

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
REPORT OF
ROUGH STONE & GRAVEL QUARRY
(As per EIA Notification, 2006 dated 14.09.2006 and amendments)**

GREENFIELD PROJECT

AREA DETAILS

**Category-B1
(Cluster)**

**Extent – 3.00.0 Ha
S.F No – 182/2 (P)
Village – Thirukooranam
Taluk – Gujiliamparai
District – Dindigul
State – Tamil Nadu**

PROPONENT

**THIRU M.K.KUNGUMARAJH
S/o. THIRU. M. KUMARESAN
N0.32, M.G.R Nagar
Chinna Andan Kovil Street,
Karur District -639 301
Mob: 9489682473**

EIA CONSULTANT

**AADHI BOOMI MINING & ENVIRO TECH (P) LTD
(QCI/NABET Accredited EIA Organization)**

**3/216, K.S.V.Nagar, Narasothipatti, Alagapuram (PO),
Salem – 636004.**

Website: www.abmenvirotec.com

Email: abmenvirotech@gmail.com suriyakumarsemban@gmail.com

Mob: 98427 29655.

2022



THIRU M.K.KUNGUMARAJH

S/o. Thiru. M. Kumaresan
N0.32, M.G.R Nagar
Chinna Andan Kovil Street,
Karur District -639 301
Mob: 9489682473

To

Date:

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
Collectorate Complex,
Dindigul – 624 004.

Sub: Submission of **Draft Environmental Impact Assessment (EIA) Report** as per EIA Notification, 2006 dated 14.09.2006 and amendments for the proposed Rough Stone and Gravel Quarry over an extent of 3.00.0 Hectare in S.F.No. 182/2 (P), Thirukooranam Village, Gujiliamparai Taluk of Dindigul District, Tamil Nadu –reg.

Ref:

- 1) MoEF&CCOM:F.No.L-11011/175/2018-IA-II(M) , dated 12.12.2018
- 2) Precise area letter: Rc. No. 23/2022 (Kanimam) dated 18.03.2022
- 3) Approval of Mining Plan Vide Rc. No. 23/2022 (Mines) dated 24.03.2022
- 4) Our application submitted Terms of Reference dated: 04.04.2021
- 5) ToR Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022

Dear Sir,

With reference to the above mentioned subject, we herewith submit the hard copy of **Draft Environmental Impact Assessment Report** as per the Terms of Reference vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022 with a Demand Draft of Rs. () in favour of DEE, TNPCB, Dindigul for your kind perusal.

Hence, we kindly request you to process our application for Public Hearing as per EIA Notification, 2006 for obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu as early as possible.

Thanking You,

Yours faithfully,

Thiru. M.K.Kungumarajh
(Project Proponent)

Enclosure: 1. Draft EIA Report along with the soft copy

INDEX

S.NO	PARTICULARS	REFERENCE
1	Proponent Undertaking	I
2	Consultant Undertaking	II
3	Table of Contents	III-XII
4	List of Figures	XIII-XVI
5	List of Tables	XVII-XX
6	List of Annexure	XXI
7	Abbreviations	XXII
8	ToR Compliance	XXIII-LX

THIRU M.K.KUNGUMARAJH

S/o. Thiru. M. Kumaresan
N0.32, M.G.R Nagar
Chinna Andan Kovil Street,
Karur District -639 301
Mob: 9489682473

Undertaking

I'm **Thiru.M.K.Kungumarajh, S/o Thiru M. Kumaresan, as Project Proponent**, hereby give this undertaking to the effect that the conditions laid down in Terms of Reference vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022 for our Rough Stone and Gravel Quarry, in SF.No. 182/2 (P), over an extent of 3.00.0 Ha of Thirukooranam Village, Gujiliamparai Taluk of Dindigul District, Tamil Nadu, have been compiled with, and the data submitted and the information presented in this report are true to the best of my knowledge.

Signature and seal of the Project Proponent

Place : Salem

Date :

Declaration by the Head of the accredited consultant organization/authorized person

I, Mr.Suriyakumar, Managing Director of Aadhi Boomi Mining & Enviro Tech (P) Ltd, hereby confirm that the Draft EIA Report has been prepared as per the conditions laid down in Terms of Reference vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022 for conducting Public Hearing and obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu for Rough Stone and Gravel Quarry of **Thiru.M.K.Kungumarajh** located in S.F.No. 182/2 (P), over an extent of 3.00.0 Ha, Thirukooranam Village, Gujiliamparai Taluk of Dindigul District, Tamil Nadu.

I also confirm that I shall be fully accountable for any mis-leading information mentioned in this statement.

Name: **Mr.S.Suriyakumar**

Signature :

Designation : **Managing Director**

Name of the EIA Consultant Organization: Aadhi Boomi Mining & Enviro Tech Private Limited.

QCI/NABET Accredited Consultant, Certificate No: NABET/EIA/2124/RA 0228.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

DECLARATION OF EXPERTS - NABET ANNEXURE – VII

S.No	Name of the Expert	Category	Functional Areas	Signature
1.	Mr.S.Suriyakumar	A	EIA Co-ordinator	<i>S. Suriyakumar</i>
		A	Solid and Hazardous Waste SHW* - HW* only	<i>S. Suriyakumar</i>
		A	Risk Assessment and Hazard Management (RH)	<i>S. Suriyakumar</i>
		A	Land Use (LU)	<i>S. Suriyakumar</i>
		A	Soil Conservation (SC)	<i>S. Suriyakumar</i>
2.	Dr. Sudharshan Ramakrishnan	A	Land Use (LU)	<i>R. Sudharshan</i>
		A	Socio Economics (SE)	<i>R. Sudharshan</i>
3.	Dr. Nithia Priya P.M	B	Air Pollution, Monitoring, Prevention and Control (AP)	<i>Nithia Priya P.M</i>
		B	Water Pollution Monitoring, Prevention and Control (WP)	<i>Nithia Priya P.M</i>
4.	Mr. M. Venkatesh Prabhu	B	Meteorology, Air Quality Modeling & Prediction (AQ)	<i>M. Venkatesh</i>
		B	Noise and Vibration (NV)	<i>M. Venkatesh</i>
5.	Mr. N. Suresh	B	Geology (GEO)	<i>N. Suresh</i>
		B	Hydrogeology (HG)	<i>N. Suresh</i>
6.	Mr. K. Manuraj	B	Geology (GEO)	<i>K. Manuraj</i>
			Hydrogeology (HG)	<i>K. Manuraj</i>
Team Member Involved in Report Preparation				
7.	Mrs. S. Santhi	-	Land Use (LU) under EIA Co-ordinator /FAE - Mr.S.Suriyakumar	<i>S. Santhi</i>
			Socio Economics (SE) under FAE- Dr. Sudharshan Ramakrishnan	<i>S. Santhi</i>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

LIST OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
1	INTRODUCTION	1-9
	1.1. PURPOSE OF THE REPORT	1
	1.2. IDENTIFICATION OF PROJECT AND PROJECT PROPONENT	2
	1.2.1 Identification of Project	2
	1.2.2 Identification of Project Proponent	2
	1.3. BRIEF DESCRIPTION OF THE PROJECT	3
	1.3.1 Nature and Size of the Project	3
	1.3.2 Location of the Project	3
	1.4 SCOPE OF THE PROJECT	7
	1.5 METHODOLOGY OF EIA STUDY	7
2	PROJECT DESCRIPTION	10-51
	2.1. NEED FOR THE PROJECT	10
	2.2. DEMAND – SUPPLY GAP	10
	2.3. LOCATION	10
	2.4 SIZE OR MAGNITUDE OF OPERATION	23
	2.5 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION	24
	2.6 TECHNOLOGY AND PROCESS DESCRIPTION	24
	2.6.1 Regional Geology	24
	2.6.2 Geology of the Lease Area	26
	2.6.2.1 Exploration	26
	2.6.3 Method of Mining	29
	2.6.4 Extent of Mechanization	29
	2.7 LAND USE PATTERN OF THE CORE ZONE	32
	2.8 ESTIMATION OF RESERVES	33

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	2.9 YEAR WISE PRODUCTION AND DEVELOPMENT	36
	2.10 STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE	42
	2.11 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN	42
	2.11.1 Restoration, Reclamation of already mined out area	43
	2.12 EMPLOYMENT POTENTIAL	47
	2.13 AMENITIES	47
	2.13.1 Sanitary Facilities	47
	2.13.2 First Aid Facility	47
	2.13.3 Labour Health	48
	2.13.4 Precautionary safety measures to the Labourers	48
	2.13.5 The Child Labour Employment	48
	2.14 PROJECT COST	49
	2.15 END USE	51
3	DESCRIPTION OF THE ENVIRONMENT	52-143
	3.1 GENERAL	52
	3.2 STUDY AREA	52
	3.3 STUDY PERIOD	53
	3.4 BASELINE ENVIRONMENT	53
	3.4.1 Scope of Baseline Data Collection	53
	3.5 LAND ENVIRONMENT	54
	3.5.1 Land use of Study Area	54
	3.5.2 Objective	55
	3.5.3 Data Used	55
	3.5.4 Methodology	58
	3.5.5 Pre-field Interpretation of Satellite Data	59
	3.5.6 Ground Truth Collection	60
	3.5.7 Post Field Work for Land Use/Land Cover Classification	60

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	3.5.8 Land Use/Land Cover Classification Interpretation	60
	3.5.8.1 Slope and Drainage Interpretation	60
	3.5.8.2 Linear Aspects of the Drainage system	61
	3.5.8.3 Stream Order (u)	61
	3.5.9 Land Use and Land Cover (LULC) for 00-10 km radius (32146.27 Ha)	63
	3.6 GEOLOGICAL STRUCTURE	66
	3.7 GEOMORPHOLOGY FEATURES	67
	3.8 SOIL	68
	3.9 CONTOUR	71
	3.10 SLOPE	71
	3.11 CONCLUSION	74
	3.12 METEOROLOGY	74
	3.12.1 Regional Meteorology	74
	3.12.2 Meteorological Data Recorded at IMD Station, Dindigul district	74
	3.13 AIR ENVIRONMENT	77
	3.13.1 Ambient Air Monitoring	77
	3.13.1.1 Selection of Sampling location	77
	3.13.1.2 Parameters and Monitoring Methodology	77
	3.13.2 Monitoring Result	80
	3.13.3 Observation	87
	3.14 NOISE ENVIRONMENT	87
	3.14.1 Method of Monitoring	87
	3.14.2 Interpretation	87
	3.15 WATER ENVIRONMENT	92
	3.15.1. Interpretation	98
	3.16 HYDRO GEOLOGY OF THE DISTRICT	99

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	3.16.1 Geophysical Electrical Resistivity Survey	100
	3.16.2 Pump test	102
	3.17 SOIL ENVIRONMENT	109
	3.17.1 Methodology	109
	3.17.2 Observation	114
	3.18 BIOLOGICAL ENVIRONMENT	114
	3.18.1 Crop Patterns in Dindigul District	116
	3.18.2 Study Area Ecology	117
	3.21.3 Methodology of Sampling	117
	3.19 DETAILED BASELINE STUDY RESULTS	118
	3.19.1 FLORA	118
	3.19.1.1 Flora in core zone	118
	3.19.1.2 Flora in buffer zone	118
	3.19.1.3 FLORA IN BUFFER ZONE	118
	3.19.2 FAUNA	124
	3.19.2.1 Fauna methodology	124
	3.22.2.2 Fauna in core zone	125
	3.22.2.3 Fauna in buffer zone	125
	3.20 SOCIO-ECONOMIC ENVIRONMENT	129
	3.20.1 Introduction	129
	3.20.2 Proponent Details	130
	3.20.3 Baseline Information	130
	3.20.4 Methodology	130
	3.20.5 Collection of Data from Secondary Sources:	131
	3.20.6 Population Characteristics- Thirukooranam Village	131
	3.20.7 Occupational Characteristics - Thirukooranam Village	133
	3.20.8 Infrastructure Improvements	136

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	3.20.9 Corporate Social Responsibility (CSR)	137
	3.20.9.1 Socio-economic Developmental Activities	137
	3.21 PRIMARY SURVEY	137
	3.21.1 Primary survey methodology	137
	3.21.2 Data structures	137
	3.22 INFRASTRUCTURE FACILITIES	140
	3.22.1 Post and Courier services	141
	3.22.2 Transport facilities	141
	3.22.3 Drinking Water facilities	141
	3.23 SOCIO- ECONOMIC PRIMARY SURVEY METHODOLOGY	142
4	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	144-195
	4.1 AIR ENVIRONMENT	144
	4.1.1 Anticipated Impact	144
	4.1.2 Emissions Details	144
	4.1.2.1 Drilling	145
	4.1.2.2 Loading of Rough stone	145
	4.1.2.3 Loading of Overburden (Gravel)	146
	4.1.2.4 Haul Road	146
	4.1.2.5 Blasting	147
	4.1.2.6 Summary of calculated Emission Rates	148
	4.1.3 Frame Work of Computation & Model Details	148
	4.1.3.1 Model Input data	148
	4.1.3.2 Model Results	149
	4.1.4 Combined Impact on Air Environment due to proposed quarry and adjacent within 500m radius	156
	4.1.5 Air Quality Index	157
	4.1.5.1 Interpretation of Air quality using IND-AQI	158
	4.1.6 Mitigation Measures	159
	4.2 CARBON EMISSION AND CARBON SINKS DUE TO PROPOSED MINING ACTIVITY	160

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	4.2.1 Carbon emissions	160
	4.2.1.1 Carbon emission due to natural activity in project site and carbon sinks	160
	4.2.1.2 Carbon emission due to human activity in project site and carbon sinks	161
	4.3 SOIL CARBON STOCK	162
	4.4 NOISE ENVIRONMENT	162
	4.4.1 Anticipated Impacts due to Noise in Core Zone	164
	4.4.2 Mitigation measures for Control of Noise	167
	4.5 GROUND VIBRATIONS	170
	4.5.1 Mitigation measures for Control of Vibration	171
	4.6 WATER ENVIRONMENT	172
	4.6.1 Anticipated Impact on Surface water body due to proposed project	173
	4.6.1.1 Mitigation measures	173
	4.6.2 Anticipated Impact on Ground water body due to proposed project	173
	4.6.3 Management of rain water in the pit during monsoon season	176
	4.6.4 Water Quality Index	176
	4.6.5 Impact on Hydrogeology	180
	4.6.6 Rainwater Harvesting Potential in Core Zone at the end of project	181
	4.7 SOIL ENVIRONMENT	181
	4.7.1 Impact on Soil Environment	181
	4.7.2 Mitigation measures for Soil Conservation	181
	4.8 WASTE DUMP MANAGEMENT	182
	4.8.1 Anticipated Impact	182
	4.8.2 Mitigation measures	182
	4.9 MUNICIPAL SOLID WASTE MANAGEMENT	182
	4.10 ECOLOGY AND BIODIVERSITY	183
	4.10.1 Impact on Ecology and Biodiversity	183

