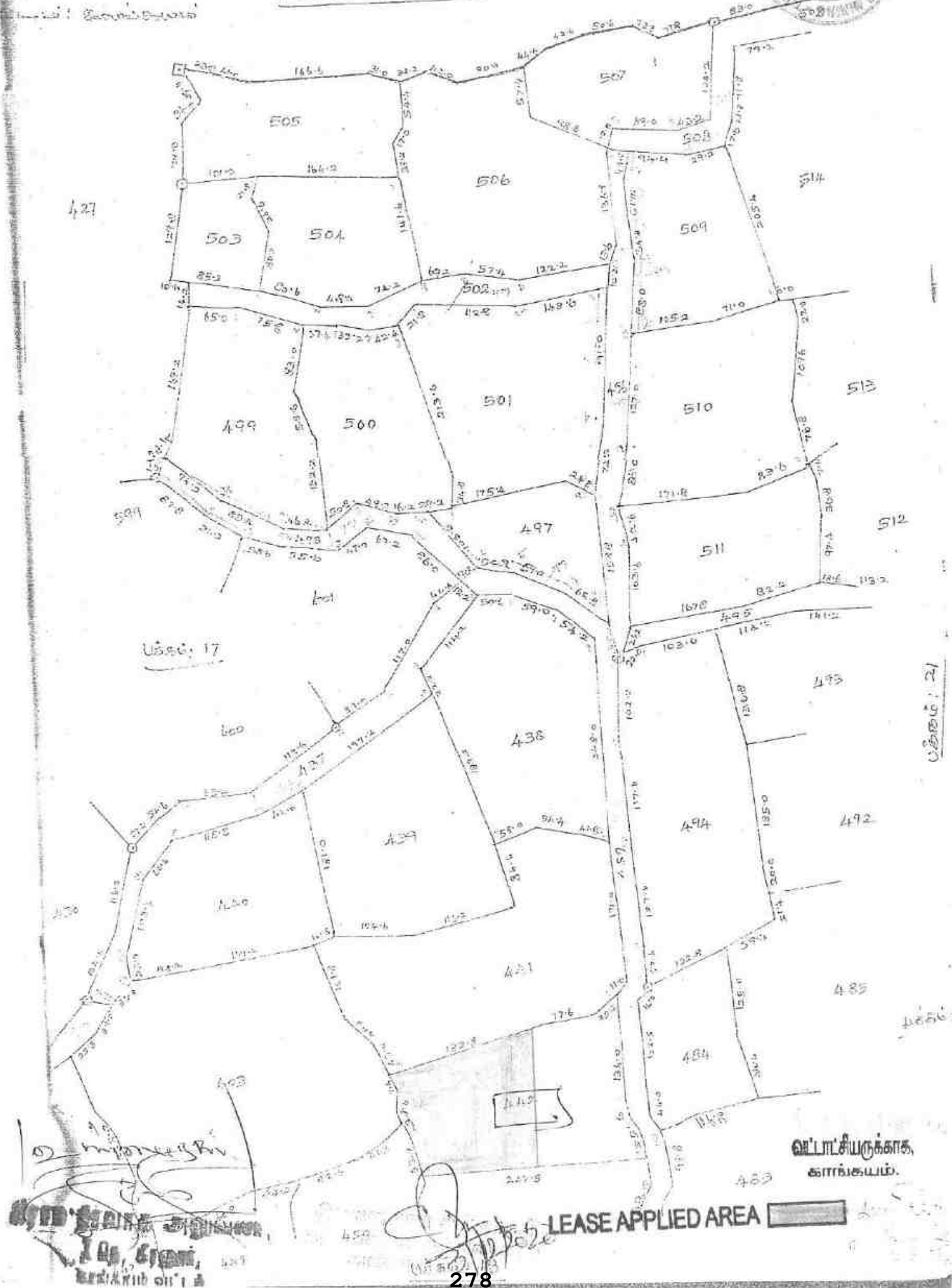
Page: 7.

தே.அம் : 6. திருவாரூர்

உயரம்: 63.5 cm

تاریخ: ۲۵/۱۲/۱۳۹۹

பெரியவர்கள்! சிறியவர்கள்!



வட்பாட்சியருக்காக,  
காங்கயம்.

LEASE APPLIED AREA ☐

11/24/2020

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : திருப்பூர்

வட்டம் : காங்கயம்

வருவாய் கிராமம் : கிரனூர்

பட்டா எண் : 1341

உரிமையாளர்கள் பெயர்

1. சி.பழனிசாமி

மகன்

பி.சசிக்குமார்



புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புரைகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	ஹெக் - ஏர்	ரூ - பை	
442	-	3 - 63.50	5.02	--	--	--	--	---- -- 15-10-2014
450	-	3 - 47.00	4.79	--	--	--	--	---- -- 15-10-2014
		7 - 10.50	9.81					

குறிப்பு2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 32/05/007/01341/30769 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 24-11-2020 அன்று 03:29:22 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



வட்டம்

முதல் போகம்.

76. கீரனார்  
காங்கயம் வட்டம்



## அ-பதிவேடு விவரங்கள்

மாவட்டம் : திருப்பூர்

வட்டம் : காங்கயம்

கிராமம் : கீரனூர்

1. புல எண்	442	9. மண் வயனமும் ரகமும்	8 - 4
2. உட்பிரிவு எண்	-	10. மண் தரம்	6
3. பழைய புல உட்பிரிவு எண்	442	11. தீர்வை (ரூ - ஹெ)	1.38
4. பகுதி	-	12. பரப்பு (ஹெக்டேர் - ஏர்)	3 - 63.50
5. அரசு / ரயத்துவாரி	ரயத்துவாரி	13. மொத்த தீர்வை (ரூ - பை)	5.02
6. நிலத்தின் வகை	பஞ்சை	14. பட்டா எண்	1341
7. பாசன ஆதாரம்	-	15. குறிப்பு	-
8. இரு போகமா	-	16. பெயர்	1,பி.சசிக்குமார்

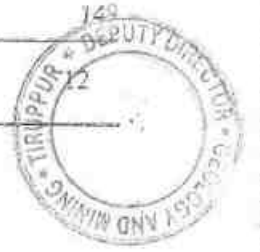
## குறிப்பு 1:



1.

மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <http://eservices.tn.gov.in> என்ற இணைய தளத்தில் 60769 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.





	2	3	4	5	6	7	8	9	10	11	
2	441-Bun	ர	பு	...	8-4	6	1 38	0 26.5	0 37	830 ரா. கருப்பண கவுண்டர் (1), செ. பாப்பம் மாள் (2).	
								5 83.0	8 06		
	442	ர	பு	...	8-4	6	1 38	3 63.5	5 02	90 க. குப்புசாமி கவுண்டர்.	
	443-1	அ	புற	...	...	...	...	0 01.5	...	.....	ரோடு.
	-2	ர	பு	...	8-3	5	2 00	1 01.5	2 03	387 க. நாச்சிமுத்து கவுண்டர்.	
	-3	ர	பு	...	8-3	5	2 00	3 98.0	7 96	201 மா. கம்பராய கவுண்டர்.	
	-4	அ	புற	...	...	...	...	0 04.0	...	.....	ரோடு.
	-5	அ	புற	...	...	...	...	0 05.5	...	.....	ரோடு.
	-6	அ	புற	...	...	...	...	0 01.0	...	.....	ரோடு.
								5 11.5	9 99		
	444	ர	பு	...	7-1	2	4 17	0 23.0	0 96	388 கொ. நாச்சி முத்து கவுண்டர்.	
	445-Aun	ர	பு	...	7-1	2	4 17	0 14.0	0 58	112 ப. சரஸ்வதி.	
	Aun	ர	பு	...	7-1	2	4 17	0 15.5	0 65	334 மு. துரைசாமி கவுண்டர்.	
	-Aun	ர	பு	...	7-1	2	4 17	0 07.5	0 31	1229 மு. துரைசாமி கவுண்டர் மற்றும் பதி நான்கு பேர்களும்.*	கூட்டுக்கி
		ர	பு	...	7-1	2	4 17	0 06.0	0 25	202 பெர். சப்பிர மணியம்.	
		ர	பு	...	7-1	2	4 17	0 05.5	0 23	613 க. ராமசாமி கவுண்டர்.	
		ர	பு	...	7-1	2	4 17	0 08.0	0 33	334 மு. துரைசாமி கவுண்டர்.	
		ர	பு	...	7-1	2	4 17	0 10.0	0 42	112 ப. சரஸ்வதி.	
										கவுண்டர் மற்றும் மூன்று பேர்களும்.*	
					7-1	2	4 17	0 08.5	0 35	613 க. ராமசாமி கவுண்டர்.	

\* விவரப்பட்டியலைப் பார்க்கவும்.

திரு. க. சிவசாமி  
திரு. க. சிவசாமி  
திரு. க. சிவசாமி

திரு. க. சிவசாமி

விபரம்  
காங்கயம்.



இந்திய அரசாங்கம்

Unique Identification Authority of India  
Government of India

உடையாள் / Enrollment No. : 2043/30783/04257

To  
Sasikumar  
சசிசுமார்  
S/O: Palanisamy  
5 / 257  
keeranur  
kangayam taluk  
Keeranur  
Keeranur, Kangayam, Tiruppur,  
Tamil Nadu - 638701  
9884544917

20/10/2016



KA011573061FH

01157306



உங்கள் ஆதார் எண் / Your Aadhaar No. :

**4034 3853 8454**

எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்

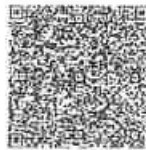
Government of India

சசிசுமார்  
Sasikumar

பிறந்த நாள் / DOB: 03/12/1982

ஆண்பால் / Male

**4034 3853 8454**



எனது ஆதார், எனது அடையாளம்



Government of India

ANNEXURE VII



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.

- 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  
Unique Identification Authority of India

முகவரி: தந்தை / தாய் பெயர்:  
பழனிசாமி, 5 / 257, கீரனூர்,  
காங்கேயம் தாலுக்கை, கீரனூர்,  
திருப்பூர், கீரனூர், தமிழ்  
நாடு, 638701

Address: S/O: Palanisamy, 5 /  
257, Keeranur, kangayam taluk,  
Keeranur, Tiruppur, Keeranur,  
Tamil Nadu, 638701

**4034 3853 8454**



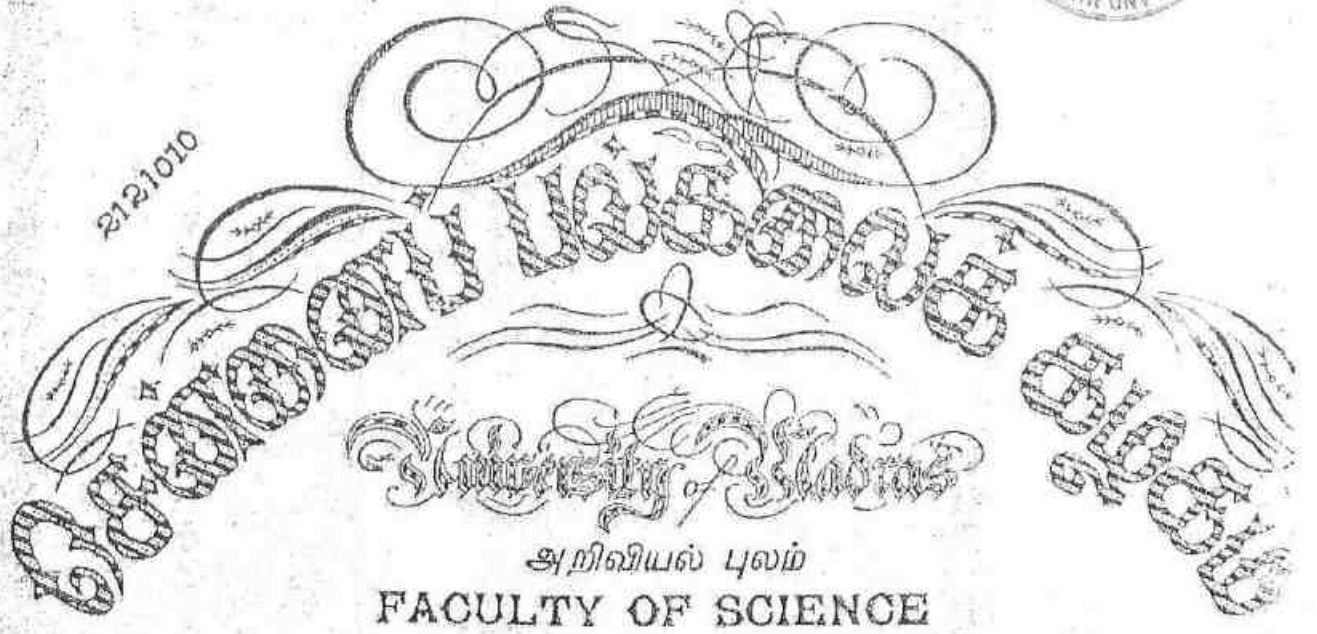
1947



help@uidai.gov.in



www.uidai.gov.in



சென்னைப் பல்கலைக் கழகப் பேரவை 1994 ஆம்

ஆண்டு ஏப்ரல் மாதம் நடந்த கனிமவியல் தேர்வில்  
பெ.தங்கராசு என்பவர் முதல் வகுப்பில்  
தேர்ச்சி பெற்றார் என்று தக்க தேர்வாளர்கள் சான்றளித்தபடி அறிவியல் நிறைஞர்  
என்னும் பட்டத்தை அவருக்குப் பல்கலைக் கழக இலாசீனைப் பரமங்குறித்து.

The Senate of the UNIVERSITY OF MADRAS hereby  
makes known that P. Thangaraju  
has been admitted to the Degree of Master of Science, he/she  
having been certified by duly appointed Examiners to be qualified  
to receive the same in Geology and was placed in the  
First Class, at the Examination held in April 1994.



Given under the seal of the University

செயலாங்கம், Chopaluk

சென்னை, Madras

நாள்: Dated: 25-01-1999

பதிவாளர்

Registrar

P.T. Thangaraju

தூணை பேரவை

V. Thangaraju



GOVERNMENT OF INDIA  
MINISTRY OF LABOUR AND REHABILITATION  
OFFICE OF THE DIRECTOR GENERAL OF MINES SAFETY

Certificate of Practical experience granted by the Manager to a candidate for a Manager's / Surveyor's / Foreman's / Over man's / Sirdar's / Mate's / Short firer's / Blaster's Certificate of competency (Restricted) examination under the Metalliferous Mines Regulations 1961.

I T.VENKATARAJAGOPALAN being the Mines Agent of M/S.LIMENAPH CHEMICALS, RAJAPALAYAM OF LIMESTONE PRODUCTS (Thenmali Limestone Mine) do hereby certify that Thiru. P.THANGARAJU, son of S.PERIASAMY (whose signature is appended) worked as a Geologist in the above mine from 02.05.1994 to 30.12.1999. 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.

THENMALI LIME STONE MINES  
10/6/96  
(Signature with date and official Seal)  
[T.VENKATARAJAGOPALAN]

Mines Agent:

P.O. : ARUKANGULAM

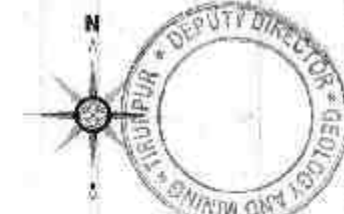
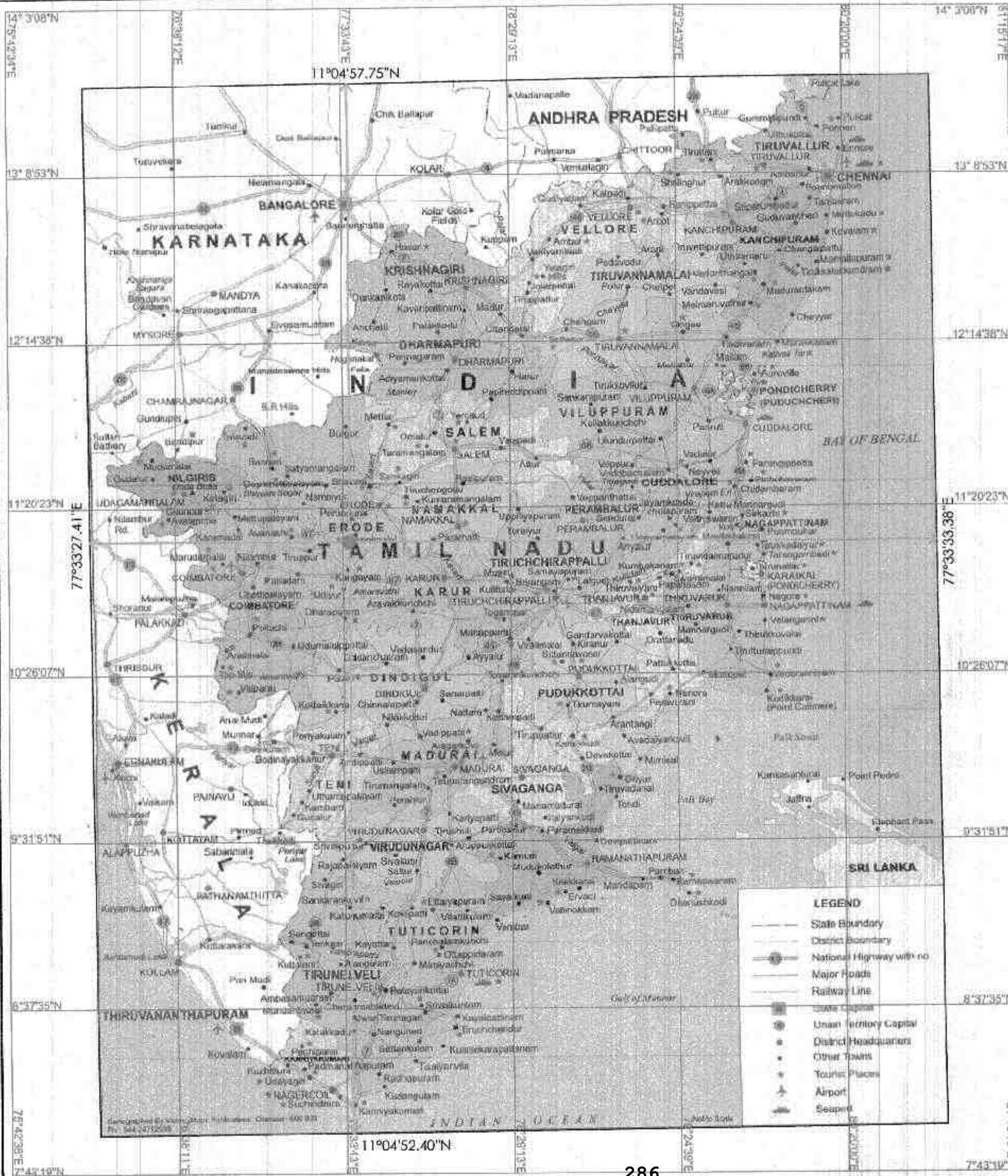
District : TIRUNELVELI

State : TAMIL NADU

(Signature of Candidate)

(State name of Mineral) : LIMESTONE





## INDEX

Q.L.APPLIED AREA :

TOPO SHEET NO. : 58 E/12

LATITUDE : 11°04'52.40"N to 11°04'57.75"N  
LONGITUDE : 77°33'27.41"E to 77°33'33.38"E

## APPLICANT :

Thiru. P. SASIKUMAR,  
S/o. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701.