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	4.11 SOCIO ECONOMIC	188
	4.11.1 Anticipated Impact	188
	4.11.2 Mitigation Measures	189
	4.12 LAND ENVIRONMENT	190
	4.12.1 Anticipated Impact on Land Use / Land Cover	190
	4.12.2 Mitigation measures	190
	4.13 OCCUPATIONAL HEALTH RISKS	190
	4.13.1 Anticipated Impact	190
	4.13.2 Anticipated occupational and safety hazards	191
	4.13.3 Anticipated health impacts on people in nearby villages	191
	4.13.4 Mitigation measures	191
	4.14 AGRICULTURAL ENVIRONMENT	192
	4.14.1 General	192
	4.14.2 Anticipated Impacts of Proposed project on Agriculture	193
	4.14.3 Mitigation measures	193
	4.15 POST COVID HEALTH MANAGEMENT PLAN	195
5	ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)	196-196
6	ENVIRONMENTAL MONITORING PROGRAMME	197-199
	6.1 MEASUREMENT METHODOLOGIES	197
	6.2 MONITORING SCHEDULE AND FREQUENCY	197
	6.3 DATA ANALYSIS	199
	6.4 EMERGENCY PROCEDURES	199
	6.5 DETAILED BUDGET	199
7	ADDITIONAL STUDIES	200-206
	7.1 PUBLIC CONSULTATION	200
	7.2 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN	200

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District**

	7.2.1 Care and Maintenance during temporary discontinuance	202
	7.2.2 Economic repercussions of closure of mine and manpower retrenchments	202
	7.2.2.1 Number of local residents employed in the mine, status of continuation of family occupation and scope of joining occupation back	202
	7.2.2.2 Compensation given or to be given to the employees connecting with sustenance of himself and their family members	202
	7.2.2.3 Satellite occupations connected to the mining industry – number of persons engaged therein – continuance of such business after mine closes	203
	7.2.2.4 Continued engagement of employees in the rehabilitate status of mining lease area and any other remnant activities	203
	7.2.2.5 Envisaged repercussions on the expectation of the society around due to closure of mine	203
	7.2.3 Time Scheduling for abandonment	203
	7.3 SOCIAL IMPACT ASSESSMENT, R&R ACTION PLANS	204
	7.4 DETAIL STUDY OF RAINWATER HARVESTING AFTER THE COMPLETION OF PROJECT	204
	7.5 PLASTIC/MICROPLASTIC WASTE MANAGEMENT PLAN	206
8	PROJECT BENEFITS	207-210
	8.1 PHYSICAL INFRASTRUCTURE	207
	8.2 SOCIAL INFRASTRUCTURE	207
	8.3 EMPLOYMENT POTENTIAL	208
	8.4 OTHER TANGIBLE BENEFITS	208
	8.4.1 Corporate Social Responsibility	208

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	8.4.2 CSR activities	208
	8.4.2.1 CSR Cost Estimation	209
	8.4.3 CORPORATE ENVIRONMENT RESPONSIBILITY (CER)	210
9	ENVIRONMENTAL COST BENEFIT ANALYSIS	211
	9.0 PROJECT COST	211
10	ENVIRONMENTAL MANAGEMENT PLAN	212-220
	10.1 DESCRIPTION OF THE ADMINISTRATIVE ASPECTS OF ENSURING THAT MITIGATIVE MEASURES ARE IMPLEMENTED AND THEIR EFFECTIVENESS MONITORED, AFTER APPROVAL OF THE EIA	220
11	SUMMARY AND CONCLUSIONS	221-237
	11.1 SCOPE OF THE PROJECT	222
	11.2 PROJECT DESCRIPTION	222
	11.3 DESCRIPTION OF THE ENVIRONMENT	223
	11.3.1 Base line environmental study	223
	11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	226
	11.4.1 Air Environment	226
	11.4.2 Noise Environment	226
	11.4.3 Water Environment	227
	11.4.4 Soil Environment	227
	11.4.5 Waste Dump	228
	11.4.6 Biological Environment	228
	11.4.7 Land Environment	228
	11.4.8 Socio Economic Environment	228
	11.5 ANALYSIS OF ALTERNATIVES	235
	11.6 ENVIRONMENTAL MONITORING PROGRAM	235
	11.7 PROJECT BENEFITS	236

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	11.8 CONCLUSION	236
12	DISCLOSURE OF CONSULTANTS ENGAGED	238-240
	12.1 SCOPE	238
	12.2 INFRASTRUCTURE	238
	12.3 DISCLOSURE OF CONSULTANT FOR EIA STUDY	239
	12.4 DECLARATION OF EXPERTS INVOLVED IN THE EIA REPORT PREPARATION	239

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
1.1	Showing Location and route map of Proposed quarry lease area	4
1.2	Toposheet showing Location of the Quarry around 10km radius	5
1.3	Google Earth Image showing 300m and 500m radius around lease area	6
2.1	Google image showing lease boundary and Coordinates of the Quarry	12
2.2	Mine Lease Plan	13
2.3	Geological & Surface Plan	14
2.4	Photograph shows general view of lease area	15
2.4.1	Photograph shows outcrops of Rough stone and GPS coordinates taken at Pillars	15
2.5	Google Earth Image showing Transport Network of 10 km radius around proposed project site	18
2.6	Google Earth Image showing Transport Network of 10 km radius around Proposed Project Site	19
2.7	Earthquake Hazard Map	20
2.8	Flood Hazard Map	21
2.9	Winds and Cyclone Hazard Map	22
2.10	Material Balance	23
2.11	Close view of colour of Rock Formation	27
2.12	Regional Geology and Geomorphology Map	28
2.13	Geological Cross Section (Plate – IV)	34
2.14	Year Wise Development and Production Plan for the 1 and 2 year	38
2.15	Year Wise Development and Production Plan for the 3 year	39
2.16	Year Wise Development and Production Plan for the 4 and 5 year	40

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

2.17	Section of Production and Development Plan (Plate – VI)	41
2.18	Conceptual Plan	44
2.19	Progressive Mine Closure Plan	45
2.20	Section of Ultimate Pit Limit	46
2.21	Environmental Plan	50
3.1	Project Site Located in the Topo Map	56
3.2	Project Site Located in the LandSat8	57
3.3	Represents the River/Streams (Drainage) of the study area within 10km radius from the project site	62
3.4	Landsat8 -LU/LC DETAILS OF 00-10 KM RADIUS	64
3.5	Toposheet showing Road Accessibility details of 10 Km Radius	65
3.6	Bar Chart Represent the Lu/Lc Details of 10 Km Radius	66
3.7	Soil Pattern of 10km Radius	69
3.8	Geology and Geomorphology of 10km Radius	70
3.9	Relief Features of 10km Radius	73
3.10	Wind Rose Pattern	75
3.11	Geo-Referenced Toposheet showing 10km radius of Environmental Monitoring Stations	76
3.12	Air Sampling at Five stations	78
3.13	Georeferenced Toposheet showing air sampling location	79
3.14	Variation in Concentration of air pollutants	86
3.15	Noise Sampling at Core Zone and Buffer Zone	89
3.16	Ambient Baseline Noise Level	90
3.17	Georeferenced Toposheet showing Noise Sampling locations	91
3.18	Water Sampling at Core Zone and Buffer Zone	94
3.19	Georeferenced Toposheet showing water sampling location	97
3.20	Image Showing Geophysical Survey conducted at the lease area	102

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

3.21	Pump test survey conducted on bore well around 1Km radius from lease area	103
3.21(a)	Well inventory survey data recording around 1km Radius	107
3.21 (b)	Google image showing bore & well located from lease area	108
3.22	Soil Samplingat Core zone and Buffer Zone	111
3.23	Georeferenced Toposheet showing soil sampling locations	112
3.24	Photos of Flora in Core and Buffer Zone	123
3.25	Floral diversity in Core Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry	123
3.26	Floral diversity in Buffer Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry	124
3.27	Photos of Faunas in Core and Buffer Zone	128
3.28	Faunal diversity in Core Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry	128
3.29	Faunal diversity in Buffer Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry	129
3.30	Population Characteristics of Thirukooranam Village (2001-2011)	132
3.31	Occupational Characteristics of Population - Thirukooranam Village (2001-2011)	135
3.32	Socioeconomic Survey Location	139
3.33	Primary Survey Photographs of Village Wise -Gujiliamparai Taluk, Dindigul District	142
4.1	Isopleths of PM10 is 20.07 µg/m ³ (Core) occurred at the project site during i) loading and unloading and ii) transportation of Rough stone and Gravel over the haul road	151
4.2	Isopleths of PM10 is 6.18 µg/m ³ occurred near the project site during blasting in the mining area.	152
4.3	Chart indicating Incremental value of SO _x due to movement of vehicle in the project site	154
4.4	Chart indicating Incremental value of NO _x due to movement of vehicle in the project site	155
4.5	Noise dispersion in Buffer zone due to proposed mining activity	168
4.6	Noise dispersion in Buffer zone due to combined mining activity	169

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

4.7	Water Balance	172
4.8	Drainage pattern and water bodies within the 1km radius around the project site	175
4.9	Schematic representation of depth of mining and water level	176
4.10	Image showing Resistivity curve, depth data	180
4.11	Agricultural land within 1km radius of project site	194
4.12	Maintain social distance of 2m in work plac	195
4.13	Sanitizing Hand Frequently	195
4.14	Wear Mask at the work place	195

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

LIST OF TABLES

TABLE NO	TITLE	PAGE NO
1.1	Identification of Project	2
1.2	Identification of Project Proponent	2
1.3	Land Particulars	3
1.4	Environment Attributes	8
2.1	Co-ordinates of Quarry lease Boundary Pillars	11
2.2	Environmental Settings	16
2.3	Mining Details	23
2.4	Details of drilling equipment	30
2.5	Details of loading equipment	30
2.6	Details of transporting vehicle	31
2.7	Explosives Details	31
2.8	Computation of existing and proposed land use pattern	33
2.9	Computation of Geological Resources and Reserves	33
2.10	Mineable/Recoverable Reserves	35
2.11	Computation of year wise production	36
2.12	Computation of rejects materials	42
2.13	YEAR-WISE DUMP DIMENSION (m)	42
2.14	Computation of ultimate pit dimension	43
2.15	Employment Potential of Thiru. M. K. Kungumarajh, Rough stone quarry	47
2.16	Water Requirements (3.5 KLD)	47
3.1	Data Specification Used For Present Study	54
3.2	LU/LC CLASSES AND THEIR COVERAGE IN SQ. KM OF 10 KM RADIUS	66
3.3	Slope Nature Process and conditions	72

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

3.4	Summary of the Meteorological data for the study period	75
3.5	Ambient Air Quality Monitoring Stations	77
3.6	Summary of Ambient Air Quality Results	80
3.7	Noise Monitoring Stations	88
3.8	Summary of Ambient Noise Level during study period	90
3.9	Water Sampling Locations	92
3.10	Summaries of Water Quality Results	95
3.11	Pump test	103
3.12	Recuperation Test	105
3.13	Details on number of Bore wells within the radius of 1km	109
3.14	Frequency and Methodology for Soil Sampling & Monitoring	110
3.15	Soil Sampling Locations	110
3.16	Result of Soil Sample Analysis	114
3.17	Details of Important crops in Dindigul district	116
3.18	Flora diversity - Core and Buffer area of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District.	118
3.19	Methodology applied during survey of fauna	125
3.20	Fauna diversity - Core and Buffer area of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District.	126
3.21	Type of Information and Sources	131
3.22	Population Characteristics- Thirukooranam Village, Gujiliamparai Taluk, Dindigul District (2001-2011)	132
3.23	Occupational Characteristics of Population - Thirukooranam Village (2001-2011)	134
3.24	Details of Infrastructure of the Village in core and Buffer Zone	136
3.25	List of Villages and Population around 10km Radius	138
3.26	Health and Medical Infrastructure	140
3.27	Post and Courier Services	141
3.28	Transport facilities	141
3.29	Drinking Water facilities	141
4.1	Source Parameters (Loading of Rough stone)	145
4.2	Source Parameters (Loading of Gravel)	146
4.3	Source Parameters (During Vehicle Movement on Haul Road)	146

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District**

4.4	Source Parameters (During Blasting)	147
4.5	Emissions Rates of PM ₁₀	148
4.6	Emissions Rates of SO ₂	148
4.7	Emissions Rates of NO ₂	148
4.8	Total predicted GLC of PM ₁₀ in core and buffer zone due to combined action of loading, unloading and Transportation of Rough stone & Gravel by trucks on the haul road, of the mining lease area.	149
4.9	Total predicted GLC of PM ₁₀ in core and buffer zone due to blasting activity in the mining lease area	150
4.10	Impact of SO _x due to Operation of Excavator and Movement of Vehicle in the mining lease area	153
4.11	Impact of NO _x due to Operation of Excavator and Movement of Vehicle in the mining lease area	153
4.12	Incremental GLC of PM ₁₀ , PM _{2.5} , SO _x and NO _x due to the proposed mining activity	156
4.13	Total predicted GLC of PM ₁₀ , PM _{2.5} , SO _x and NO _x due to the combined activity in the cluster	157
4.14	AQI and its associated Health Impacts	157
4.15	Proposed Breakpoints for AQI Scale 0-500 (Units: µg/m ³ unless mentioned otherwise)	158
4.16	Computation of AQI with Baseline data	158
4.17	Emission of carbon monoxide from vehicle	161
4.18	Permissible Exposures in Cases of Continuous Noise (CPCB)	163
4.19	Noise Exposure Levels & Its Effects	163
4.20	Expected Noise Levels	164
4.21	Predicted Noise levels in Core Zone and buffer zone	165
4.22	Predicted Noise levels in Core Zone and buffer zone due to combined action of three quarries in the cluster area	166
4.23	Estimated Peak Particle velocities for different Explosive Charges	170
4.24	Permissible Peak Particle Velocities (mm/s)	171
4.25	Water Quality Index (W.Q.I.) and Status of water quality (Chatterji and Raziuddin 2002)	177
4.26	Analyses of water quality using Water Quality Index	178

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

4.27	Resistivity Survey	181
4.28	Ecological Impact Assessments and Its Mitigations -Part 1	183
4.29	Ecological Impact Assessments – Part 2	185
4.30	Afforestation Plan of the Proposed Rough Stone & Gravel Quarry for the next five years	188
6.1	Instruments used for Monitoring	197
6.2	Monitoring Schedule	198
6.3	Environment monitoring budget	199
7.1	Risk Assessment and Disaster Management Plan	201
10.1	Environmental Management Plan	213
10.2	EMP Budget for Plan period	220
10.3	Budget Allocation for Mine Closure Plan as per ToR	220
11.1	Project Details	222
11.2	Baseline Data	224
11.3	Environmental Management Plan	229
11.4	Post Project Environmental Monitoring Program	235
12.1	Declaration of Experts	240

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

LIST OF ANNEXURES

ANNEXURE	PARTICULARS	PAGE NO
I	COPY OF TERMS OF REFERENCE	241
II	COPY OF PRECISE AREA COMMUNICATION LETTER	262
III	CONSENT LETTER	267
IV	COPY OF FMB	279
V	COPY OF COMBINED SKETCH	280
VI	COPY OF PATTa, ADANGAL, 'A' REGISTER	281
VII	COPY OF QP	285
VIII	COPY OF AFFIDAVIT	289
IX	COPY OF VAO LETTER	292
X	COPY OF AD 500M RADIUS CLUSTER LETTER	293
XI	COPY OF DFO LETTER	295
XII	COPY OF APPROVED MINING PLAN LETTER	296