## LOCATION OF Q.L.A AREA:

S.F.No : 442 (PART),  
EXTENT : 2.00.0 Ha,  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

## PLATE NO - I

DATE OF SURVEY : 25.02.2021

## 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

*Dr. P. Thangaraju*  
Dr. P. THANGARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON





Express highway: with toll; with bridge; with distance stone.....  
 Roads metalled: according to importance.....  
 Roads, double carriageway; according to importance.....  
 Unmetalled road. Cart-track. Pack-track with pass. Foot-path.....  
 Streams: with track in bed; undefined. Canal.....  
 Dams: masonry or rock-filled; earthwork. Weir.....  
 River, dry with water channel; with island & rocks. Tidal river.....  
 Submerged rocks. Shoal. Swamp. Reeds.....  
 Wells: lined; unlined. Tubewell. Spring. Tanks: perennial; dry.....  
 Embankments: road or rail; tank. Broken ground.....  
 Railways, broad gauge: double: single with station; under constr.....  
 Railways, other gauges: double; single with distance stone; do.....  
 Mineral line or tramway. Kiln. Cutting with tunnel.....  
 Contours with sub-features. Rocky slopes. Cliffs.....  
 Sand features: (1) flat. (2) sand-hills (permanent). (3) dunes (shifting).  
 Towns or Villages: inhabited; deserted. Fort.....  
 Huts: permanent; temporary. Tower. Antiquities.....  
 Temple. Chhain. Church. Mosque. Idgah. Tomb. Graves.....  
 Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage.....  
 Mins. Vine on trellis. Grass. Scrub.....  
 Palms. palmyra; other. Plantain. Conifer. Bamboo. Other trees.....  
 Areas: cultivated; Wooded. Surveyed trees.....  
 Boundary, international.....  
 Boundary, state: demarcated; undemarcated.....  
 Boundary, district; subdivision; tahsil or taluk; forest.....  
 Boundary pillars: surveyed; unlocated.....  
 Heights, triangulated: station: point; approximate.....  
 Bench-mark: geodetic; tertiary; canal.....  
 Post office. Telegraph office. Overhead tank.....  
 Rest house or inspection bungalow. Circuit house. Police station.....  
 Camping Ground. Forest: reserved; protected.....  
 Spaces names: administrative; locality or tribal.....  
 Hospital. Dispensary. Veterinary; Hospital/Dispensary.....  
 Aerodrome. Helipad. Tourist site.....  
 Powerline: with pylons surveyed; with poles unsurveyed.....

**APPLICANT :**

Thiru. P. SHANMUGAM  
 S/o. PALANISAMY,  
 No. 2/ 116, WEST STREET,  
 MORATTUPALAYAM,  
 UTHUKULI TALUK, TIRUPPUR DISTRICT - 638 701.

**LOCATION OF Q.L.A. AREA:**

S.F.No : 420/ 3.  
 EXTENT : 1.52.0 Ha,  
 VILLAGE : MARAVAPALAYAM,  
 TALUK : KANGAYAM,  
 DISTRICT : TIRUPPUR,  
 STATE : TAMIL NADU.

**PLATE NO - I-A**

DATE OF SURVEY : 25.02.2021

**TOPO SKETCH OF QUARRY LEASE  
 APPLIED AREA FOR 10Km RADIUS**

SCALE. 1:1,00,000

**PREPARED BY :**

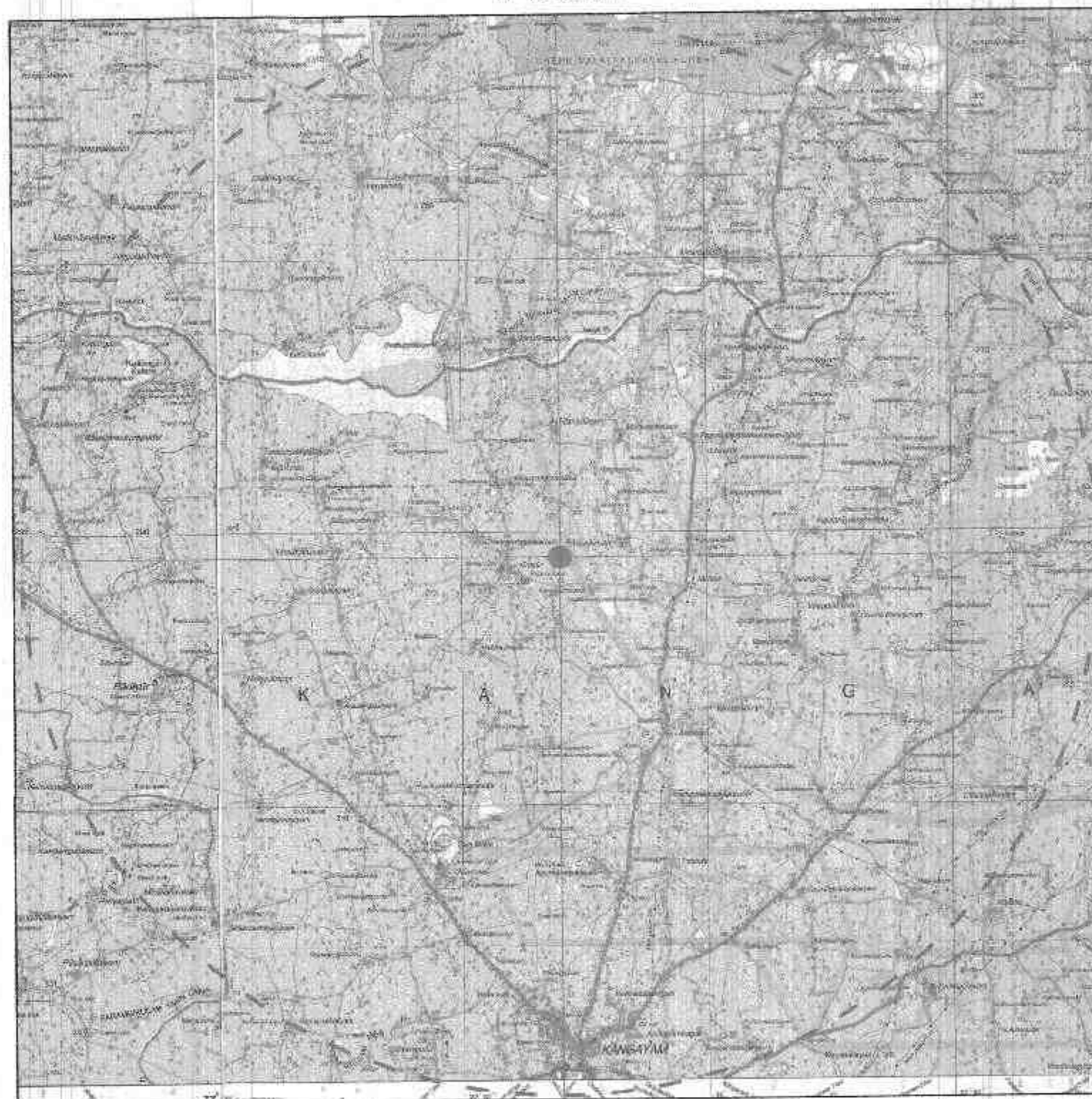
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS  
 PLATE IS TRUE AND CORRECT TO THE BEST OF MY  
 KNOWLEDGE BASED UPON THE LEASE MAP  
 AUTHENTICATED BY STATE GOVERNMENT.

  
 Dr. P. THANGARAJU, M.Sc., Ph.D.,  
 QUALIFIED PERSON

11° 10' 23.00"N

77° 27' 58.09"E

77° 39' 02.67"E



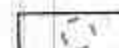
10° 59' 27.14"N

TOPO SHEET NO. : 58 E/12

LATITUDE : 11°04'52.40"N to 11°04'57.75"N  
 LONGITUDE : 77°33'27.41"E to 77°33'33.38"E

10km RADIUS

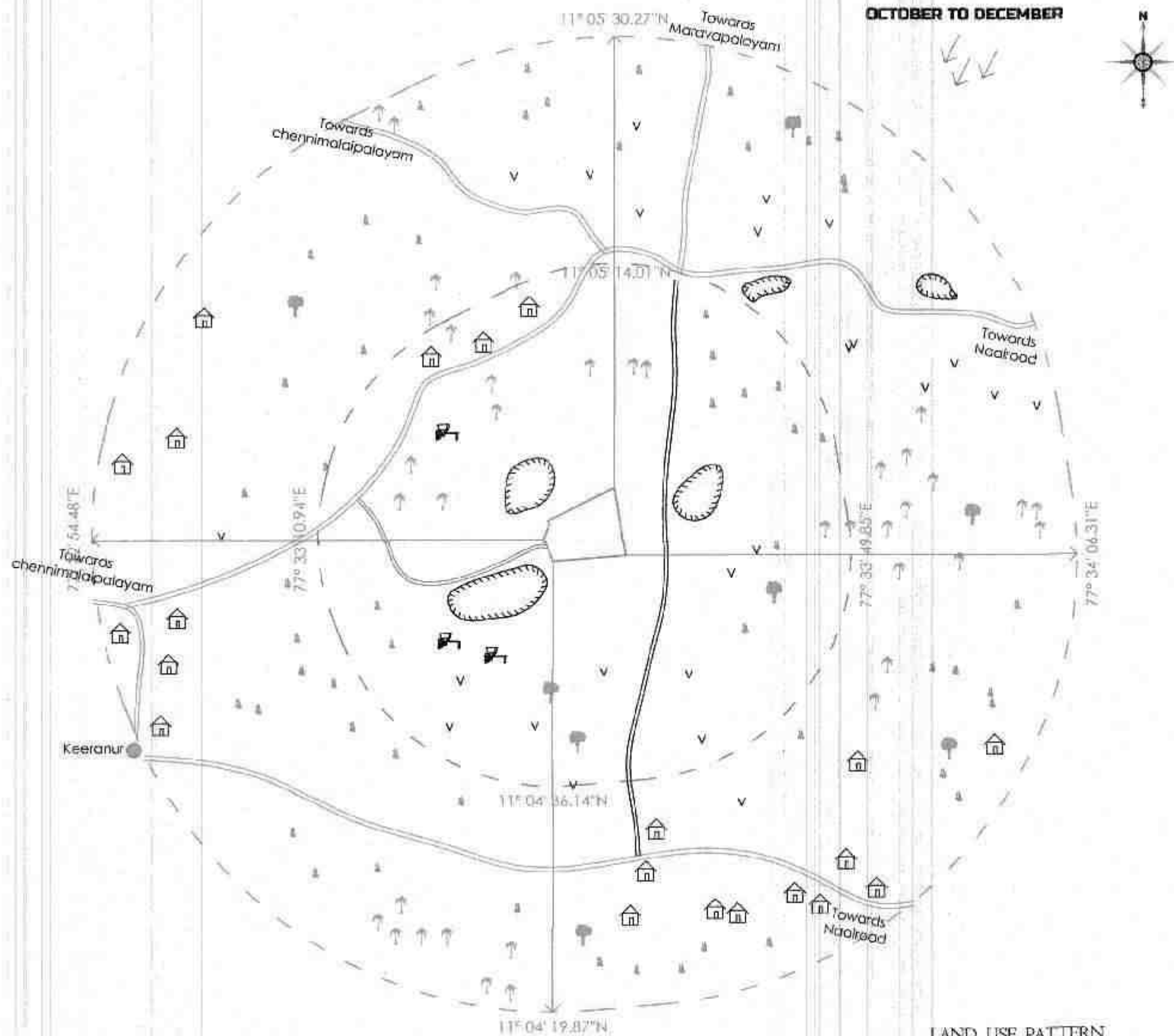
:



Q.L. APPLIED AREA

:





JULY TO SEPTEMBER

TOPO SHEET NO. : 58 E/12

LATITUDE : 11°04'52.40"N to 11°04'57.75"N  
LONGITUDE : 77°33'27.41"E to 77°33'33.38"E

OCTOBER TO DECEMBER

LAND USE PATTERN

DESCRIPTION	PERCENTAGE	INDEX
QUARRY PITS&CRUSHER	(09%)	
TREES	(12%)	
SEASONAL AGRI LAND	(47%)	
ROADS	(07%)	
HABITATION	(08%)	
BARREN LAND	(17%)	
TOTAL	100%	

INDEX

- Q.L. APPLIED AREA
- 1 Km RADIUS
- 500m RADIUS
- SEASONAL AGRICULTURE LAND
- TREES
- HABITATION
- QUARRY PIT & CRUSHER
- WIND DIRECTION
- PANCHAYAT ROAD
- APPROACH ROAD
- CART TRACK
- BARREN LAND



APPLICANT :

Thiru. P. SASIKUMAR,  
S/o. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701.