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

LIST OF ABBREVIATIONS AND ACRONYMS

AQI	Air Quality Index
AAQ	Ambient Air Quality
CPCB	Central Pollution Control Board
CAPEXIL	Chemical and Allied Export Promotion Council of India
CSR	Corporate Social Responsibility
DB	Decibel
DGM	Department of Geology & Mining
DGPS	Differential Global Positioning System
EC	Environment Clearance
EMP	Environment Management Plan
EIA	Environmental Impact Assessment
EMC	Environmental Management Cell
LEQ	Equivalent Noise Level
GOVT	Government of Tamilnadu
GLC	Ground Level Concentration
HSE	Health, Safety And Environment
HA	Hectare
KLD	Kilo Litres Per -Day
KM	Kilo Meter
MOEF & CC	Ministry of Environment Forest and Climate Change
NH	National Highway
NOC	No Objection Certificate
PH	Public Hearing
R & R	Rehabilitation & Resettlement
SEIS	Seismograph
SEIAA	State Environmental Impact Assessment Authority
SEAC	State Expert Appraisal Committee
SH	State Highway
SPM	Suspended Particulate Matter
TNPCB	Tamil Nadu Pollution Control Board
TOR	Terms of Reference
WQI	Water Quality Index

Consultant (ACO): Aadhi Boomi Mining & Enviro Tech (P) Ltd, Salem, Tamil Nadu

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District****Compliance of ToR**

S.No.	ToR	Compliance
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.	It is newly proposed Rough Stone Quarry The mining plan was approved by the Assistant Director, Dept. of Geology and Mining, Dindigul vide Roc.No.23/2022 (Mines), dated 24.03.2022. Refer Annexure XII, Page No 296.
2.	A copy of the document in support of the fact that the proponent is the rightful lease of the mine should be given.	The precise area communication was granted by Assistant Director, Dept. of Geology and Mining, Dindigul District in the name of project proponent Thiru. M. K. Kungumarajh, Vide Roc. No. 23/2022 (Mines), Dated 18.03.2022. Refer Annexure II, Page No.262.
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.	Contents in all documents are synchronizing with one another in terms of mine lease area, production levels, waste generation, its management and mining technology. The mining plan was approved by the Assistant Director, Dept. of Geology and Mining, Dindigul vide Roc.No.23/2022 (Mines), dated 24.03.2022. Refer Annexure XII, Page No 296.
4.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet; topographic sheet, geomorphology	The study area lies between northern latitude of 10°44'36.82" to 10°44'41.38" and eastern longitude of 77°57'17.33"E to 77°57'25.31"E.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>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).</p>	<p>The area is marked in the survey of India Toposheet No. 58F/14.</p> <p>Details are given in clause 1.3.2 of Chapter1 and Pg. No. 3.</p> <p>Geomorphology and geology of the mine is given in Clause 3.7 of Chapter 3. Refer Page no.67 and Fig No: 3.8. Refer Pg. No: 70.</p> <p>Land Use / Land Cover map of the study area (core and buffer zone) have been prepared on the basis of Satellite imagery using RS & GIS Technique & the same has been incorporated in Fig No: 3.4 of Chapter 3 (Refer Pg. No: 64).</p>
5.	<p>Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.</p>	<p>Survey of India Toposheet No. 58F/14 in 1:50,000 scale indicating physical and surface features 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 is given in Fig No: 1.1, 1.2, 2.4.1, 3.3, 3.7, 3.8 and Refer pages 4, 5, 15, 62, 69, 70 respectively.</p>
6.	<p>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.</p>	<p>The land proposed for mining activities is given in Table No.2.8 of Pg. No. 33</p>
7.	<p>It should be clearly stated whether</p>	<p>The proponent Thiru M. K. Kungumarajh</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.</p>	<p>is very much conscious of implementing Environment management plan with systematic mining. The proponent will submit the compliance the EC conditions with stipulated time.</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>Mines safety pertaining to failure of Pit slope for open cast mining is described in Table 7.1 (5th point) of Chapter 7 and Refer Pg. No. 201.</p> <p>Safety for blasting is given in Clause 4.5.1, 4.13.4 in Chapter 4. Refer Page No.171, 191</p> <p>General safe guard measures are given in 4th Chapter Pg. No.159- 195.</p>
9.	<p>The study area will comprise of 10 km zone around the mine lease from lease periphery and the data</p>	<p>The Study area of the existing mining project comprises of 10 km zone around the mining Lease boundary has been</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	prepared and given in chapter 1. Refer Fig No. 1.2 & Pg. No. 5. Data like reserves, waste generation up to life of mine (at the end of the 5th year) have been incorporated in Chapter 2 (Pg. No. 33, 42) of the Final EIA report.
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.	10 km radius map of the Study area delineating forest area, agricultural land, grazing land, wildlife sanctuary and national park, migratory routes of fauna, water bodies, human settlements, other existing mines/industrial activity and other ecological features are shown in Fig No. 2.5 of Chapter 2, Pg. No.18 & Fig No. 3.4 of Chapter 3, Pg. No. 64. Land use plan of the mine lease area is given in Clause 2.7 of Chapter 2 & Refer Pg. No. 32
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.	The details of dump and its location area is detail given in Chapter 2. Refer Table No 2.13 in Page No.42. The mining operations will not disturb/relocate any villages or need resettlement. Details of nearby villages and their population are given in Table No: 3.25 of Chapter 3, Refer Pg. No. 138. No Resettlement or Re- habitation Plan (R & R) is proposed (Refer Clause 7.3 of Chapter 7, Pg. No: 199).
12.	Certificate from the Competent Authority in the State Forest Department should be provided,	The Mining lease area does not involve forest land. No Reserve forest found within 10km radius of lease area.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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.	Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE The proposed project site does not attract Forest Conservation Act, 1980. Refer Annexure XI –DFO Letter, Pg. No. 295
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.	The Mining lease area does not involve forest land. No Reserve forest found within 10km radius of lease area. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE The proposed project site does not attract Forest Conservation Act, 1980. Refer Annexure XI –DFO Letter, Pg. No. 295
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.	NA
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	The Mining lease area does not involve forest land. No Reserve forest found within 10km radius of lease area. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

		The proposed project site does not attract Forest Conservation Act, 1980. Refer Annexure XI, Pg. No. 295
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.	Eco biodiversity (EB) study has been done for the project which details the impact on surrounding wildlife and mitigation measures are discussed and given in Chapter-4, Clause 4.10, Pg. No. 183-187. No wildlife sanctuary found around 10km radius.
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.	No wildlife sanctuary, National parks, Ramsar site Tiger/Elephant Reserves found around 10km radius.
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,	Details of Flora and Fauna found in the study area are given in the clause 3.19.1 (Pg. No 118-129). No Scheduled list of fauna is found in this study area.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>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>	
19.	<p>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.</p>	<p>The project site is not falling under any 'proximity to area declared as Critically Polluted Area.</p>
20.	<p>Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ,</p>	<p>Not Applicable. The mining area is located 154 km from Bay of Bengal (SE). Hence, the project doesn't attract the C.R.Z. Notification, 2011. Refer Table No.2.2 in Chapter 2. (Pg. No .16).</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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.	<p>R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not.</p> <p>The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.</p>	<p>The mining project does not involve any kind of displacement of the population since the mining will be concentrated only in the quarry area. The impact of mining activity on the population will be insignificant. Hence, Rehabilitation of settlements is not anticipated under this project as it will not be required. (Refer Clause 7.3 Pg. No. 204.</p> <p>The Socio-Economic study is given detailed in Clause 3.10 of Chapter 3, (Pg. No: 129-143) of the EIA report.</p>
22.	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February	March-May (Summer Season) season monitoring data on Air quality for a period of three months and Water quality, and Noise level, Soil and Flora &

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>(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.</p>	<p>Fauna in core and buffer zones are detailed in Chapter 3, Page No. 74-129.</p>
23.	<p>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</p>	<p>The detail on air quality status predicted is detailed in Clause 4.1 of Chapter 4, Pg.No.144-160.</p> <p>Wind Rose Pattern is shown in Fig. 3.1, (Pg. No: 75) of Chapter 3.</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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.	The water requirement for the Project is 3.5 KLD. Refer Table No.2.16 of Chapter 2. (Pg. No: 47). Water Balance chart in Fig 4.7 chapter 4 (Pg. No.172).
25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Thiru M.K.Kungumarajh rough stone and gravel require water for drinking and for water spraying, dust suppression and plantation. Water for drinking will be utilized from the certified supplier of water vendor. Water for dust control shall be taken from the Water Tanks. The overall water requirement is 3.5 KLD. So no clearance from Competent Authority is required. Refer Table No.2.16 of Chapter 2. (Pg. No: 47).
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The project consume water for drinking, dust suppression & plantation only. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. At the end of the project, the quarried pit will be used as water storage pond and it will improve the water table in buffer zone Refer Table No.2.16 of Chapter 2. (Pg. No: 47). The Rainwater harvesting details are given in chapter 7. Refer page No.204
27.	Impact of the Project on the water	The impacts of the project on the water

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	quality have been assessed and necessary safeguard measures are given. (Refer Clause 4.6.1 of Chapter 4, Pg. No: 172-179).
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	The mining operation will be maximum of 20m below ground level. The ground water table is 30m below the ground level and therefore mine working as proposed on higher level will not affect water regime. Hence there will not be any intersect of mining operation with ground water table. (Refer Fig No 4.9 of Chapter 4 in Page No 173-176).
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.	There is no stream crossing inside the mine lease area and no need for modification / diversion. (Refer Fig 4.8 of Chapter 4, Pg. no 175).
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.	Site elevated from 172m above MSL is given in; (Pg. No.16). The mining operation will be Maximum of 20m bgl. The ground water table at 30m below ground level and mine workings are

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

		proposed on higher and will not affect water regime. Hence there will not be any intersect of mining operation with ground water table. (Refer Fig No 4.9 of Chapter 4 in Page No 173-176).
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.	Phase-wise plan of plantation and Compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the name of the species is detailed in Table 4.30. Refer pg. No. 188.
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	The mining activities will be carried out through the existing roadways during leisure hours only, with no increase in the existing traffic pattern. (Refer Fig No. 2.6, Pg. No.19)

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.</p>	
33.	<p>Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.</p>	<p>Onsite shelter and facilities like temporary shed will be provided to the mine workers. The workers in the mines will be provided rest shed, first aid centre, ambulance facility. Refer Clause 2.13 of Chapter 2. The hazardous protecting equipment also will be provided to the employees such as helmet, ear muff, mask etc. Table No 10.1 (Point No 9 & 10) of Chapter 10, Pg No. 218, 219.</p>
34.	<p>Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.</p>	<p>Conceptual plan of proposed activity has been prepared for the proposed project. It is given in Chapter 2. Refer Fig No. 2.18 in page No.44 The ultimate Pit Section is given in Fig No 2.20 in Page no 46.</p>
35.	<p>Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in</p>	<p>Occupational Health impacts of the Project are anticipated and the proposed preventive measures are detailed in EIA the report. (Refer Clause 4.13 of Chapter 4, Pg. No: 190-192).</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	All control measure for air emission, noise control, and waste management will be taken as per norms. Hence there will not be any impact on population. (Refer Chapter 4, Pg. No: 159, 167, 182).
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.	Details of community welfare activities proposed for the local community, along with proposed budget have been incorporated in EIA Report (Refer Clause 8.4 of Chapter 8, Pg. No: 208-210).
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.	Environmental Management Plan for the existing mining project has been prepared and incorporated in Chapter 10. (Pg.No.212-220).
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 Draft EIA Report has been prepared for conducting Public hearing

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation pending against the 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.	Total Cost of the Project (capital cost and recurring cost) is Rs. 19.00 lakhs. The cost towards EMP is Rs. 5.80 lakhs. (Refer Clause 2.14, Pg. No: 49).
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A detailed Risk and Disaster Management Plan has been prepared and detailed in clause 7.2 of Chapter 7. (Pg. No: 200-203).
43.	Benefits of the Project if implemented should be spelt out. The benefit of the project shall clearly indicate environmental, social, economic, employment potential, etc.	If the Project is implemented, mining activity will help in improving environmental, social, and economic and employment potential directly and indirectly in the study area. Refer Chapter 8 of Pg. No: 207-210.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

General Points to be followed as per ToR

S.No .44	ToR	Compliance
a)	Executive Summary of the EIA/EMP Report	Chapter 11 of Final EIA Report.(Page No.221)
b)	All documents to be properly referenced with index and continuous page numbering.	Yes, all documents are 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.	Yes. Separate Contents for Tables have been included in EIA Report.
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 Report Refer Chapter 3.
e)	Where the documents provided are in a language other than English, an English translation should be provided.	No.
f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Yes, environmental appraisal of mining projects also submitted along with the EIA report. Refer Annexure I in below table.
g)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by 1) MoEF&CC OM: F.No.L-11011/175/2018-IA-II (M), dated 12.12.2018, which are available on the website of this Ministry, should also be followed.	1)Yes, Followed as per their MoEF&CC OM :F.No.L-11011/175/2018-IA-II(M), dated 12.12.2018 .

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

h)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No Change has been made.
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 by the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is newly proposed Rough stone & gravel quarry. The EC compliance will be submitted on time after getting the EC
j)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All details of lease area and required Maps are included in Fig No: 1.1, 1.2, 2.3, 2.12, 2.13, 2.14, 2.17, 2.20 and Refer pages 4, 5, 14, 28, 34, 38, 41, 46 respectively.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District****Additional TOR conditions recommended by SEAC**

S.No.	CONDITIONS	COMPLIANCE
1.	In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.	This is newly proposed Rough stone & gravel quarry. (Fresh Area)
2.	The PP shall include the letter received from DFO concerned stating the proximity details of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., upto a radius of 25 km from the proposed site.	Refer Annexure XI Letter from DFO, Pg. No. 295
3.	Details of odai (water course), viz nature of odai, origin, category etc.,	Kudakkanaru river is located 435m away from lease in east direction.
4.	The Proponent shall submit a conceptual "Slope Stability Plan" for the proposed quarry during the appraisal while obtaining the EC, as the depth of the working is extended beyond 30 m below ground level.	The proposed depth of mining is only 20m below ground level. Conceptual plan pertaining to ultimate pit limit, stability etc. is given in Clause 2.11 of Chapter 2, fig no. 2.17, 2.18 (page no. 42-43, 44-45)
5.	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, IVI Class mines manager appointed by the proponent.	Agreed
6.	The EIA Coordinators shall obtain and	Agreed

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences	
7.	<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>What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?</p> <ul style="list-style-type: none"> a) Quantity of minerals mined out. b) Highest production achieved in any one year. c) Detail of approved depth of the mining. d) Actual depth of the mining achieved earlier. e) Name of the person already mined in that leases area. f) If EC and CTO already obtained, the copy of the same shall be submitted. g) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches 	This is newly proposed Rough stone & gravel quarry. (Fresh Area)
8.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Topo 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).	The corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Topo sheet, geomorphology, lithology and geology of the mining lease area has been prepared and incorporated in EIA report. Kindly Refer Fig No: 1.1, 1.2, 2.12, 3.4, 3.6 and Refer pages 4, 5, 28, 64, 66 respectively.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

9.	The PP shall carry out Drone video survey covering the cluster, Green belt fencing etc.,	Agreed
10.	The proponent shall furnish photographs of adequate fencing, green belt along periphery including re-plantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	This is newly proposed rough stone and gravel quarry. The photographs of adequate fencing, green belt and safety distance will be complied in six month EC compliance report.
11.	The project proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impact of the mining operations on the surrounding environment and the remedial measures for the same.	The mineral reserves and mineable reserves, planned production capacity, proposed working methodology are given in Chapter 2. Refer Page No 35-41 and 29-32. The anticipated on surrounding environment due to proposed mining activity is given in Chapter 4.
12.	The project proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.	The employment potential of Thiru. M.K. Kungumarajh, Rough stone and gravel quarry is mentioned in Chapter 2 of EIA report. Refer Page No 47.
13.	The project proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, 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	The project proponent has conducted detailed study on hydro geology such as number ground water pumping & open wells, and surface water bodies such as rivers, tanks, ponds etc within 1 km (radius) and collected water levels in surround wells. The contour map has been prepared based on field work data. Refer Page No. 99- 109 in

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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.	Chapter 3. The schematic drawing showing depth of mining and depth of water table is incorporated in chapter 4. Refer Page No.176
14.	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The base line data of air, water, soil and biological environment, Traffic Movement is given in Chapter 3.
15.	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of air pollution, water pollution, & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mine.	The Anticipated cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of air pollution, water pollution, & health impacts has been described in Chapter 4. Environment Management plan with mitigation measures are given in Chapter 10
16.	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Rain water harvesting with recharge details is given in Chapter 4 & chapter 7 (Page no. 176 & 204)
17.	Issues relating to Mine Safety, including slope geometry in case of Granite quarrying, blasting parameters etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Mine safety is detailed in Table No.7.1 (point no. 5& 6) Chapter 7, page no. 201
18.	Land use of the study area delineating forest area, agricultural land, grazing land,	10 km radius map of the Study area delineating forest area, agricultural

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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, grazing land, wildlife sanctuary and national park, migratory routes of fauna, water bodies, human settlements, other existing mines/industrial activity and other ecological features are shown in Fig No. 2.5 of Chapter 2, Pg. No.18 & Fig No. 3.4 of Chapter 3, Pg. No. 64. Land use plan of the mine lease area is given in Clause 2.7 of Chapter 2 & Refer Pg. No. 32
19.	Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.	Mineral Rejects and Disposal of waste is discussed in Chapter 2 page no. 42
20.	Since non-saleable waste /OB / intermediate waste etc_ is huge in the granite quarry, the Proponent shall provide the details pertaining to management of the above material with year wise utilization and average moving inventory be submitted.	NA. It is only Rough stone & gravel quarry
21.	Proximity to Areas declared project (or) the project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	NA
22.	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,	water conservation measures given in Clause 4.6.3 in Chapter 4, pg. No. 176 Rain water harvesting is detailed in Chapter 7, pg. No. 204

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	should be provided.	
23.	Impact on local transport infrastructure due to the project should be indicated.	Impact of local transport due to the project is detailed in chapter 4 pg. no. 161. No new roads are formed. Refer Fig. No. 2.6, pg. no. 19 in Chapter 2
24.	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.	There are no trees present in the lease area. Some bushes are only present. The details of flora within lease area and in buffer zone are given detail in Chapter 3. Refer Page No. 118-129. The proponent proposed to develop green belt around the lease boundary for ecological balance in the project site. The afforestation plans for the next five years are given in Chapter 4. Refer Page no.188
25.	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific	The conceptual mine closure plan and progressive mine closure plan is given in Chapter 2. Refer Fig No 2.18, 2.19 in Page No 44 and 45 respectively.
26.	Public Hearing points 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 Repot of the project and to be submitted to SEIAA,/SEAC with regard to the Office Memorandum of MoEF & CC accordingly.	The Draft EIA Report has been prepared for conducting Public hearing
27.	The public hearing advertisement shall be published in one major National daily and one most circulated daily.	Agreed
28.	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing	Agreed

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	in Tamil Language also.	
29.	As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	Agreed
30.	The purpose of green belt around the project is to capture the fugitive emission, 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 and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.	The proponent has planned to plant one year taller tree saplings around the lease area in consultation with DFO to capture the fugitive emission, carbon sequestration and to attenuate the noise generated after the commencement of the Project. The afforestation plans for the next five years are given in Chapter 4. Refer Page no.188.
31.	Taller/one year old Sapling raised in appropriate size of bags, preferably eco-friendly bags should be planted in proper placement as per the advice of local forest authorities/Botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.	The proponent has planned to plant one year taller tree saplings around the lease area in consultation with DFO to capture the fugitive emission, carbon sequestration and to attenuate the noise generated after the commencement of the Project.
32.	A Disaster Management Plan shall be prepared and included in the EIA/EMP	The disaster management plan has been prepared and incorporated in

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District**

	Report.	chapter 7. Refer Page No.198
33.	A Risk Assessment and Management Plan shall be prepared and included in the EIA/EMP Report.	Risk Assessment and Management plan has been prepared and incorporated in chapter 7. Refer Page No.200
34.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	<p>The Anticipated health impacts and mitigation measures are detailed in chapter 4, pg. no. 190-192.</p> <p>Budget has been allocated for periodic medical examination and included in EMP cost in Chapter 2, refer pg. no. 49</p>
35.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	<p>The Anticipated Public health impacts and mitigation measures are detailed in chapter 4, pg. no. 190-192.</p> <p>Budget has been allocated for periodic medical examination and included in EMP cost in Chapter 2, refer pg. no. 49</p>
36.	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 are given in Chapter 3. Refer Clause 3.20 in Page No 129.
37.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.	NA

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

38.	Benefits of the Project if the project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Project Benefits are described clearly in Chapter – 8, pg. no. 207
39.	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 be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.	It is a newly proposed Rough stone & gravel quarry.
40.	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

Additional ToR Compliance (SEIAA)

S.No.	CONDITIONS	COMPLIANCE
1	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/Rivers, & any ecological fragile areas	The anticipated impact on various environment is given detail in Chapter 4
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	Draft EIA is been prepared for conducting public hearing

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	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.	The carbon emission due to proposed mining activity and its mitigation measures are given in Chapter4. Refer Clause 4.2 in Chapter 4 (Page No 160).
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.	The detailed study of impact on ecology and biodiversity including soil micro flora and fauna, soil seed bank is given in Chapter 4. Refer Page No 183-187
5	Action should specifically suggest for sustainable management of the area restoration of ecosystem for flow of goods and services.	The proponent has planned to plant one year taller tree saplings around the lease area in consultation with DFO for sustainable management after the commencement of the project. The afforestation plans for the next five years are given in Chapter 4. Refer Page no.188.
6	The project proponent shall study impact on fish habitats and food WEB/ food chain in the water body and reservoir.	The detailed study of impact on fish habitation and food WEB/ food chain in the water body and reservoir is given in Chapter 4. Refer Table 4.29, Page No 187.
7	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The impact study on soil health and erosion is given in Clause 4.7 in Chapter 4. Refer Page no 181. The soil physical, chemical components and microbial components are given in Chapter 3. Refer Page No.109-114.
8	The Environmental Impact Assessment	There are no forests situated within

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	10km radius of the lease area. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE No endangered indigenous flora and fauna identified in study area.
9	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	There are no trees identified within the lease area. Only few shrubs are notified. The proponent will develop green belt around the lease boundary for the environment sustainability.
10	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	The impact study on surface water bodies and agricultural land is given in Chapter 4. Refer Page No 173-175, 192-194.
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 environmental management plan is given chapter 10. The cost for green belt development is mentioned in table 10.2 in Chapter 10. Refer Page No 220. Budget for mine closure plan is given in Page No 220, in Chapter 10. The disaster management plan is given in Chapter 7. Refer page no 200
12	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	The Environmental Impact Assessment study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock is given in Chapter 4. Refer Clause 4.2 in Page No 160-162.
13	The Environmental Impact Assessment should study impact on protection areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site	There are no Reserve Forests, National Parks, Corridors and Wildlife pathways located within 10km radius of the lease area. Refer Annexure XI, Pg. No. 295
14	The project proponent shall study and	The study and furnish the impact of

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	furnish the impact of project on plantation in adjoining patta lands, Horticulture, Agriculture and livestock.	project on plantation in adjoining patta lands, Horticulture, Agriculture and livestock is mentioned in Chapter 4. Refer Clause 4.14.2 in Page No 193.
15	The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.	The detailed impact studies are given in Chapter 4.
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.	The study and the impact on aquatic plants and animals in water bodies is mentioned in Chapter 4. Refer Clause 4.10 in Page No 183 and Table 4.29 in Page No 185.
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 & microplastics on aquatic environment and fresh water system due to activities, contemplated during mining may be investigated and reported.	The study on pollution due to plastic and micro plastic and its ecological risk is mentioned in Chapter 7. Refer Clause 7.5 in Page no 206.
18	The project proponent shall detailed study on impact of mining on Reserve forest free ranging wildlife.	There are no reserve forests and wild life sanctuary located within 10km radius of the lease boundary. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE The proposed project site does not attract Forest Conservation Act, 1980. Refer Annexure XI, Pg. No. 295
19	Detailed study shall be carried out in regard to impact of mining around the	Impact on Soil Health, biodiversity, carbon emission and impact on water

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<p>proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following</p> <ul style="list-style-type: none"> a) Soil health & bio-diversity. b) Climate change leading to Droughts, Floods etc. c) Pollution leading to release of Greenhouse gases (GHG). rise in Temperature, & Livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health. e) Agriculture, Forestry & Traditional practices. f) Hydrothermal/Geothermal effect due to destruction in the Environment. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams. 	<p>environment including aquatic ecosystem and on agricultural environment are discussed in detail in Chapter 4.</p>
<p align="center">20</p>	<p>Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby water bodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period</p>	<p>Detailed Hydro-geological study is given in Chapter 3, refer pg. no. 99-109</p>
<p align="center">21</p>	<p>To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce</p>	<p>Disaster management plan is given in Chapter 7, pg. no. 200</p>

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	
22	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.	Details are furnished in Table 7.1 in chapter 7, pg.no. 201
23	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued is given in Chapter 2, pg.no. 42-45
24	Detailed Environment Management plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period per precise area communication order issued	Detailed environmental management plan is given in Chapter 10, pg. no. 212
25	No objection certificate from the Competent Authority for impact of mining on the River Kudakanaaru shall be furnished along with EC application.	It is under Process

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

ANNEXURE 1

Additional Information for Considering EC for Mining Projects

S. No.	Details to be provided	Page no.
1]	Name of the project lease & owner	1
2]	Lease Extent	1
3]	Lease Validity	1
4]	Approved Mining Plan / Scheme – Review a) Specify whether DSR is provided [applicable in case of minor minerals only]	1
5]	Specify – Nature and type of violation	Nil
	I. Without EC or in excess of quantity approved in EC	It is a newly proposed Rough stone & gravel quarry
	II. Without CTO or in excess of quantity approved in CTO	
	III. Without mining plan / Scheme of mining or in excess of quantity approved in Mining Plan / Scheme of mining	It is not an violation case
	IV. Without Forest Clearance	
	V. Any other violation	
6]	Violation period	Fresh EC for newly proposed quarry. It is not an violation case
	I. Number of months	
	II. Number of Years	
7]	Exploitation / Excavation quantity – Reserves proved through exploration by drilling	29
8	Give details of production from the date of execution of the lease deed / since 1994	Fresh
9]	Quantity mined out during the violation period & if, yes indicate the violated quantity, in term of % of consented quantity.	NA
10]	State illegal mining / encroachments outside the lease boundary? Percentage of quantity mined out outside the lease boundary.	Not applicable

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

11]	Method of working		[b], 29	
	I. Category type ;[a] Mechanised [b] Semi-Mechanised [c] Manual			
	II. Construction and design of haul roads			
	a] Dimension as per the statutory requirements which were followed or otherwise		Two tippers, one Hydraulic excavators 144-160	
	b] Number of vehicles plying on the main haul roads inside the mine and the approach road to the pit located outside the mine, if any.			
	c] Are any measures taken to minimise fugitive dust generated form mine haul roads /Does it comply with the CPCB/PCB Guidelines/			
	d] Is there a possibility that air pollutants emitted from the project area that do not comply with air quality standards as per CPCB/PCB/			
12]	Mechanized /Semi- Mechanized Method of Mining		Page No 29 Loading and excavating equipment will be used as per AMP only.	
	[i] Number of loading / excavating equipments as per approved mining plan and capacity.			
	[ii] Number of loading / excavating equipments actually being deployed and capacity.			
	[iii] Type and number of transporting equipments.			
	[iv] Type of transporting system used –[a] trucks [b] Any other mode			
	[v] Capacity and No. Trucks used as per approved mining plan			
	[vi] Capacity and No. Trucks used actually in the mine			
	[vii] Number and Capacity of loading equipments and trucks used not in line with approved mining plan			
		Capacity[m ³]		Number
	Excavator			
Trucks				

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	[viii] Impact of excess deployment of loading equipments [excavators] and transporting equipments on environment.	144-160
	[a] Air pollutants	172-179
	[b] Water Quality	190
	[c] Land Quality	162-169
	[d] Noise level	
	[ix] Does the deployment of loading equipments [excavators] and trucks fulfill the statutory requirements as per MMR 1961, with respect to the site conditions/	Yes
13]	Method of Rock Breaking / Material preparation for the excavation;	
	[i] Methodology adopted-	
	[a] Drilling and blasting	(a)
	[b] Rock breakers	29-32
	[c] Rippers	
	[d] Surface miners	
	[e] Direct mucking by excavators	
	[f] Manual means	
	[g] Any other methods or combination of above	
	[ii] In case of drilling and blasting method	
	[a] Type of blasting ; short hole or deep hole	
	[b] Whether controlled blasting technique adopted / If yes, specify the technique with details of the study , year of study	
	[c] Impacts due to blasting defined as per the studies , if any carried out previously as indicated	
	[d] Dust pollution	
	[e] Noise level[dB[A]]	
	[f] Ground vibration studies and Fly rock projection	170-172
	[iii] Impact of preparation of Ore and waste on environment-	
	a] Air Pollution	144-160
	b] Noise Pollution	162-169
	c] Water Pollution	

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	d] Safety standards	172-179
	e] Traffic density	161
	f] Road Conditions[vulnerability]	
14]	Construction and Design of Dumps.	
	a] Place / Location	42
	b] Approach to Dump form the mine distance and safety standards.	
	[c] Area of extent occupied	
	[d] Dimension of Dump and No. of terrace with heights [benches]	
	[e] Vegetation covered ;If yes, specify the details of plants	
15]	Construction and Design of Waste Dumps	
	[i] Numbers and Location of Dumps as per approved Mining Plan	42
	[ii] Specify whether reject dumps are located within or outside mining lease	
	[iii] Area occupied in excess of the approval mining plan.	
	[iv] Dimension of Terracing, Light, shapes, etc., Dump as per approved Mining Plan	
	[v] Fresh / Existing Dimension Height, shape, width. etc., of Dumps in the mine.	
	[vi] Volume / Quantity added to Waste / Dump during the violated period.	
	[vii] Approach to the Dump-Dimension, distance.	
	[viii] Number of and type of equipments deployed in Dump.	42
	[ix] Provision of Garland drains around the Dumps.	
	[x] Any vegetation made on the slopes.	
	[xi] Provision of safety standards.	
	[xii] Impact of Waste/Dumps on environment.	
	a] Air Pollution	144-160
	b] Water Pollution	
	c] Dust Pollution	172-179