LOCATION OF Q.L.A. AREA:

S.F.No : 442 (PART).  
EXTENT : 2.00.0 Ha,  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

PLATE NO - I-B

DATE OF SURVEY : 25.02.2021

ENVIRONMENTAL & LAND USE  
PLAN

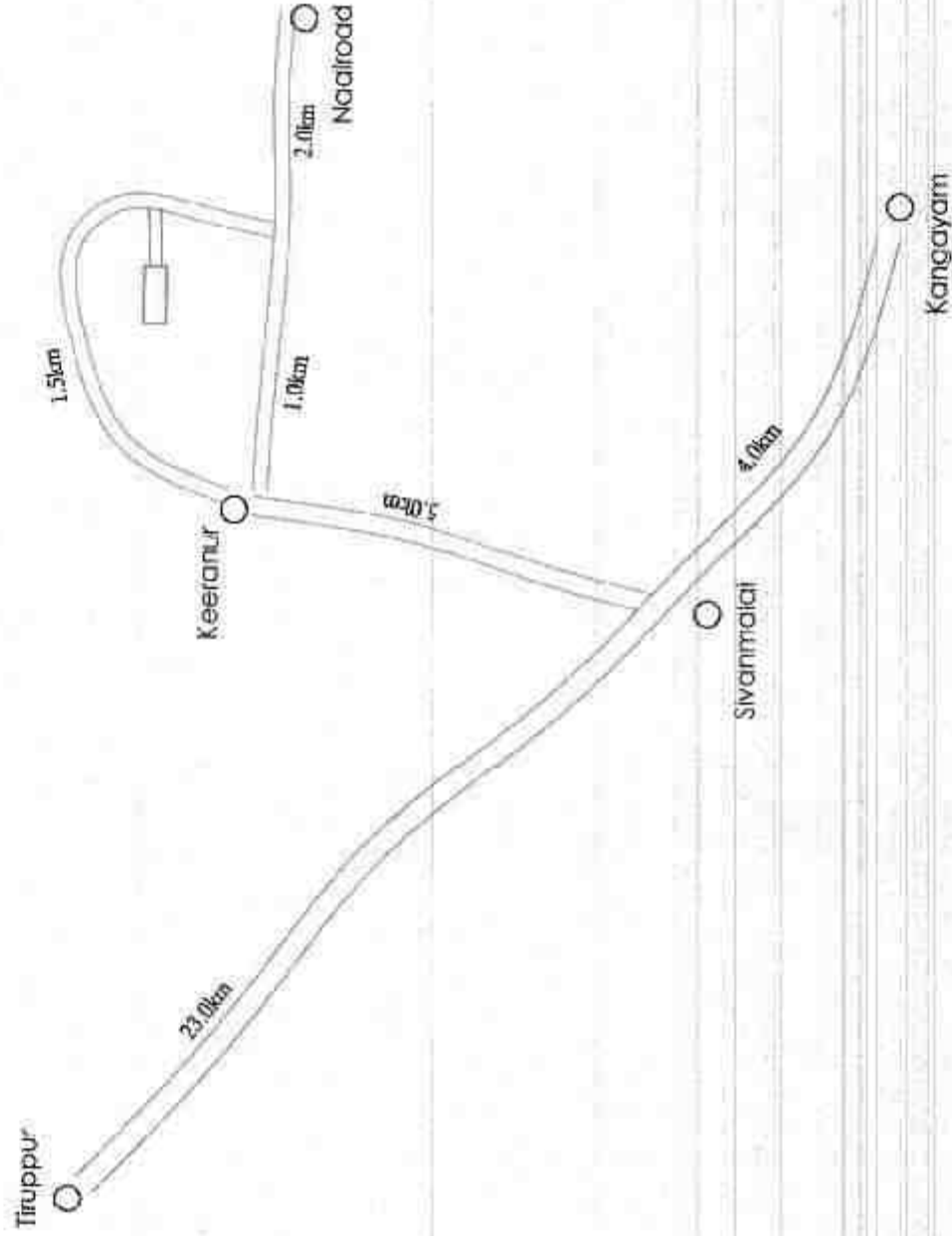
SCALE: 1:10,000

PREPARED BY :

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PLATE IS TRUE AND CORRECT TO THE BEST OF MY  
KNOWLEDGE BASED UPON THE LEASE MAP  
AUTHENTICATED BY STATE GOVERNMENT

Dr. P. THANGARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON

PLATE NO : I-C  
ROUTE MAP



APPLICANT :

Thiru. P. SASIKUMAR,  
S/o. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701.

LOCATION OF Q.L.A AREA:

S.F.NO : 442 (PART),  
EXTENT : 200.0 Ha,  
VILLAGE: KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

INDEX

LEASE APPLIED AREA ☐  
SH- ROAD ☐  
PANCHAYAT ROAD ☐  
APPROACH ROAD ☐

SCALE :

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

*[Signature]*  
Dr P. THANGARAJULU, P.H.D.,  
QUALIFIED PERSON





## INDEX

	Q.L. APPLIED AREA BOUNDARY
	7.5m SAFETY DISTANCE
	TEMPORARY BENCHMARK
	GRAVEL
	CONTOUR
	SHRUBS
	APPROACH ROAD

## APPLICANT :

Thiru. P. SASIKUMAR,  
S/o. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701.

## LOCATION OF Q.L.A AREA:

S.F.No : 442 (PART).  
EXTENT : 2.00.0 Ha.  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