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	d] Noise Pollution	162-169
	[xiii] Terracing	
16]	Construction and Design of Ore and sub grade ore / mineral Stacks;-	NA
	[i] Number and Location of Ore stacks.	
	[ii] Dimension of Ore / sub grade Stacks as per the Approved Mining Plan	
	[iii] Volume / Quantity added during the violation period.	
	[iv] Any Screening plant or any other loading equipment engaged during the violated period.	
	[v] Approach to Ore / sub grade stack – Distance, hazards.	
	[vi] Safety standards adopted while operation.	
	[vii] Impact of ore / sub grade on environment	
	a] Air Pollution	
	b] Water Pollution	
	c] Dust Pollution	
	d] Noise Pollution	
17]	Mine Pit Water	172-179
	[i] Intersection of Ground water table, specify the measures taken.	
	[ii] Ground water table as per hydro geological Studies [Pumping test]	
	[iii] Provision of Garland drains around pit and dumps	
	[iv] Water pollution	
	[v] Management of mine water	
	[vi] Ultimate pit limit, w.r.t. Ground water intersection and management of drainage of ground water.	
18]	Diversion of General Drainage / River / Nallah course for mining	No

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

19]	Clearing of vegetation before the commencement of mining operation – Number of trees [species wise]	No. There are no trees identified within the lease area. Only few shrubs are notified.
20]	Man Power	47
	[a] Statutory management	
	[b] Regular [Non-statutory] Manpower	
21]	Occupational Health and Safety	190
	[a] Periodical monitoring of health standards of persons employed as per Mine Act, 1952	
	[b] Failure to inform statutory bodies periodically, if any	
22]	Population [Nearby Habitation]	131
	[i] Population / Significant Population / Dense Population within the buffer zone of 10 Kms.	
	[ii] People displacement due to mining activities	204
	[iii] Location / Existence of habitation near the river or any other historical / sensitive / forest distance.	144-160
	[iv] Impact of mining on Surrounding and habitation- Air, Water, Noise, Pollution.	172-179 162-169
	[v] Socio Economic aspects of mining	129
23]	CSR	137
	[a] Field ground Activities or studies. Actual amount spent towards CSR and the future proposal.	
24]	NOC from DMG for quantity clarification in respect of settlement of all the amount payable against identified violation.	NA
25]	For the Clearance of EC, Public Hearing is mandated as per MoEF & CC Notification. Give reason for exemption of Public Hearing	Draft EIA report has been prepared for conducting PH
26]	Conceptual post mining land use / restoration	42-43
27]	Litigation / court cases, if any pending	-
28]	Disaster management plan for the mine	200

CHAPTER – 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

The Applicant, **Thiru. M. K. Kungumarajh** S/o. Thiru. M. Kumaresan, residing at No.32, M.G.R Nagar, Chinna Andan kovil street, Karur District, TamilNadu -639301 has applied for grant of permission for quarrying Rough Stone & Gravel located in S.F. No. 182/2 (P) over an Extent of 3.00.0 Ha in Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu for the period of ten years.

The Assistant Director, Department of Geology and Mining, Dindigul has directed the applicant **Thiru. M. K. Kungumarajh** S/o. Thiru. M. Kumaresan, vide his precise area communication letter Roc.No.23/2022, dated 18.03.2022 to get approved mining plan and obtain Environmental clearance from the State Environment Impact Assessment Authority (SEIAA) as per the EIA Notification, 2006 and its amendments for grant of quarrying lease to Rough Stone & Gravel quarry in S.F. No. 182/2 (P) over an Extent of 3.00.0 Ha in Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu for the period of Ten Years.

The mining plan is prepared as per the Assistant Director's Precise area communication letter, Roc.No.23/2022, dated 18.03.2022 under Rule 41& 42 of Tamil Nadu Minor Minerals Concession Rules, 1959 for quarrying Rough Stone & Gravel and it is approved by Assistant Director, Department of Geology and Mining, Dindugul vide letter Roc.No.23/2022, dated 24.03.2022. The project cost is about Rs. 19 lakhs and EMP cost is Rs. 5.80 lakhs.

The proposed area comes under cluster classification, based on the Assistant Director, Dindugul letter vide Roc.No.23/2022, dated 01.04.2022. So this project has to obtain Terms of Reference for conducting EIA studies. There are two existing quarries namely Thiru.D.Sivajeeganesan with an extent of 3.41.0 Ha & Thiru.R.K.Pannerselvam with an extent of 1.58.32 Ha, one abandoned quarry namely Thiru.K.Palanisamy with an extent of 1.15.0 Ha and one present proposed quarry namely Thiru.M.K.Kungumarajh with an area of 3.00.0 Ha located within the 500m radius from the lease boundary of the proposed project. The total cluster area is 9.14.32 Ha.

As per MoEF&CC OM: F.No.L-11011/175/2018-IA-II(M), dated 12.12.2018, the EIA/EMP report has to be prepared for the cluster area based on ToR recommended by SEIAA. Therefore, the applicant applied for ToR through Parivesh website vide online proposal no. SIA/TN/MIN/74776/2022 Dated 04.04.2021. The ToR proposal was placed in 284th SEAC meeting, dt 10.06.2022 and 529th SEIAA meeting, dated

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

06.07.2022. Then ToR has been issued by the SEIAA vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022. The EIA report has been prepared based on the recommended Standard ToR and Specific ToR.

1.2. IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

1.2.1. IDENTIFICATION OF PROJECT

The applicant, **Thiru. M. K. Kungumarajh**, proposed to start new Rough Stone quarry located in S.F. No. 182/2 (P) over an Extent of 3.00.0 Ha in Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu. The Assistant Director, Department of Geology and Mining, Dindigul District has directed the applicant, Thiru. M. K. Kungumarajh through his Precise area communication letter Roc.No.23/2022, dated 18.03.2022 to get AMP and obtain EC form SEIAA as per the EIA Notification, 2006.

1.2.2. IDENTIFICATION OF PROJECT PROPONENT

Table. 1.1 Identification of Project	
Particulars	Details
Applicant	M. K. Kungumarajh
Lease Area	3.00.0Hectares (Consent Patta Land)
Site Location	Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu
Precise Area Communication	Roc.No.23/2022, dated 18.03.2022
Period of Lease	10 Years(To be granted)
Mining Plan Approval Details	Mining plan approved by DD, Dept of Geology and Mining, Vide Roc.No.23/2022, dated 24.03.2022
Table. 1.2 Identification of Project Proponent	
Address of the Project Proponent	Thiru. M. K. Kungumarajh S/o. Thiru. M. Kumaresan, No.32, M.G.R Nagar, Chinna Andan kovil street, Karur District, TamilNadu -639301 Mobile No: 9489682473
Status	Individual

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Table No: 1.3 Land Particulars

State & District	Taluk,	Village	S.F.No.	Permissible for quarrying (Ha)	Ownership Occupancy
Tamil Nadu & Dindugul	Gujiliamparai	Thirukooranam	182/2(P)	3.00.0	Consent Patta land
			TOTAL	3.00.0	

1.3. BRIEF DESCRIPTION OF THE PROJECT

1.3.1. Nature and Size of the Project

Open cast Semi-Mechanized mining shall be adopted to raise the production in this area and transportation of ore and waste. The excavated Rough stone is used for building's basement stones and also used for crushing units and other infrastructure development work in and around the district.

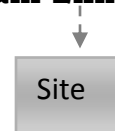
Geological resources of Rough Stone & Gravel is estimated as 419040m³ and mineable reserves is estimated at 322936m³ of rough stone up to a depth 18m and 33360m³ of Gravel up to a depth of 2m (Total depth of mining is 20m) after leaving necessary safety distance from the lease boundary. Production Schedule is proposed as 152281m³ @95% of Rough Stone for five years & 31958m³ of Gravel for three years and average production of Rough stone is 30456m³ per annum or 102m³ per Day. Average Production of Gravel shall be 10652m³/Year by open cast mining. The above said reserves and productions are as per Approved mining plan.

1.3.2. LOCATION OF THE PROJECT

The area is accessible from Dindigul to Aravakurichi by 47 km further travel 6km to reach Thirukooranam then 2km reach the site. There is an approach road located nearby the site on the East and southern side for transport of materials.

Route:

Dindigul 47 Km Aravakurichi 6Km Thirukooranam 2km



The area is represented by Survey of India Toposheet No. 58 F/14. It is given fig no 1.2. The location map is given in fig no 1.1. The area lies in the northern latitude of 10°44'36.82"N to 10°44'41.38"N and eastern longitude of 77°57'17.33"E to 77°57'25.31"E.

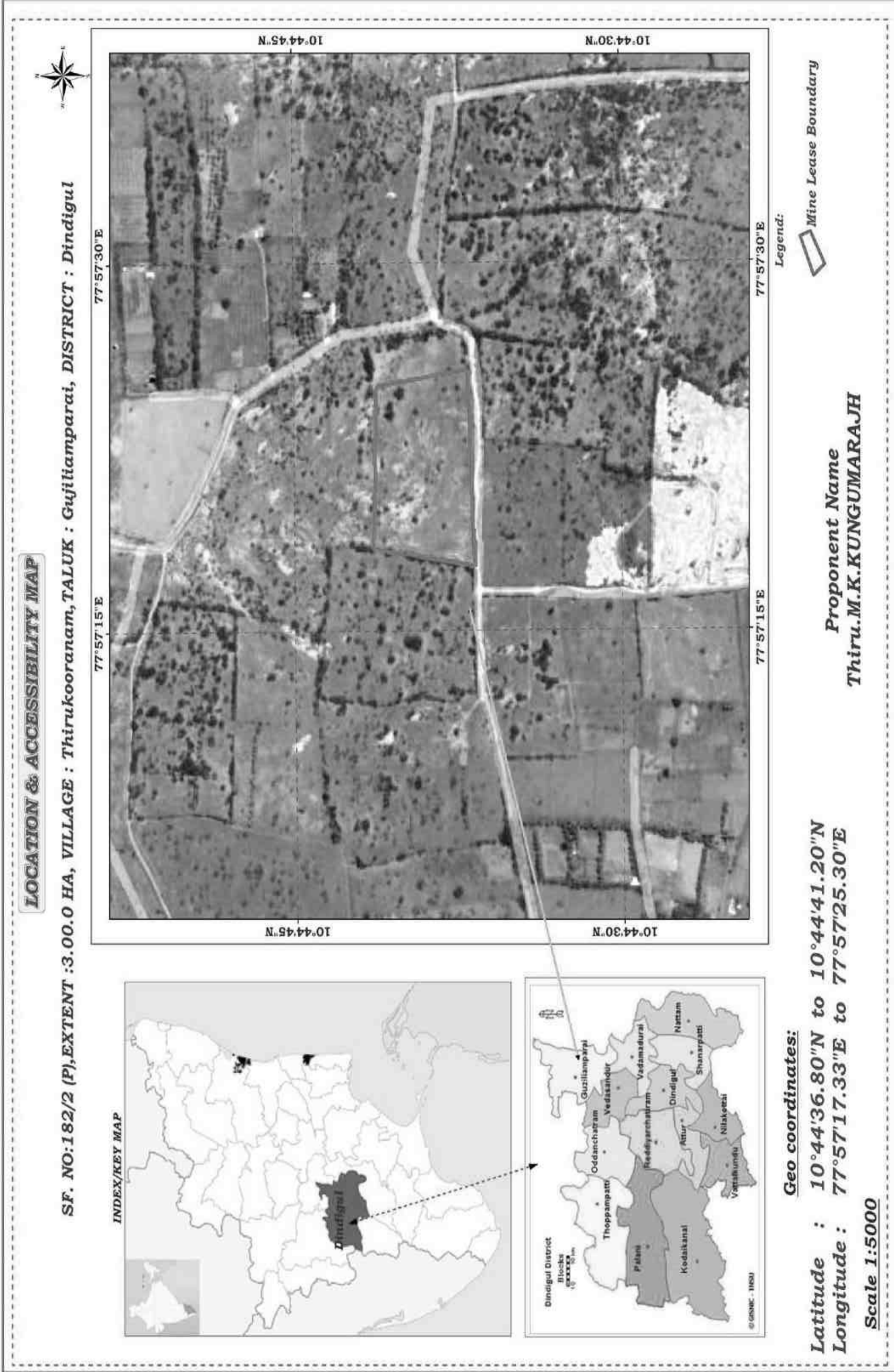


Fig.No.1.1: Showing Location and route map of Proposed quarry lease area

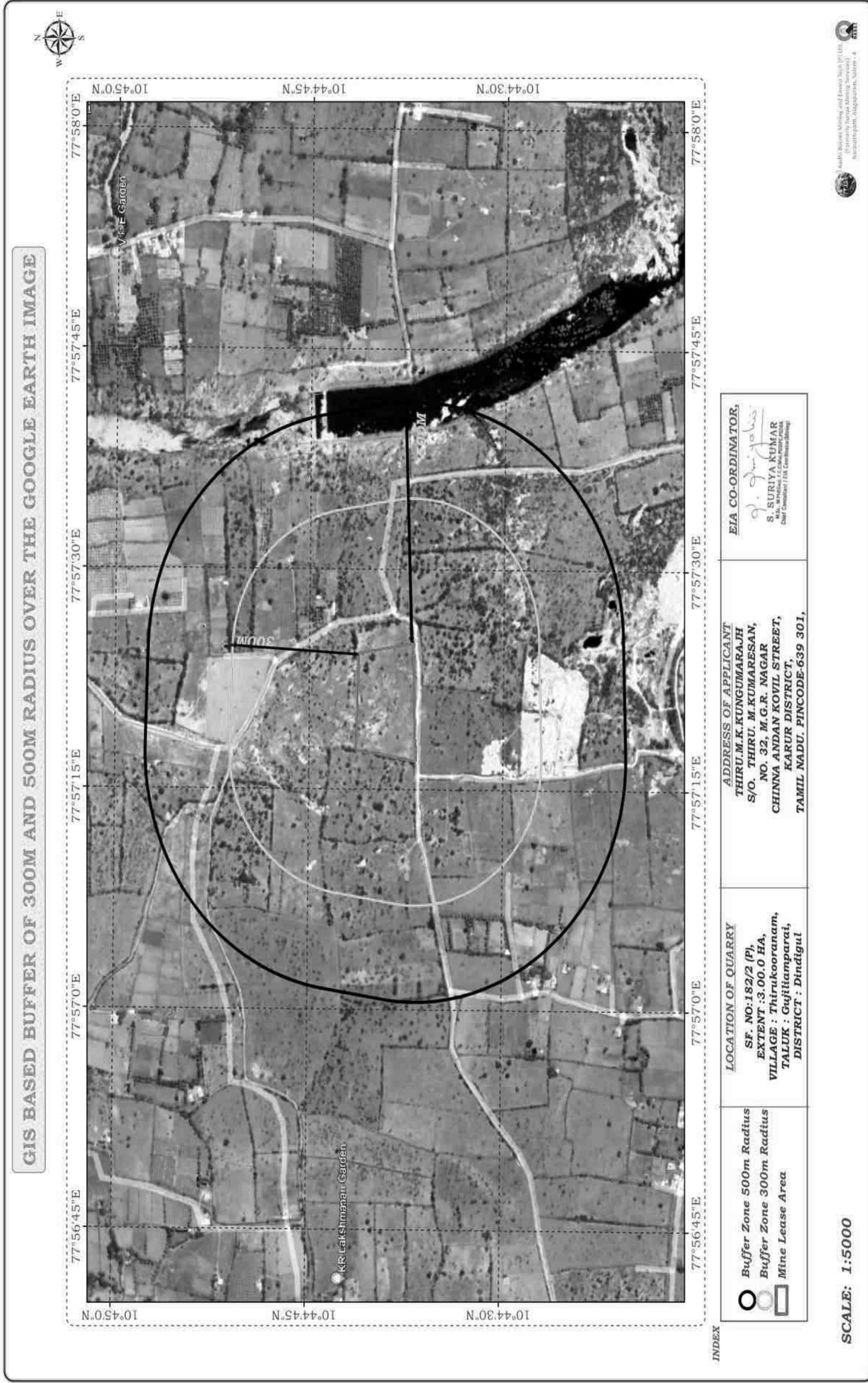


Fig.No.1.3: Google Earth Image showing 300m and 500m radius around lease area

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

1.4. SCOPE OF THE PROJECT

The proposal for Environment Clearance of Rough Stone and Gravel quarry lease of **Thiru. M. K. Kungumarajh**, requires Combined Environmental Impact Assessment (EIA) study to be carried out as per Standard, Specific and additional TOR specified by the SEAC. Based on the documents furnished for TOR, the Committee observed that the project falls under the category B1(Cluster) and schedule 1(a) of the EIA Notification, 2006 as the cluster area is greater than 5 Ha and less than 250 Ha. This is primarily to ascertain the potential impacts of the mining activity on environmental components, prediction and evaluation of environmental impacts to delineate Environment Management Plan.

The EIA/EMP report also includes an independent chapter prepared by an Accredited Consultant. The collection and analysis of air, water and soil sample required for preparation of EIA report data will be done by an Environmental Laboratory duly notified under the Environment (Protection) Act, 1986, accredited by NABET/NABL.

The scope of the study includes a detailed characterization of the environment in an area of 10km radius from the mine lease Area. The EIA covers one season baseline environmental data, as per the standard generic model given by the MoEFCC, New Delhi.

In order to assess the likely impacts arising out of this project on the surrounding environment and evaluating the quantum of likely negative impacts, if any, from this mine, the proponent has selected Aadhi Boomi Mining and Enviro Tech Pvt. Ltd., Salem as their EIA consultant for this project. ABM prepared an Environmental Impact Assessment (EIA) report and made an effective Environment management Plan (EMP) for various environmental components likely to be affected.

The scope covers all the conditions along with the specific and additional TOR prescribed by SEAC/SEIAA, Tamil Nadu vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022.

1.5 METHODOLOGY OF EIA STUDY

The EIA study includes detailed baseline data generation and characterization of existing status of environment in an area of 10km radius with the project as its Centre for various environmental components viz. air, noise, water, land, geo-

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

hydrology, Noise & Vibration, biological and socio-economic components and other parameters of interest. The envisaged scope of EIA is as follows:

- To assess the present status of air, biota, water, land, biological and socio-economic components of environment within 10km radius of study area from the project site.
- To identify and quantify the significant positive and negative impacts due to various mining operation in various components of the environment through identification and prediction of impacts
- To identify the impact and description of the impact with quantitative and qualitative data
- To prepare a detailed Environment Management Plan for implementation of mitigate measures
- To suggest a monitoring program to evaluate the effectiveness of mitigate measures
- Post-project environmental quality monitoring program to be followed

The baseline monitoring study has been carried out during the March to May 2022 for various environmental components so as to assess the anticipated impact on the environment and suggest suitable mitigation measures for likely adverse impacts due to the project. Environmental attributes, source and frequency of monitoring are outlined in Table No 1.4.

Table: 1.4Environment Attributes

S. No	Attributes	Parameters	Source and Frequency
1	Meteorology	Temperature, Wind Speed, Wind Direction, Rain fall, Relative Humidity,	Secondary sources of IMD station, Dindigul. Hourly recorded data for the period of 3months.
2	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x	8 hour samples twice in a week for three months at 5 locations.
3	Water Quality	Physical, Chemical and Biological parameters	Grab sampling at 3 locations once during study period.
4	Noise levels	Noise levels in dB(A)	At 5 locations data monitored once in a Month for three months for 24 hours during EIA study.
5	Soil Characteristics	Physical and Chemical parameters	Once at 3 locations during study period

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

6	Hydrogeology	Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected through field investigation devices once in a study.
7	Land use	Existing land use for different categories	Based on Survey of India Toposheet and Google Earth imagery
8	Ecology and Biodiversity	Existing terrestrial flora and fauna within 10Km radius	Field observation and utilization of Secondary data.
9	Socio–Economic aspects	Socio–economic and demographic characteristics, worker characteristics	Based on collection of primary data through questionnaire analyses and utilization of Secondary data from census records (2001 –2011), statistical hand books, topo sheets, health records and relevant official records.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances if any	Based on the findings of risk associated with explosives, landslides, slips and fire/explosion during blasting etc.,

The impacts of the project activities on environmental components can be quantified through EIA Studies within the impact zone of the project activities. The results of EIA Studies form the basis for the preparation of a viable EMP for mitigation of the adverse impacts.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

CHAPTER – 2: PROJECT DESCRIPTION

2.1. NEED FOR THE PROJECT

The applicant, **Thiru. M. K. Kungumarajh** residing at No.32, M.G.R Nagar, Chinna Andan kovil street, Karur District, Tamil Nadu has applied for quarry lease Rough Stone and Gravel quarry in a Consent Patta Land over an area of 3.00.0 hectares, located in S.F.No: 182/2(P) in Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu.

The mining plan was approved by Assistant Director, Department of Geology and Mining, Dindigul vide letter Rc.No.23/2022 (Mines), dated 24.03.2022. The proposed rate of production of Rough Stone is about 152281m³ up to the depth of 20m bgl (depth for five years -14m). The ultimate depth of mining is 20m bgl.

Rough stone is one of the important materials for the building construction. The rough stone is used as both as coarse aggregate and fine aggregate after the proper sizing of stone. The coarse and fine aggregate are essential for preparing concrete which is used in foundation, beam, column, roof slab work of the buildings. The infrastructure is the sign of development of nation. So it is very need to excavate the rough stone for economic and infrastructure development of our Nation.

2.2 DEMAND – SUPPLY GAP

The coarse and fine aggregate are the basic raw material for the building construction and the road formation. It takes place in all villages, towns, cities and metropolitan cities. There is great demand in availability of rough stone. So it is necessary to fulfill the demand by starting the proposed rough stone quarry.

2.3 LOCATION

The area is represented by Survey of India Topo sheet No. 58 F/14. The lease boundary with Geo Co-ordinates is shown in Fig no 2.1. The area lies in the northern latitude of 10°44'36.82"N to 10°44'41.38"N and eastern longitude of 77°57'17.33"E to 77°57'25.31"E. Latitude and Longitude of all boundary Pillars are given below,

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

Table No-2.1 Co-ordinates of Quarry lease Boundary Pillars

Pillar Id	Latitude (N)	Longitude (E)
1	10°44'36.82"N	77°57'17.33"E
2	10°44'41.38"N	77°57'18.03"E
3	10°44'41.21"N	77°57'24.62"E
4	10°44'37.05"N	77°57'25.31"E

- No Trees will be uprooted due to this quarrying operation.
- The existing road from the main road to quarry is in good condition and the same will be maintained and utilized for Transportation of Rough stone & Gravel.
- There will be no Export of this quarrying Rough stone

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru.M.Thiruvappu, Rough Stone and Gravel Quarry, Virudhunagar District