## PLATE NO - II

DATE OF SURVEY : 25.02.2021

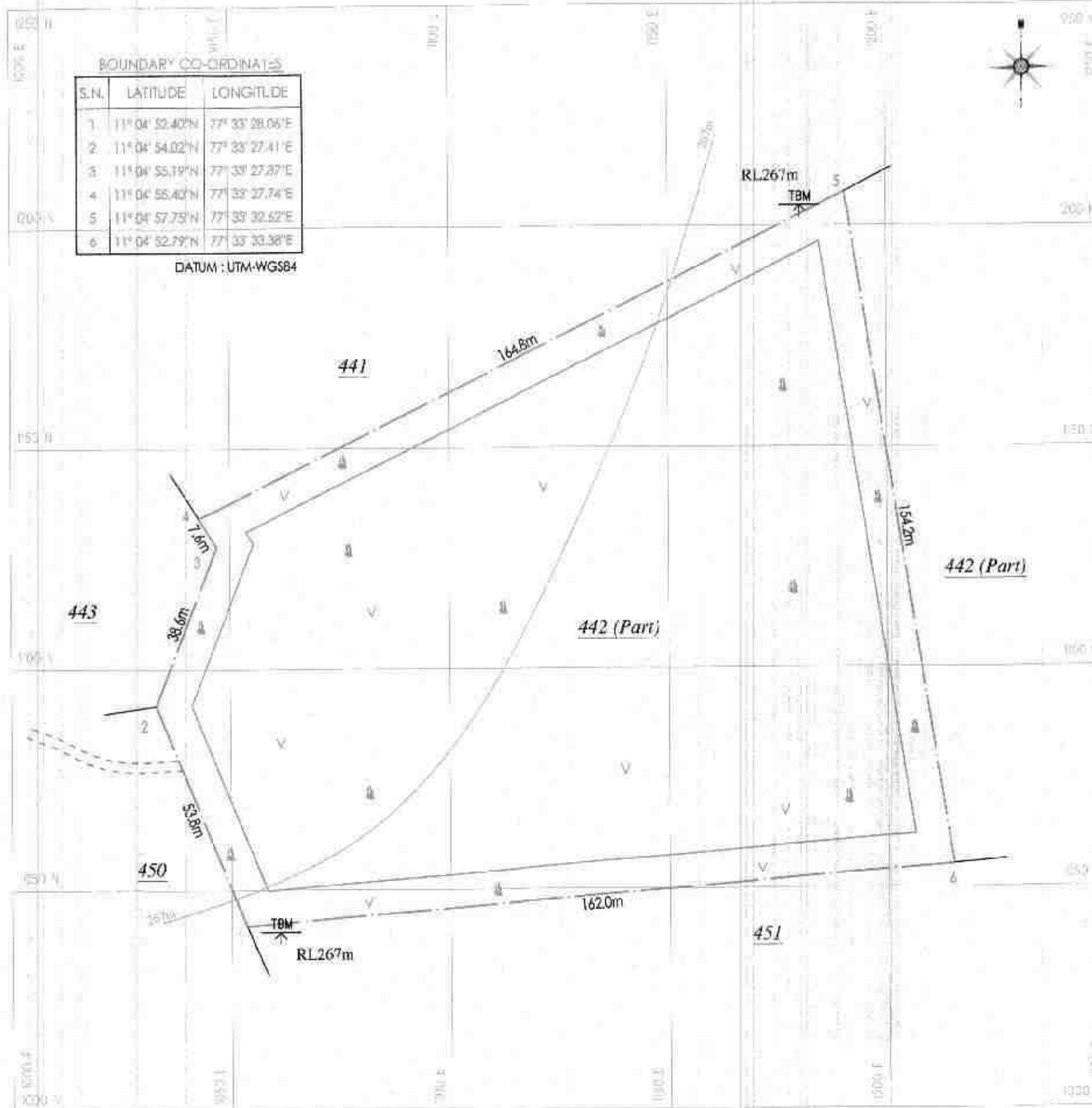
## QUARRY LEASE PLAN & SURFACE PLAN

SCALE. 1:1000

## PREPARED BY:

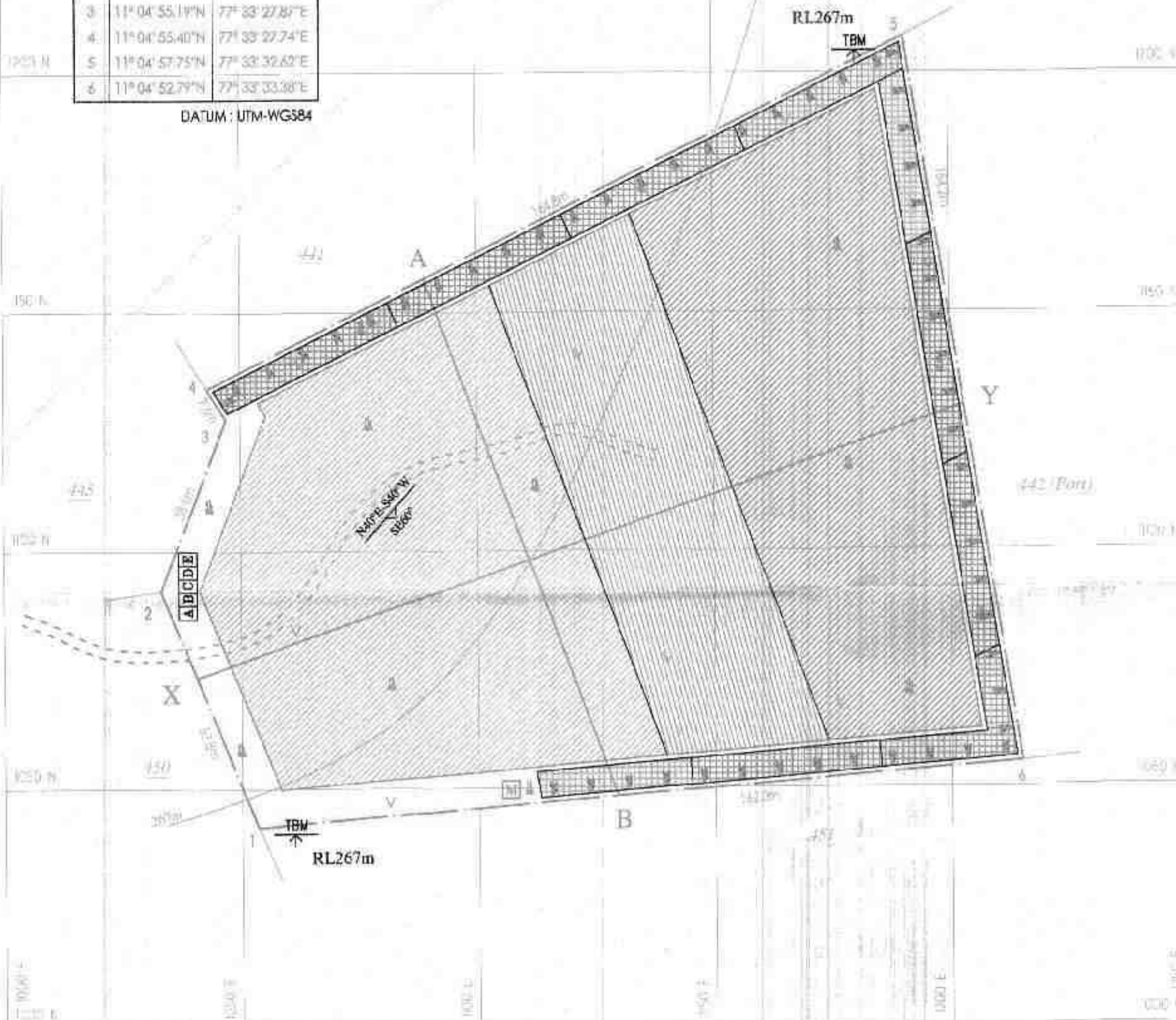
THIS IS TO CERTIFY THAT THE INFORMATION IN THIS  
PLATE IS TRUE AND CORRECT TO THE BEST OF MY  
KNOWLEDGE BASED UPON THE LEASE MAP  
AUTHENTICATED BY STATE GOVERNMENT

Dr. P. THANGARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON

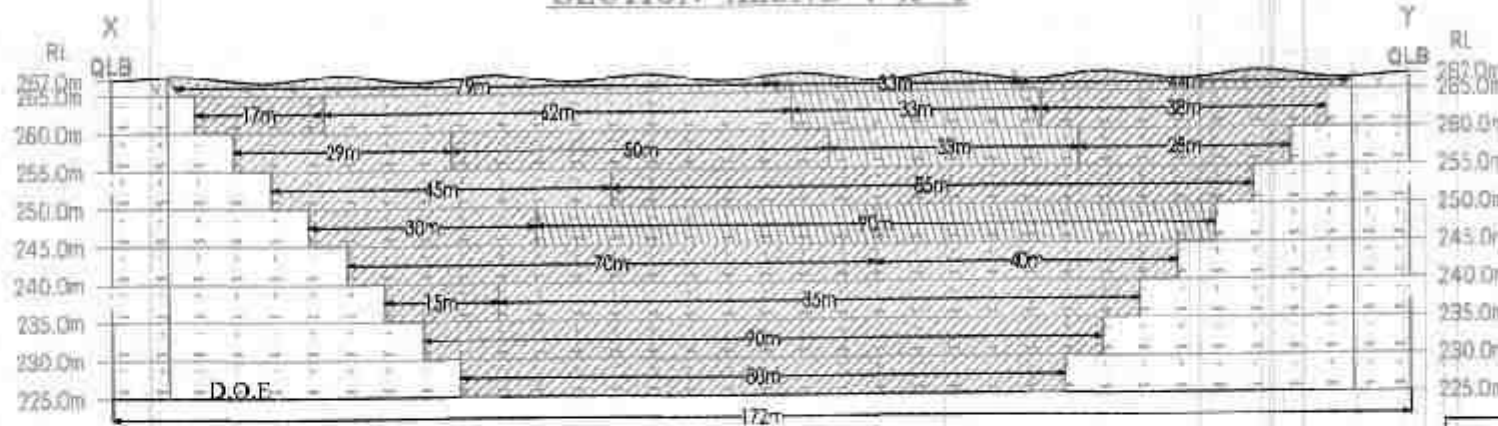


BOUNDARY CO-ORDINATES		
S.N.	LATITUDE	LONGITUDE
1	11° 04' 52.46"N	77° 33' 28.08"E
2	11° 04' 54.02"N	77° 33' 27.41"E
3	11° 04' 55.19"N	77° 33' 27.87"E
4	11° 04' 55.40"N	77° 33' 27.74"E
5	11° 04' 57.75"N	77° 33' 32.62"E
6	11° 04' 52.79"N	77° 33' 33.38"E

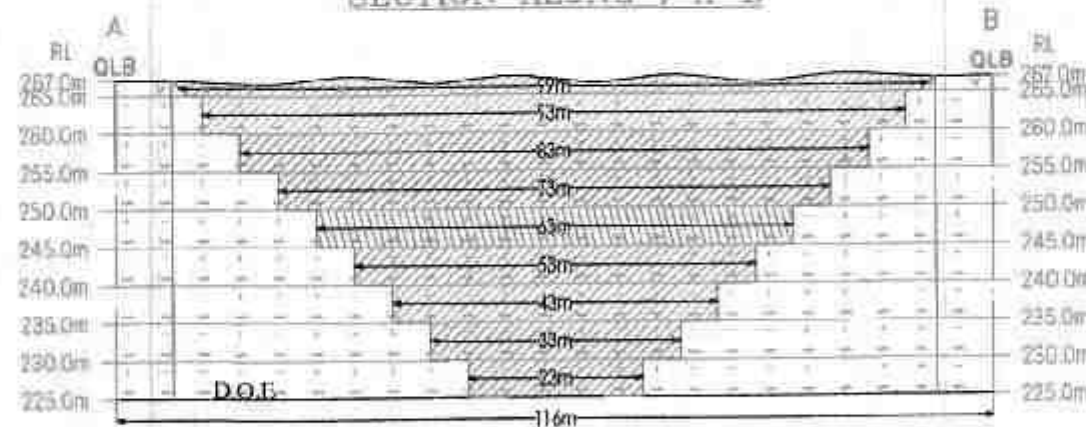
DATUM : UTM-WGS84



SECTION ALONG : X-Y



SECTION ALONG : A-B



**SITE SERVICES**  
(Proposed)

- A - OFFICE
- B - STORE ROOM
- C - FIRST AID ROOM
- D - REST SHELTER
- E - TOILET
- M - MAGAZINE

I - yr Proposed area to be Planted

II - yr Proposed area to be Planted

III - yr Proposed area to be Planted

IV - yr Proposed area to be Planted

V - yr Proposed area to be Planted

VI - yr Proposed area to be Planted

VII - yr Proposed area to be Planted

VIII - yr Proposed area to be Planted

IX - yr Proposed area to be Planted

X - yr Proposed area to be Planted

**INDEX**

- Q.L. APPLIED AREA BOUNDARY
- 7.5m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- GRAVEL
- ROUGHSTONE
- STRIKE & DIP
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- D.O.E DEPTH OF ESTIMATION

**APPLICANT :**

Thiru. P. SASIKUMAR,  
S/o. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701.