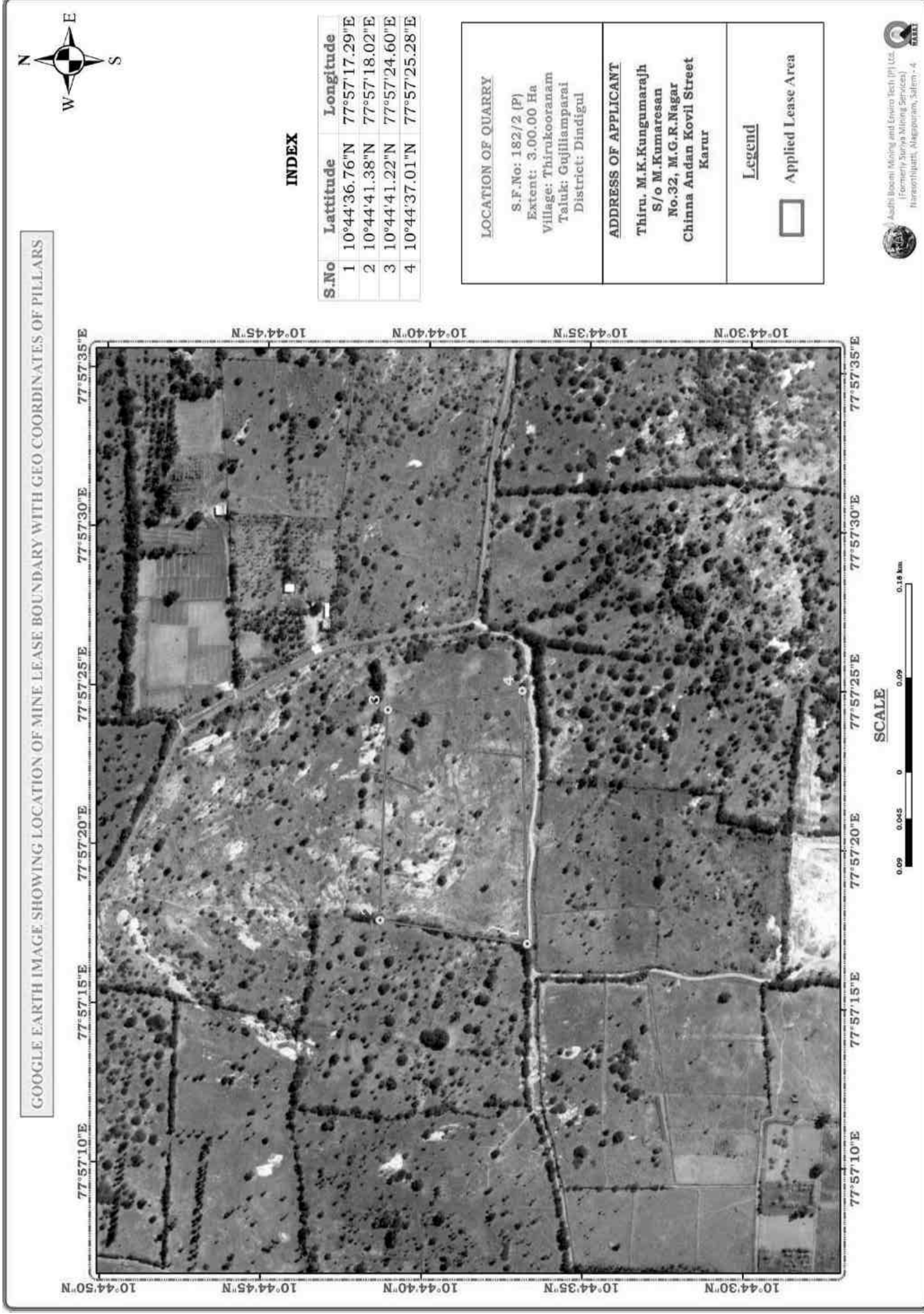


Fig.No.2.1: Google image showing lease boundary and Coordinates of the Quarry

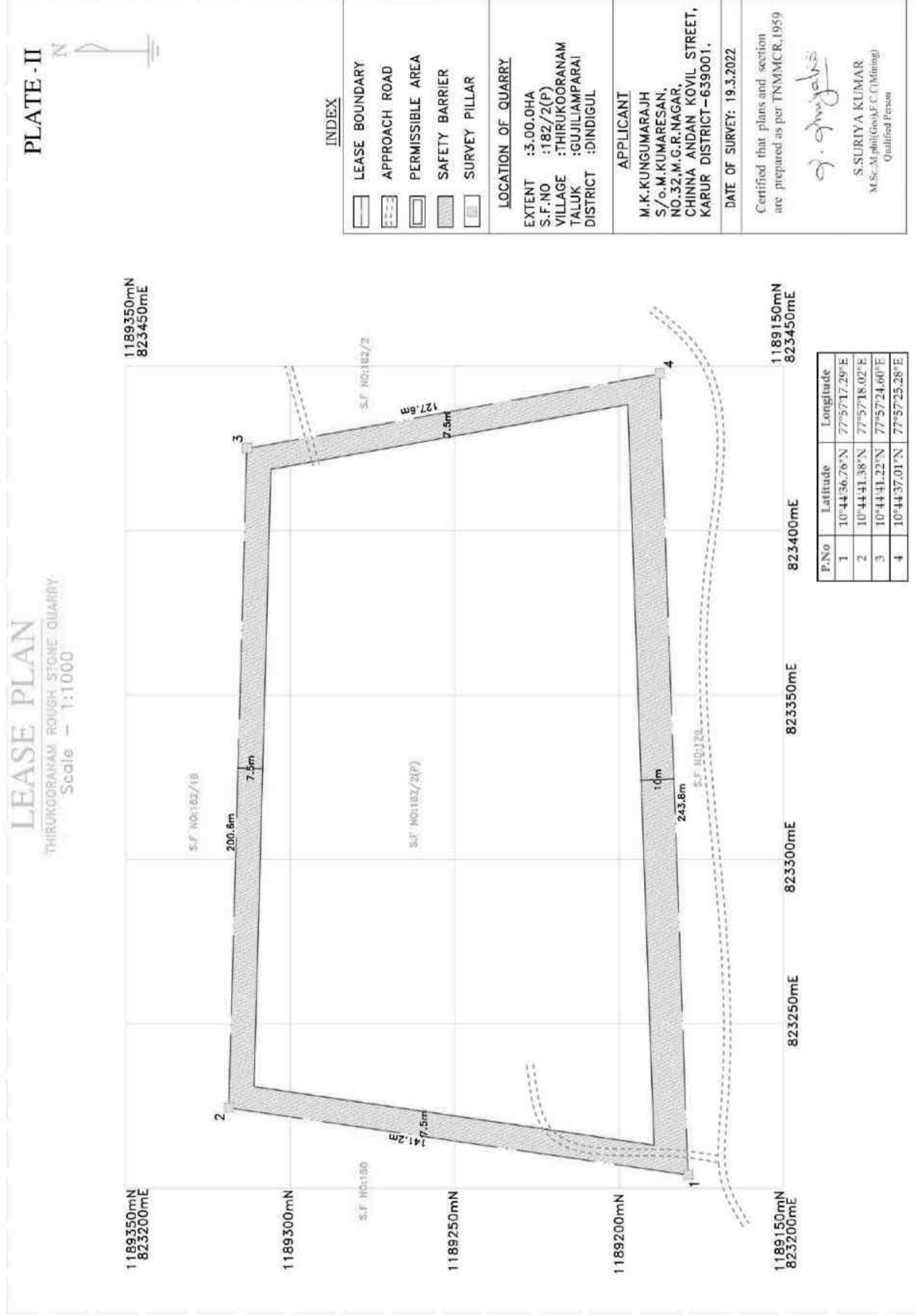


Fig.No.2.2: Lease Plan

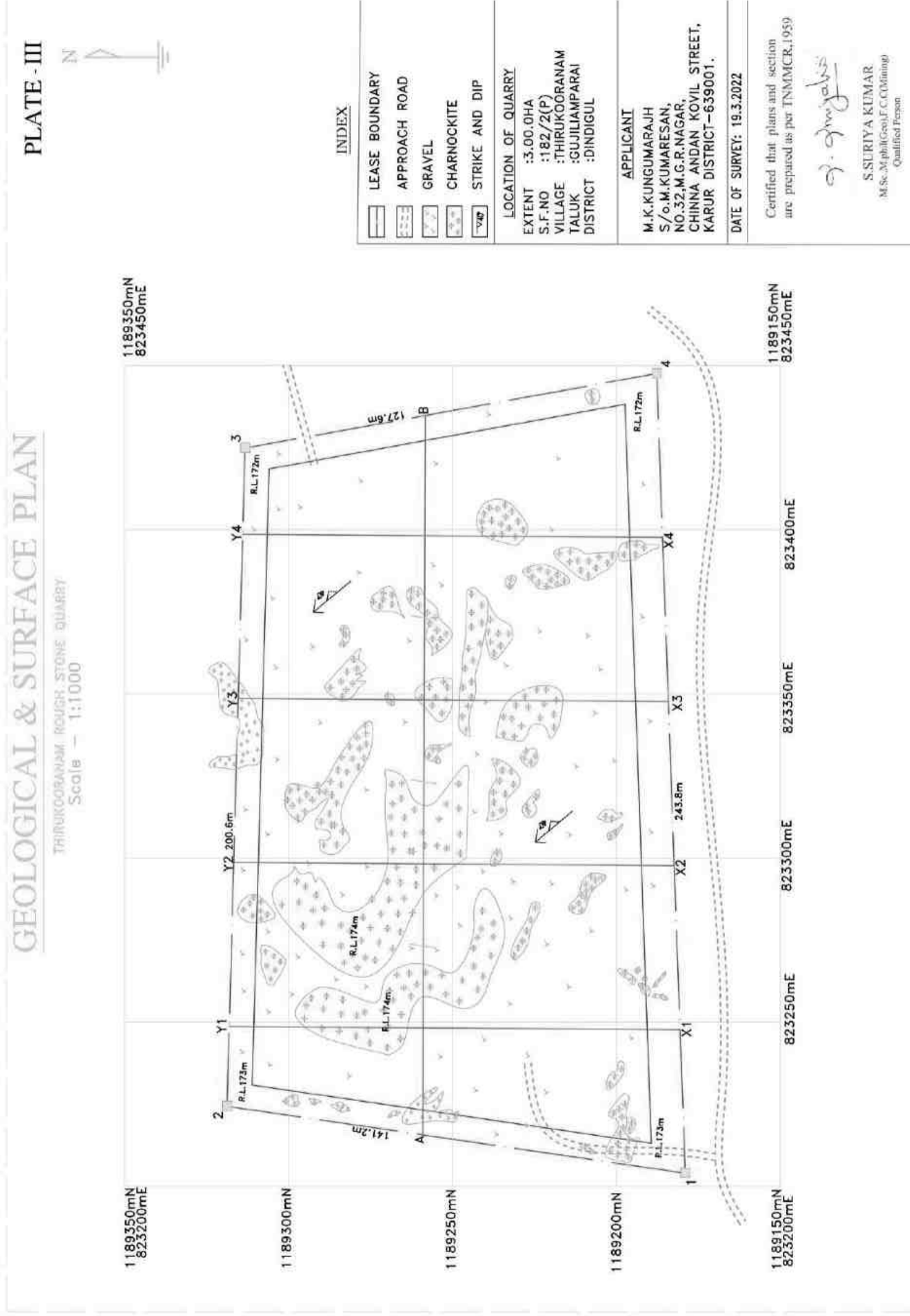


Fig.No.2.3: Geological & Surface Plan

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District



Fig. No. 2.4 Photograph shows general view of lease area



Fig. No. 2.4.1 Photograph shows outcrops of Rough stone and GPS coordinates taken at Pillars

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District****Table 2.2.: Environmental Settings**

Project Details				
Proponent	Thiru. M. K. Kungumarajh			
Total Mine Lease Area	3.00.0 Ha - Rough Stone & Gravel quarry			
Survey No.	182/2 (P)			
Site Location	Thirukoornam Village, Gujiliamparai Taluk, Dindigul District, TamilNadu.			
Geographical Co-ordinates	Latitude: 10°44'36.82"N to 10°44'41.38"N Longitude: 77°57'17.33"E to 77°57'25.31"E			
Toposheet No.	58 F/14			
Elevation	Elevation of the area is 173m above MSL			
Accessibility				
Nearest Habitation	98m - NE			
Nearest Village	Kanchamaranpatti – 905m - SW			
Nearest Settlement	Name of Village	Direction	Distance from Mines (Approx.)	Population
	Thirukoornam	N	1.5 km	2210
	Vellodu	E	2.5 km	3147
	koombur	S	2.5 km	3584
	Pallapatti	N-W	7 km	4807
Nearest Town	Aravakurichi – 5.4km - NW			
Nearest Roadway	NH 44 – 3.5km – South west side –Salem - Dindigul SH 193 – 5.7km - West side – Aravakurichi - Dindigul MDR 37 – 2.2km – North side Aravakurichi – Attamed Village road – Adjacent to lease area - S			
Nearest Railway station	Palayam Railway Station – E- 19km			
Nearest Airport	Trichy International Airport–82km – E			
Environmental Sensitiveness				

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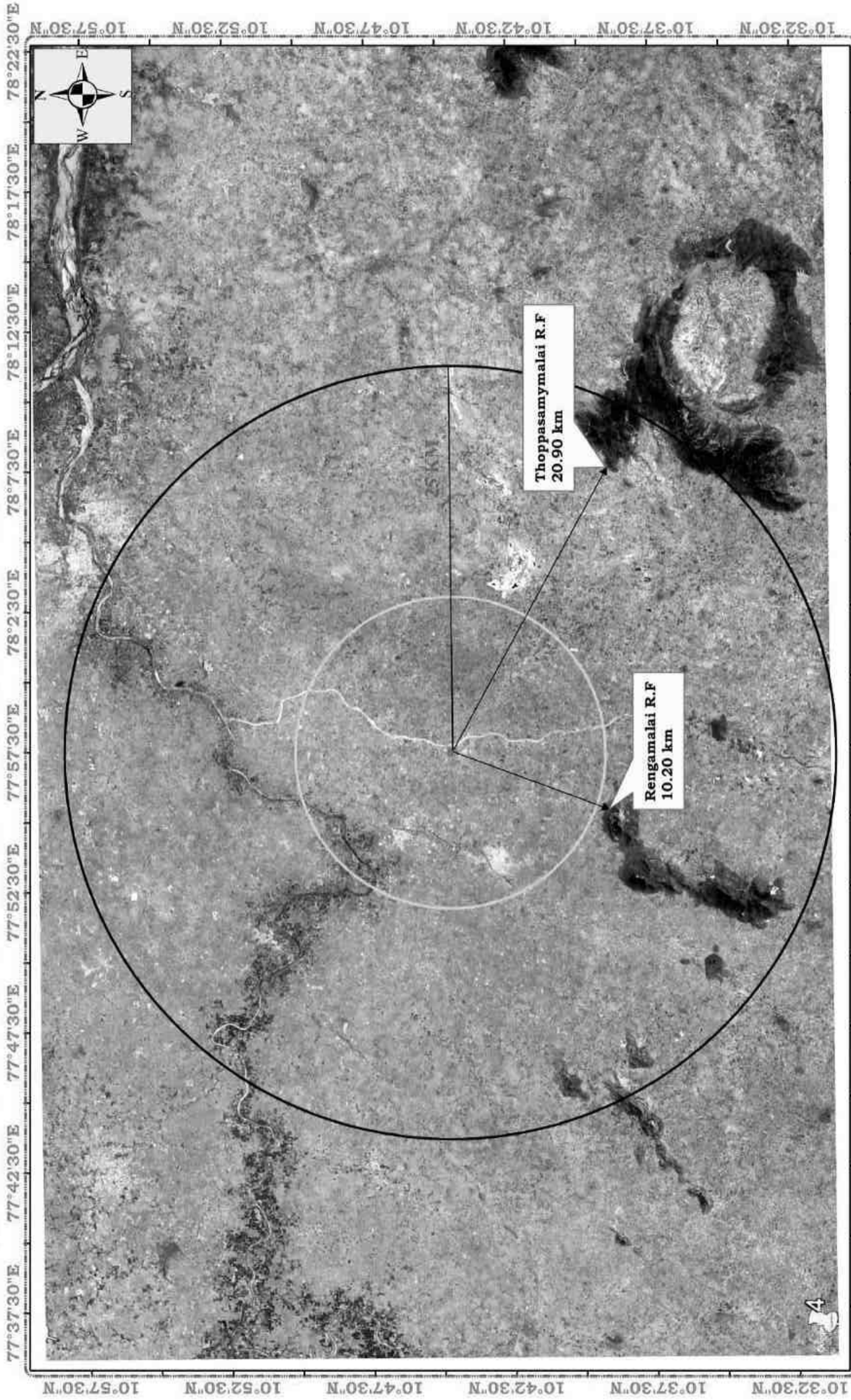
Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

Interstate Boundary	There is no interstate boundary within 15km radius. Tamil Nadu – Kerala Interstate boundary is located 93 km away from lease area in South west direction.
Coastal Zone	Bay of Bengal is located 154 km away from lease area in SE direction.
Reserve Forest	There is no Reserve forest and wild life sanctuaries found within 10km radius. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE The proposed project site does not attract Forest Conservation Act, 1980.
Wildlife sanctuary	Nil within 10km radius. The Proposed project site does not the Wildlife (Protection) Act, 1972.
Water bodies	<ol style="list-style-type: none">1. Godavanar River – 435m – E2. Kodavanar Check dam – 450m – E3. Alamarathupatti lake – 1.3km – NE4. Small odai – 1km – NE5. Amaravathi river – 8.2km – NW6. Nanganji River – 5.1km - W
Defense Installations	Nil within 10km radius
Critically Polluted area	Nil within 10km radius
Quarries around 500m radius	Two existing quarries, one abandoned quarry and one present proposed quarry are located within the 500m radius from the lease boundary of the proposed project site. Total Cluster area : 9.1432 Ha AD Cluster Letter: Rc.No: 23/2022 (Mins), dated: 01.04.2022
Seismic zone	Zone-II, Low damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

GOOGLE EARTH IMAGE SHOWING LOCATION OF RESERVE FOREST AROUND 10KM AND 25KM RADIUS

S.F.No: 182/2 (P),Extent: 3.00.00 Ha,Village: Thirukooranam,Taluk: Gujiliamparai,District: Dindigul.



SCALE: 1:225,000

APPLICANT

Thiru. M.K.Kungumarajh
 S/o M.Kumaresan



Aadhi Boomi Mining and Enviro Tech (P) Ltd.
 (Formerly Suriya Mining Services)
 Narasothipatti, Alagapuram, Salem - 4



Fig No.2.5: Google Earth Image showing 10 km radius around Proposed Project site

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

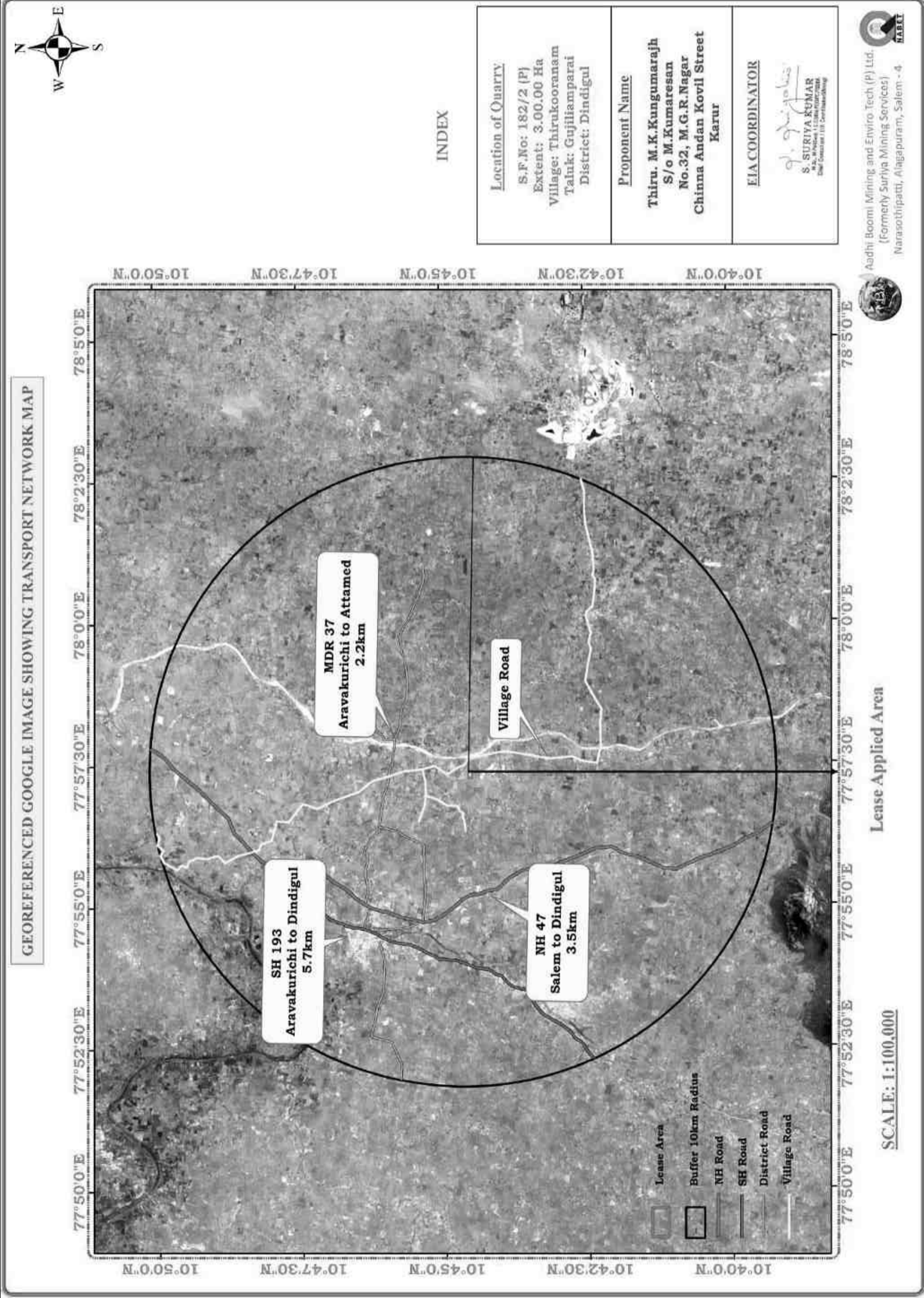


Fig.No.2.6: Google Earth Image showing Transport Network of 10 km radius around Proposed Project Site