**LOCATION OF Q.L.A AREA:**

S.F.No : 442 (PART).  
EXTENT : 2.00.0 Ha.  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

PLATE NO. 44

DATE OF SURVEY : 25.07.2021

**TOPOGRAPHY, GEOLOGICAL PLAN  
YEARWISE DEVELOPMENT &  
PRODUCTION PLAN & SECTIONS**

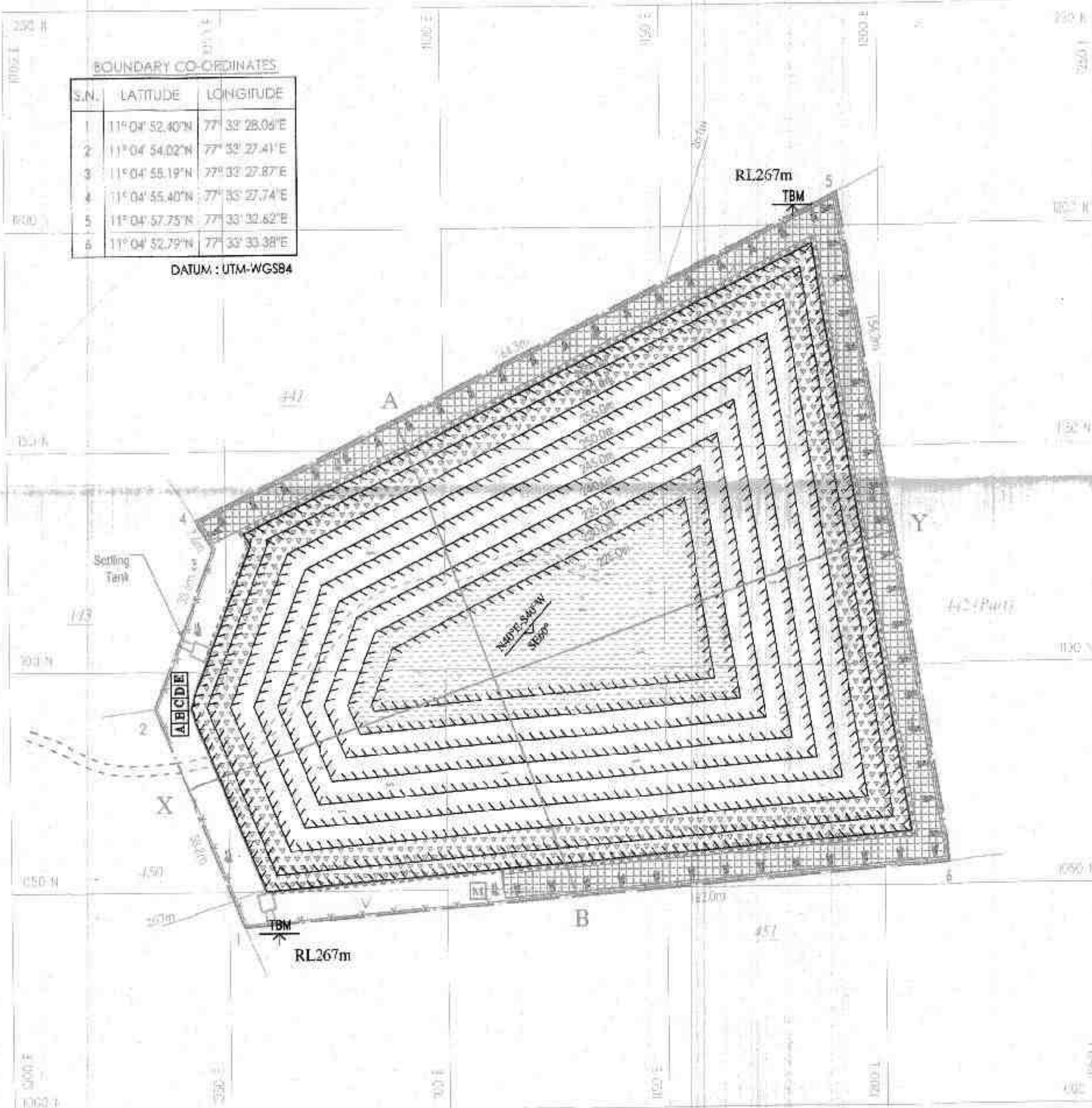
SCALE :- 1 : 1000

**PREPARED BY :**

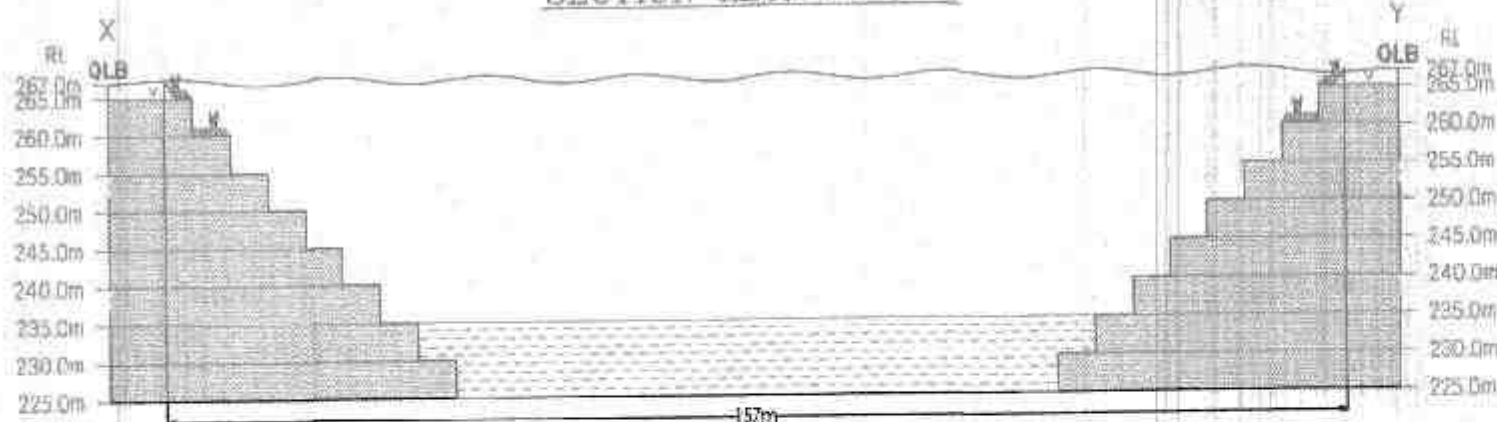
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AUTHENTICATED BY STATE GOVERNMENT

*[Signature]*  
Dr. P. THANGARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON

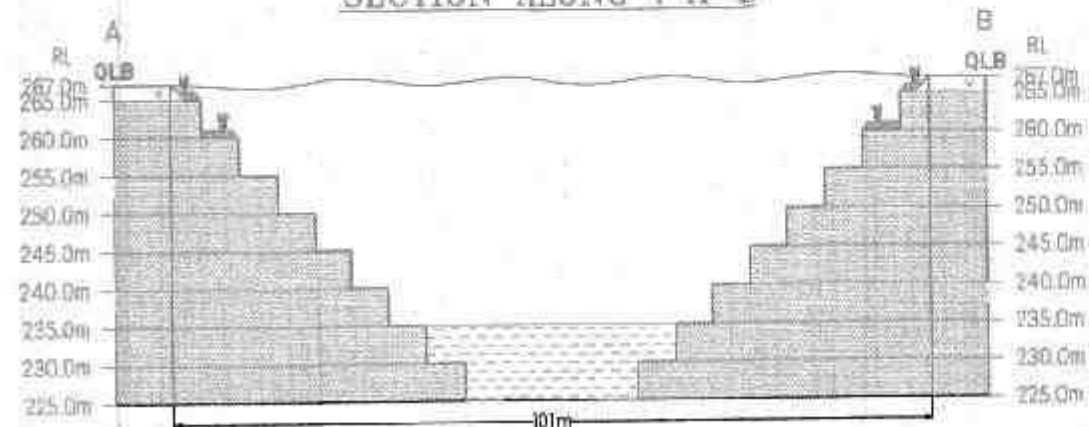




SECTION ALONG : X-Y



SECTION ALONG : A-B



**SITE SERVICES**

A - OFFICE  
B - STORE ROOM  
C - FIRST AID ROOM  
D - REST SHELTER  
E - TOILET  
M - MAGAZINE

Proposed Pit Dimension (max)  
= 157mX101mX2m(d)

**LAND USE PATTERN**

DESCRIPTION	PRESENT AREA IN (Ha)	AREA AT THE END OF THIS QUARRYING PERIOD (Ha)
QUARRYING PIT	Nil	1.60.0
INFRASTRUCTURE	Nil	0.01.0
ROADS	Nil	0.02.0
GREEN BELT	Nil	0.22.0
UN-UTILIZED AREA	2.00.0	0.15.0
TOTAL	2.00.0	2.00.0

**INDEX**

- Q.L. APPLIED AREA BOUNDARY
- 7.5m SAFETY DISTANCE
- TBM
- TEMPORARY BENCH MARK
- GRAVEL
- ROUGHSTONE
- STRIKE & DIP
- QUARRY PIT
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- 1-X Yr PLANTATION
- BARBED WIRE FENCING
- EXISTING LAND FORM
- SOIL LAYER
- REHABILITATED LAND FORM
- PROPOSED GARLAND DRAIN
- OLD SURFACE LEVEL
- FINISHED SURFACE LEVEL
- RAIN WATER STORAGE

**APPLICANT :**

THIRU. P. SASIKUMAR,  
S/O. PALANISAMY,  
No. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701



**LOCATION OF Q.L.A. AREA:**

S.F.No : 442 (PART)  
EXTENT : 2.00.0 Ha,  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

**PLATE NO - IV**

DATE OF SURVEY : 25.02.2021

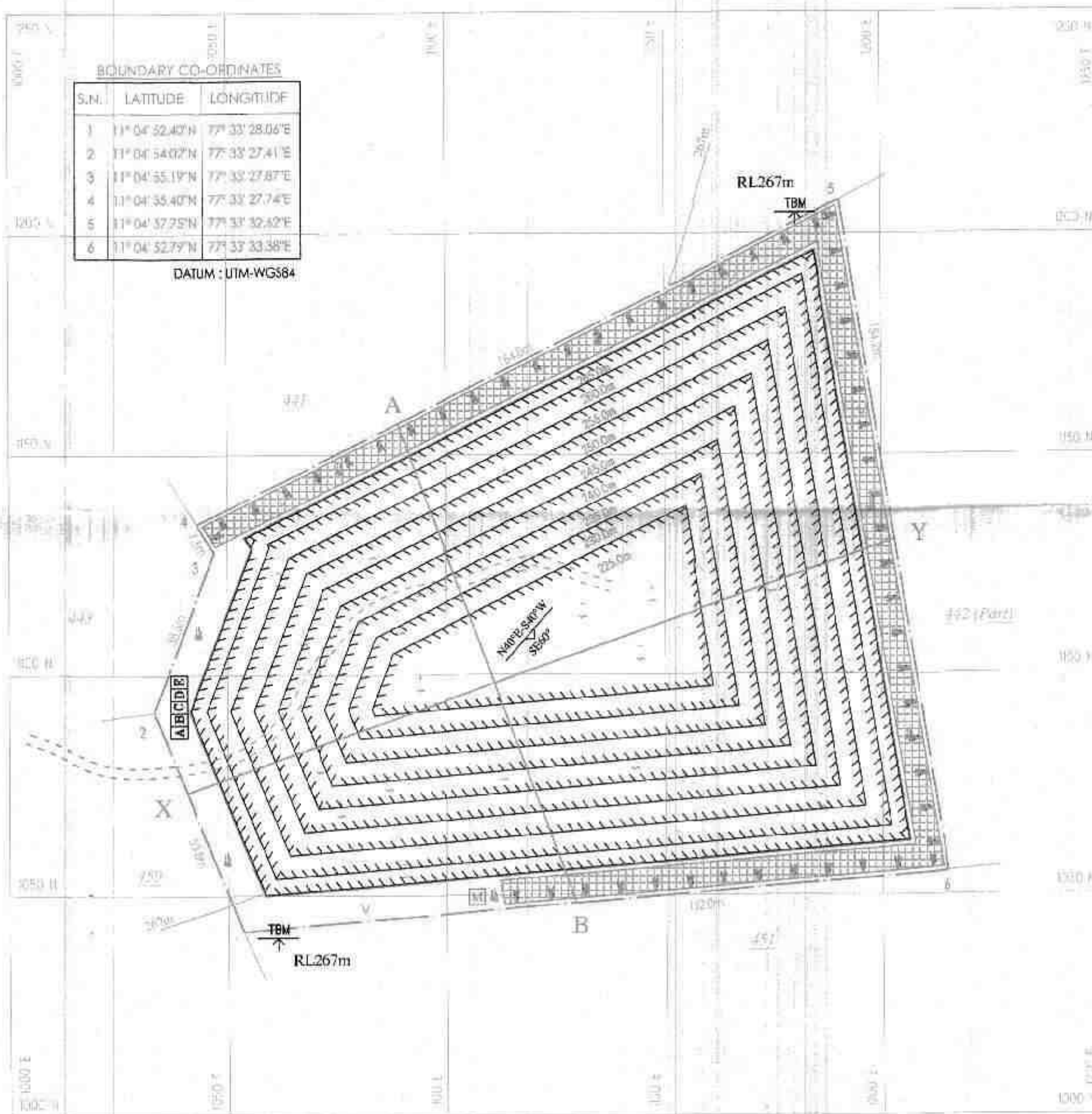
**PROGRESSIVE QUARRY CLOSURE  
PLAN & SECTIONS**

SCALE: 1:1000

**PREPARED BY :**

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KNOWLEDGE BASED UPON THE LEASE MAP  
AUTHENTICATED BY STATE GOVERNMENT

Dr. P. MANIKARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON



### INDEX

- Q.L. APPLIED AREA BOUNDARY
- 7.5m SAFETY DISTANCE
- TEMPORARY BENCH MARK
- GRAVEL
- ROUGHSTONE
- STRIKE & DIP
- QUARRY PIT
- CONTOUR
- SHRUBS
- QUARRY HAUL ROAD
- APPROACH ROAD
- 1-X Yr PLANTATION

### APPLICANT :

Thiru. P. SASIKUMAR,  
S/O. PALANISAMY,  
NO. 5/ 257, KEERANUR VILLAGE,  
KANGAYAM TALUK,  
TIRUPPUR DISTRICT - 638 701

### LOCATION OF Q.L.A AREA

S.F.No : 442 (PART).  
EXTENT : 2.00.0 Ha.  
VILLAGE : KEERANUR,  
TALUK : KANGAYAM,  
DISTRICT : TIRUPPUR,  
STATE : TAMIL NADU.

### PLATE NO - V

DATE OF SURVEY : 25.02.2021

### CONCEPTUAL PLAN & SECTIONS

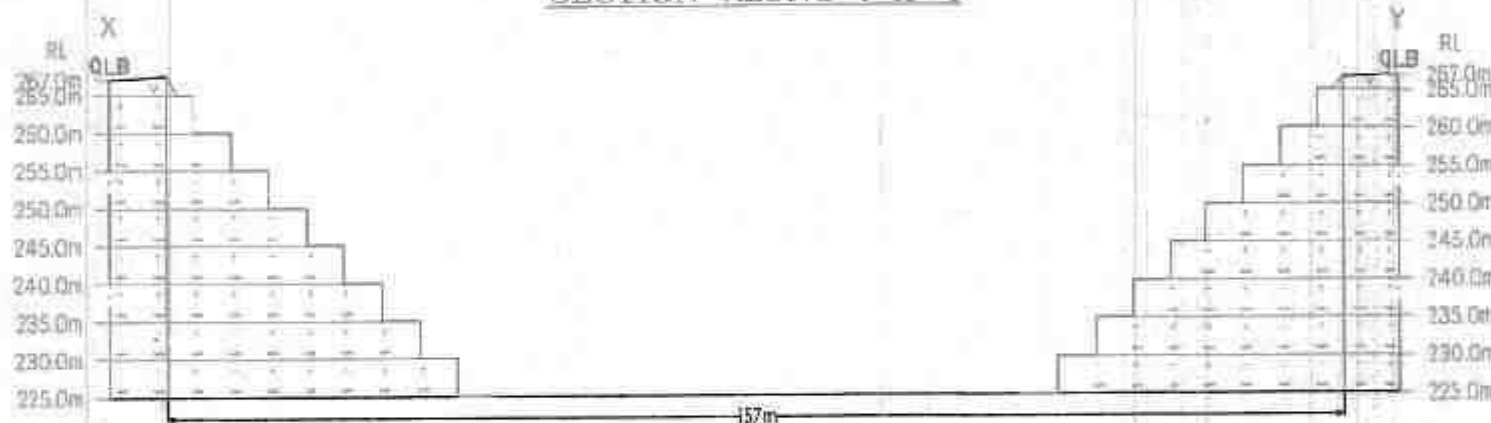
SCALE :- 1 : 1000

### PREPARED BY :

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AUTHENTICATED BY STATE GOVERNMENT

Dr. P. THANGARAJU, M.Sc., Ph.D.,  
QUALIFIED PERSON

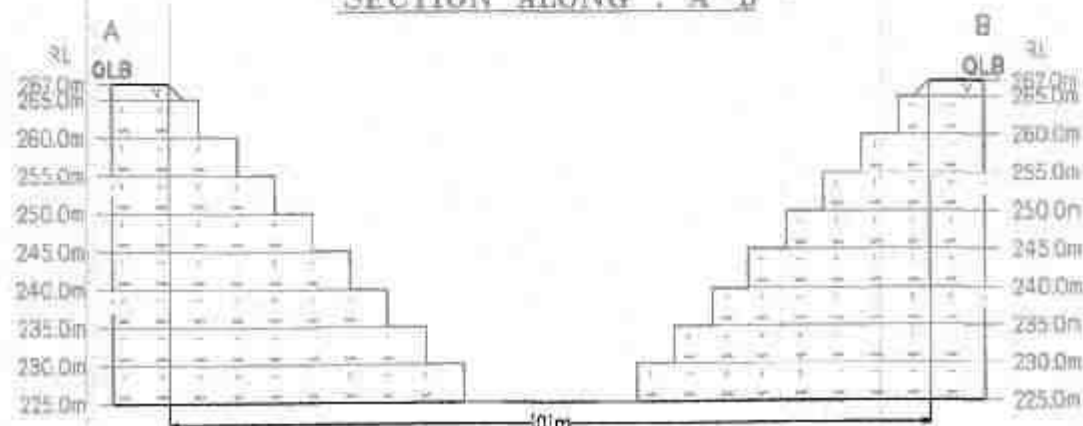
### SECTION ALONG : X-Y



### SITE SERVICES

- A - OFFICE
- B - STORE ROOM
- C - FIRST AID ROOM
- D - REST SHELTER
- E - TOILET
- M - MAGAZINE

### SECTION ALONG : A-B



Ultimate Pit Dimension (max)  
= 157mX101mX42m(d)



From

Dr. S.Vediappan, M.Sc., Ph.D.,  
Deputy Director,  
Dept. of Geology and Mining,  
Tiruppur.

To

Thiru. P. Sasikumar,  
S/o. Palanisamy,  
No. 5/257, Keeranur village,  
Kangeyam Taluk,  
Tiruppur District – 638 701

**R.c. No. 1475/2020/Mines Dated : 26.02.2021.**

Sub: Mines and Minerals – Minor Mineral – Rough Stone and Gravel – Tiruppur District – Kangeyam Taluk – Keeranur Village – Patta land in S.F.No. 442 (Part) over an extent of 2.00.0 Hectares – Quarry lease application preferred by Thiru. P. Sasikumar, S/o. Palanisamy - Precise area communicated - Mining Plan Submitted for approval - Approval accorded - regarding.

- Ref: 1. Thiru. P. Sasikumar, S/o. Palanisamy, No. 5/257, Keeranur village, Kangeyam Taluk, Tiruppur District quarry lease application dated: 20.11.2020 and 19.02.2021.  
2. The Deputy Director, Geology and Mining, Tiruppur letter R.C. No. 1475/Mines/2020 dated 23.02.2021.  
3. Mining Plan submitted by Thiru. P. Sasikumar, S/o. Palanisamy letter dated 25.02.2021 enclosed with mining plan.

\*\*\*\*\*

1. Thiru. P. Sasikumar, S/o. Palanisamy has preferred application for the grant of Rough Stone and Gravel quarry lease in Patta land in S.F.No. 442 (Part) over an extent of 2.00.0 Hectares of Keeranur Village of Kangeyam Taluk of Tiruppur District for a period of 10 years.


2. Based on reports and records available, precise area has been communicated to the applicant with a direction to submit mining plan and also to submit environmental clearance as stipulated in rule 41 and 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 vide memo dated 23.02.2021.

3. Accordingly, Thiru. P. Sasikumar, S/o. Palanisamy has submitted the Draft Mining Plan and the same has been examined in detail and it is found correct. Therefore, in exercise of the powers delegated under Rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959, and as per the guidelines / instructions issued by the Commissioner of Geology and Mining, Chennai vide letter Roc.No.3868/LC/2012 dated 19.11.2012, the mining plan submitted by Thiru. P. Sasikumar, S/o. Palanisamy in respect of the subject area is hereby 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. Safety distances mentioned in the precise area has to be maintained for the entire duration of the lease period.
- vii. Waste material should be dumped within the lease granted area as earmarked in the Mining Plan.
- viii. Necessary Environmental Clearance has to be obtained by the applicant from the competent authority before the grant of quarry lease as per the rules.
- ix. 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.
- x. If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules shall attract.
- xi. The applicant should strictly adhere to the statutory and safety requirements.

End: Approved Mining Plan.

  
Deputy Director,  
Geology and Mining,  
Tiruppur.

Copy to

1. The Commissioner, Department of Geology and Mining, Guindy, Chennai - 600 032.
2. The Chairman,  
State Level Environment Impact Assessment Authority,  
Panagal park Building, Saidapet, Chennai -600 015.
3. Dr. P. Thangaraju, RQP,  
Reg.off.No.17, Advaita Ashram Road,  
Alagapuram, Salem-636 004.

  
26.2.21

## சான்றி

திருச்சிபுரம் மாவட்டம், காங்கியம் வட்டம்

07. கீரனார் கிராமம், 5/257, கீரனார்  
என்ற சிவசுமியில் வசிக்கும் மதுரைக்காடு  
மகன் P. சசிகுமாரன் என்பவருக்கு மேற்படி  
கீரனார் கிராமத்தில் ரீ.ச 442 எட.காணல்  
4.௭௭ 3.63.5 ரூபிள் (மட்டம் எண் 1341) பூம  
மேற்படியானது பாதிக்கப்பட்டதாகும். மேற்படி  
ரீ.ச 442 - 3.63.5 ரூபிள் நிலத்தை சீர்த  
300 மீட்டர் சீர்தளம் கட்டியிருப்பதால், கையாள்  
பள்ளிக்கூடம் குடி கிடைக்காத சான்றிதான்.  
- மருத்துவர்,

  
கிராம நிர்வாக அலுவலர்  
70௭, கிராமம்  
காங்கியம் வட்டம்



**Dr. S. KALYANASUNDARAM ,I.F.S.(Retd.)**  
**CHAIRMAN**

**STATE LEVEL ENVIRONMENT IMPACT**  
**ASSESSMENT AUTHORITY – TAMIL NADU**

3rd Floor, Panagal Maaligai,  
No.1 Jeenis Road, Saidapet,  
Chennai-15.  
Phone No.044-24359974  
Fax No. 044-24359975

**ENVIRONMENTAL CLEARANCE**

**Lr. No.SEIAA-TN/F.No.5252/1(a)/ EC.No: 3526/2016 dated: 10.08.2016**

**To**

Thiru. P. Sasikumar  
No.130, Arasankadu  
Perumanallur  
Tiruppur - 638701



**Sir,**

**Sub:** SEIAA-TN – Proposed **Rough Stone & Gravel** quarry located at S.F.No 449 (P) & 450, Keeranur Village,Kangeyam Taluk, Tiruppur District- issue of Environmental Clearance – Reg.

**Ref:** 1. Your Application for Environmental Clearance dt: 16.04.2016  
2. Minutes of the 78th SEAC held on 23.07.2016  
3. Minutes of the SEIAA meeting held on 10.08.2016

**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.

<b>1</b>	<b>Name of Project Proponent and address</b>	Thiru. P. Sasikumar No.130, Arasankadu Perumanallur Tiruppur - 638701
<b>2</b>	<b>Location of the Proposed Activity</b>	
	Survey Number	449 (P) & 450
	Latitude and Longitude	11°04'45"N to 11°04'54"N 77°33'20"E To 77°33'29"E
	Village	Keeranur
	Taluk	Kangeyam



	District	Tiruppur
<b>3</b>	<b>Proposed Activity</b>	
	i. Minor mineral	Rough Stone & Gravel
	ii. Mining Lease Area	4.44.0 Ha
	iii. Approved quantity	142250 cu.m Rough stone & 25764 cu.m of Gravel
	iv. Depth of Mining	12 m
	v. Type of mining	Opencast Semi mechanised Mining
	vi. Category(B1/B2)	B2
	vii. Precise area communication	Na.Ka.61/Kanimam/2015 dated 05.12.2015
	viii. Mining plan approval	Deputy Director R.c.No61/Mines/2015 dated 12.04.2016
	ix. Mining lease period	5 years
<b>4</b>	<b>Whether Project area attracts any General conditions specified in the EIA notification, 2006 as amended:-</b>	Not attracted. Affidavit furnished
<b>5</b>	<b>Man Power requirement per day:</b>	12 Employees
<b>6</b>	<b>Utilities</b>	
	i. Source of Water :	water vendors/Existing Borehole
	ii. Quantity of Water Requirement in KLD:	
	a. Domestic	0.3KLD
	b. Industrial	} 0.7KLD
	c. Green Belt & Dust Suppression	
	iii. Power Requirement:	
	a. Domestic Purpose	TNEB
	b. Industrial Purpose	118098 Liters of HSD
<b>7</b>	<b>Cost</b>	
	i. Project Cost	Rs.58.32 Lakhs
	ii. EMP Cost	Rs.7.60 Lakhs
<b>8</b>	<b>Public Consultation:-</b>	Not required as per O.M. dated 24.12.2013 of MoEF, Gol.
<b>9</b>	<b>Date of Appraisal by SEAC:-</b>	23.07.2016
	<b>Agenda No:</b>	78-26
<b>10</b>	<b>Date of Review/Discussion by SEIAA and the Remarks:-</b>	
	The proposal was placed before the SEIAA in its 186 <sup>th</sup> Meeting held on 10.08.2016 and the Authority after careful consideration, decided to grant environmental clearance to the said project Mining of Rough Stone & Gravel subject to terms and conditions stipulated under the provisions of Environment Impact Assessment Notification, 2006 as amended.	
<b>11</b>	<b>Validity:</b>	
	The Environmental Clearance will be coterminous with the mine lease period or limited to a maximum period of 5 years from the date of issue whichever is earlier.	

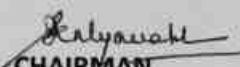
**Conditions to be Complied before commencing mining operations:-**

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. The applicant has to obtain land use classification as industrial use before issue/renewal of mining lease.
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 15 mts. From any civil structure shall be kept from the periphery of any excavation area.
14. Depth of quarrying shall be 2m above the ground water table /approved depth of mining whichever is lesser to be considered as a safe guard against Environmental Contamination and over exploitation of resources.

15. 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.
16. 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.
17. Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
18. The explosives shall be stored at site as per the conditions stipulated in the permits issued by the licensing Authority.
19. Blasting shall be carried out after announcing to the public adequate through public address system to avoid any accident.
20. 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.
21. The Proponent shall take appropriate measures to ensure that the GLC shall comply with the revised NAAQ norms notified by MoEF, GoI on 16.11.2009.
22. 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
23. 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.
24. 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 MoE&F, GoI to control noise to the prescribed levels.
25. 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.
26. Permission from the competent authority should be obtained for drawl of ground water, if any, required for this project.
27. Topsoil, if any, shall be stacked properly with proper slope with adequate measures and should be used for plantation purpose.
28. 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.

*Kalyanade*  
CHAIRMAN  
SEIAA-TN

29. Waste oils, used oils generated from the EM machines, mining operations, if any, shall be disposed as per the Hazardous Wastes (Management, Handling, and trans boundary movement) Rules, 2008 and its amendments thereof to the recyclers authorized by TNPCB.
30. 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.
31. Rain water harvesting to collect and utilize the entire water falling in land area should be provided.
32. 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.
33. 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.
34. No tree-felling shall be done in the leased area, except only with the permission from competent Authority.
35. 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.
36. 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 25 hectares within the mining lease period of this application.
37. 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 500m radius from the periphery of the quarry site
38. Ground water quality monitoring should be conducted once in 3 Months
39. Transportation of the quarried materials shall not cause any hindrance to the Village people/Existing Village road.
40. Free Silica test should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF , GOI.
41. Air sampling at intersection point should be conducted and reported to TNPCB, Department of Geology and Mining and Regional Director, MoEF , GOI..
42. Bunds to be provided at the boundary of the project site.
43. 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.

  
**CHAIRMAN**  
 SEIAA-TN


44. At least 10 Neem trees should be planted around the boundary of the quarry site.
45. Floor of excavated pit to be levelled and sides to be sloped with gentle slope (Except for granite quarries) in the mine closure phase.
46. The Project Proponent shall ensure a minimum of 2.5% of the annual turnover will be utilized for the CSR Activity
47. The Project Proponent shall provide solar lighting system to the nearby villages
48. The Project Proponent shall comply with the mining and other relevant rules and regulations where ever applicable.
49. Rainwater shall be pumped out Via Settling Tank only
50. Earthen bunds and barbed wire fencing around the pits with green belt all along the boundary shall be developed and maintained.
51. As per MoEF&CC, GoI, Office Memorandum dated 30.03.2015, prior clearance from Forestry & Wild Life angle including clearance from standing committee of the National Board for Wild life as applicable shall be obtained before starting the quarrying operation, if the project site is located within 10KM from National Park and Sanctuaries.
52. 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.
53. Safety equipments to be provided to all the employees.
54. Safety distance of 50m has to be provided in case of railway, reservoir, canal/odai
55. 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.
56. 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.
57. 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.
58. The Proponent shall furnish the data obtained from the Public Works Department regarding the details of Ground Water table in the quarry site.
59. 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.
60. 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.
61. Heavy earth machinery equipments if utilized, after getting approval from the competent authority.



**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 for Establishment 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.
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. Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. 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, draft Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006 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.

  
CHAIRMAN  
SEIAA-TN

Copy to:

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Principal Secretary, Environment and Forests Department, Government of Tamil Nadu, Tamil Nadu.
3. The Additional Chief Secretary, Industries Department, Government of Tamil Nadu, Tamil Nadu.
4. The Additional Principal Chief Conservator of Forests, Regional Office (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> 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, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-32
7. The District Collector, Tiruppur District
8. The Commissioner of Geology and Mines, Guindy, Chennai-32
9. EI Division, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
10. Spare.



**Quality Council of India**  
National Accreditation Board for  
Education & Training

**Certificate of Accreditation**

**Geo Technical Mining Solutions**

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

**Accredited as Category – 'B'** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	B

**Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IA AC Minutes dated January 29, 2021 on QCI-NABET website.**

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/21/1674 dated March 30, 2021. The accreditation needs to be renewed before the expiry date by Geo Technical Mining Solutions, Dharmapuri following due process of assessment.*

**Sr. Director, NABET**  
Dated: March 30, 2021

**Certificate No.**  
NABET/EIA/2023/IA0067

**Valid till**  
December 29, 2023

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