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

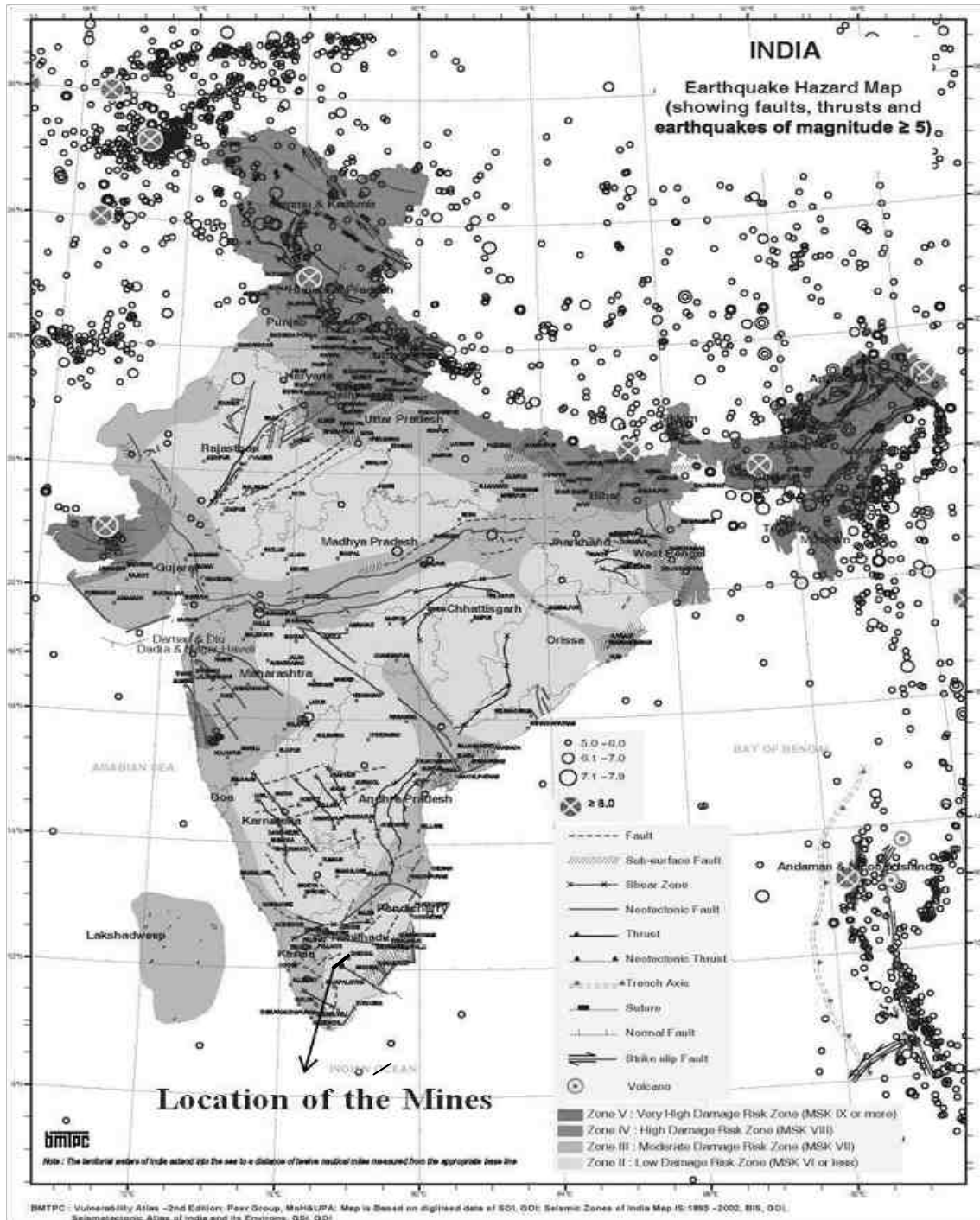


Fig No: 2.7 Earthquake Hazard Map

The area falls under Zone-II, Low damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

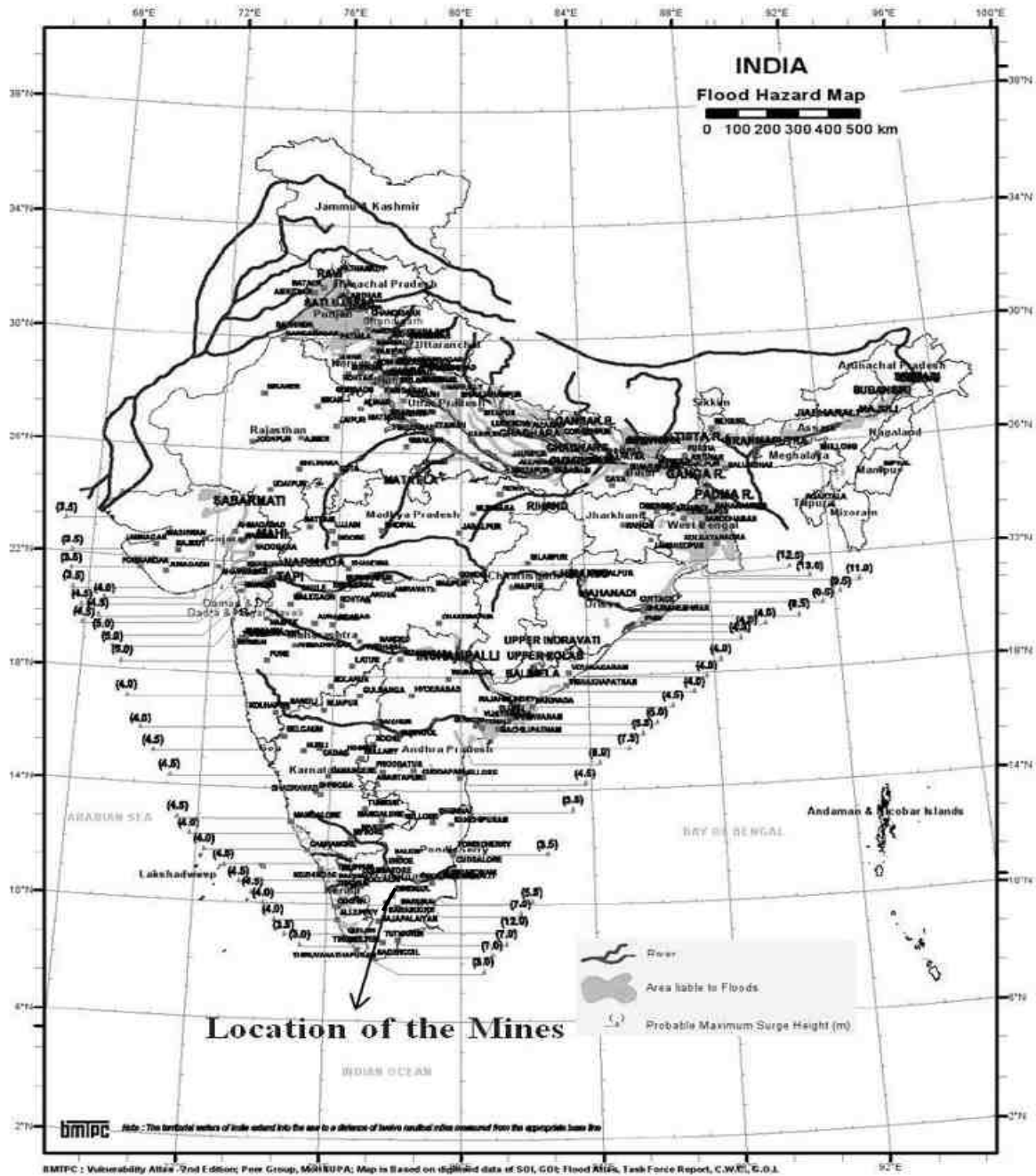


Fig No: 2.8 Flood Hazard Map

The area falls under Probable Maximum Surge Height of 5m.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

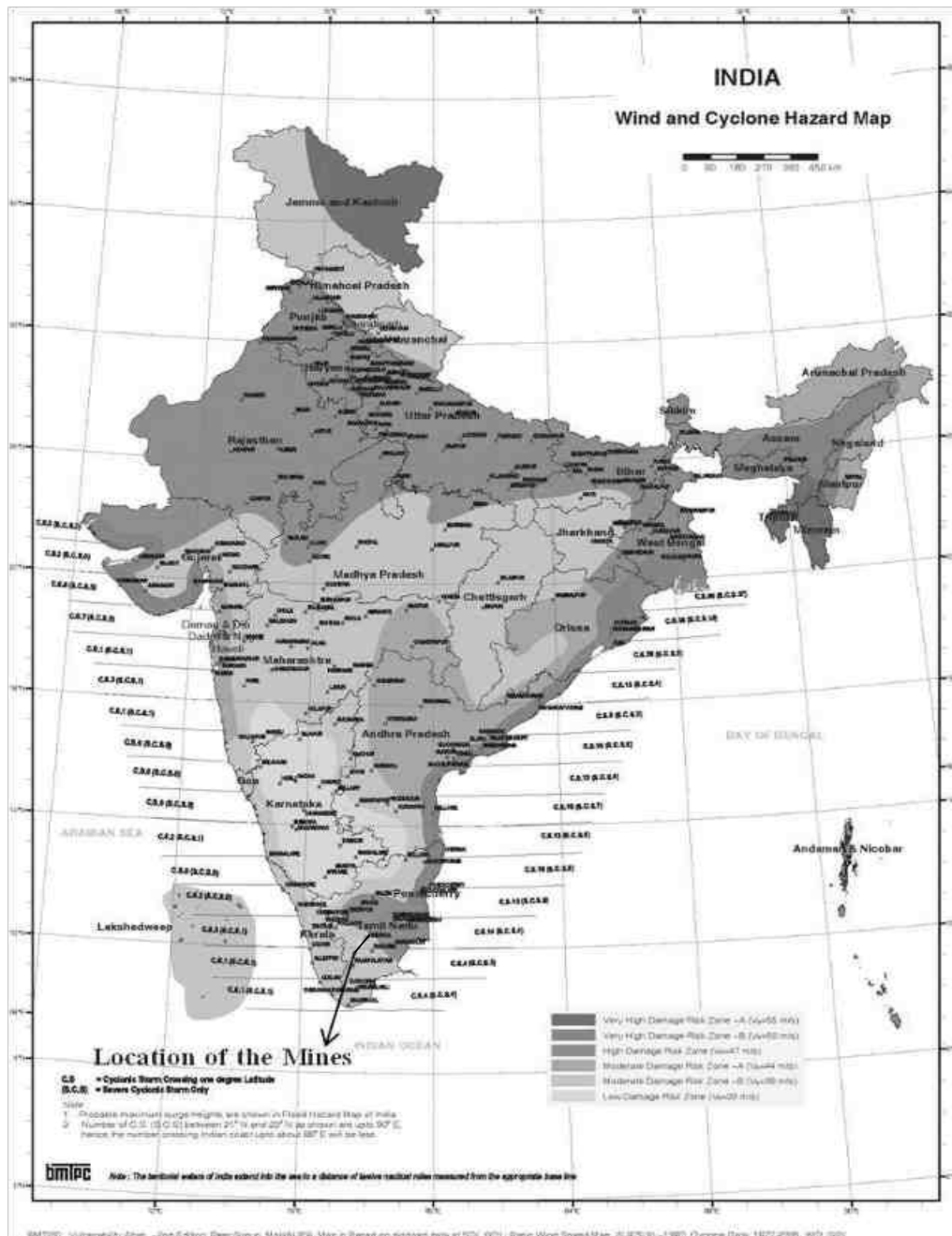


Fig No: 2.9 Winds and Cyclone Hazard Map

The area falls under Low Damage Risk Zone-B ($V_b = 33$ m/s).

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.4 Size or Magnitude of Operation

Table 2.3: Mining Details

Particulars	Details
Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	419040m ³
Mineable reserves	322936m ³ of Rough Stone & 33360m ³ of Gravel
Production (95%)	Rough stone – 152281m ³ for five years or 30456m ³ per annum(Avg) Gravel – 31958m ³ for three years or 10652m ³ per annum
Top soil	Gravel – 33360m ³ - 2m
Ore: Waste ratio	1: 0.052
Depth of Mining	14m bgl (for first five years) and 20m bgl (Ultimate Depth)
Water Table	30 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 Years (To be granted)

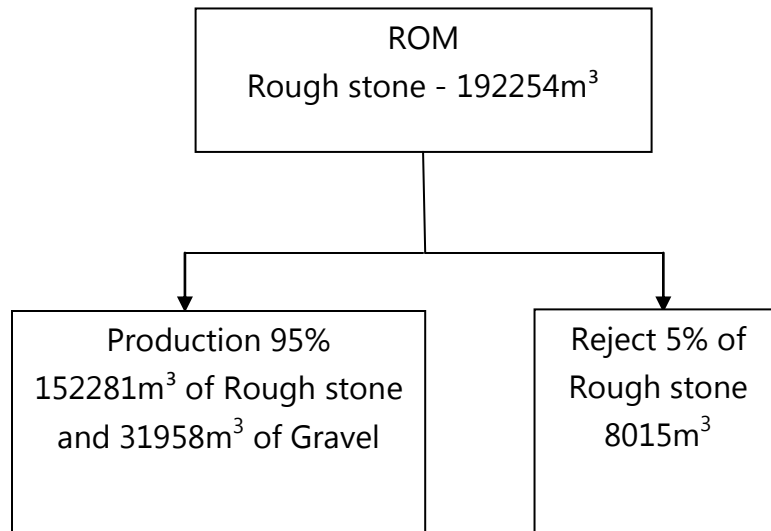


Fig.2.10: Material Balance

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.5 Proposed schedule for approval and implementation

The proposed activity will be commenced only after obtaining Environment Clearance from SEAC/SEIAA, Tamil Nadu and CTE/CTO from TNPCB and other necessary clearance from concerned departments.

2.6 Technology and process description

2.6.1 Regional Geology

Crystalline rocks of Archaean to late Proterozoic age occupy over 80% of the area of the state of Tamilnadu, while the rest is covered by Phanerozoic sedimentary rocks mainly along the coastal belt and in a few inland River valleys. The hard rock terrain comprises predominantly of Charnockite and Khondalite groups and their migmatitic derivatives, supracrustal sequences of Sathyamangalam and Kolar groups and Peninsular Gneissic Complex (Bhavani Group), intruded by ultramafic-mafic complexes, basic dykes, granites and syenites. The sedimentary rocks of the coastal belt include fluviatile, fluvio-marine and marine sequences, such as Gondwana Supergroup (Carboniferous to Permian and Upper Jurassic to Lower Cretaceous), marine sediments of Cauvery basin (Lower Cretaceous to Paleogene), Cuddalore /Pannambarai Formation (Mio-Pliocene) and sediments of Quaternary and Recent age. Geological map of Tamilnadu is given below:

The general geological sequences of the rocks in this area are given below:

The geology of the area is characterised by contrasting lithological associations that are grouped under Sathyamangalam Group, Khondalite Group, Charnockite Group, Migmatite Complex, and Bhavani Gneissic Complex of Archaean/ Pre-Cambrian age, younger basic and acid intrusives are of Proterozoic age and kankar/ calcretes belonging to Quaternary age.

The Sathyamangalam Group of rocks comprises Quartzites □ Fuchsite □ Sillimanite □ Talc-Tremolite, Actinolite schist, Amphibolite, Amphibolite, Gabbro and Pyroxenite. These litho units occur as thin bands, pods and lenses of various dimensions within Charnockites and Hornblende Biotite Gneisses. Quartzite bands are co-folded with Amphibolite and Pyroxenite.

Talc-Tremolite-Actinolite schists occur as small oval to bean-shaped bodies in Hornblende Biotite Gneiss in the Southeast. Gabbros and Pyroxenites are distributed in

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

the valley portion in the Northeast and in Southern plains. A thin band of Amphibolite occurs in the North.

The Charnockite Group is represented by Charnockite and Banded Magnetite Quartzite. Charnockite, a greasy looking rock, is confined to the Northern part occupying the hills and the intervening valley. It is light to dark Grey in colour, medium to coarse to Pegmatoidal and consists of bluish Grey Quartz, Grey Feldspars, Pyroxenes (opx) □ Hornblende □ Biotite and opaques. It has a NNW-SSE trend with moderate to steep dips towards SSE or vertical in disposition. The rock is intruded by basic and ultrabasic rocks and basic dykes. Banded Magnetite Quartzite occurs as very thin bands within Charnockite.

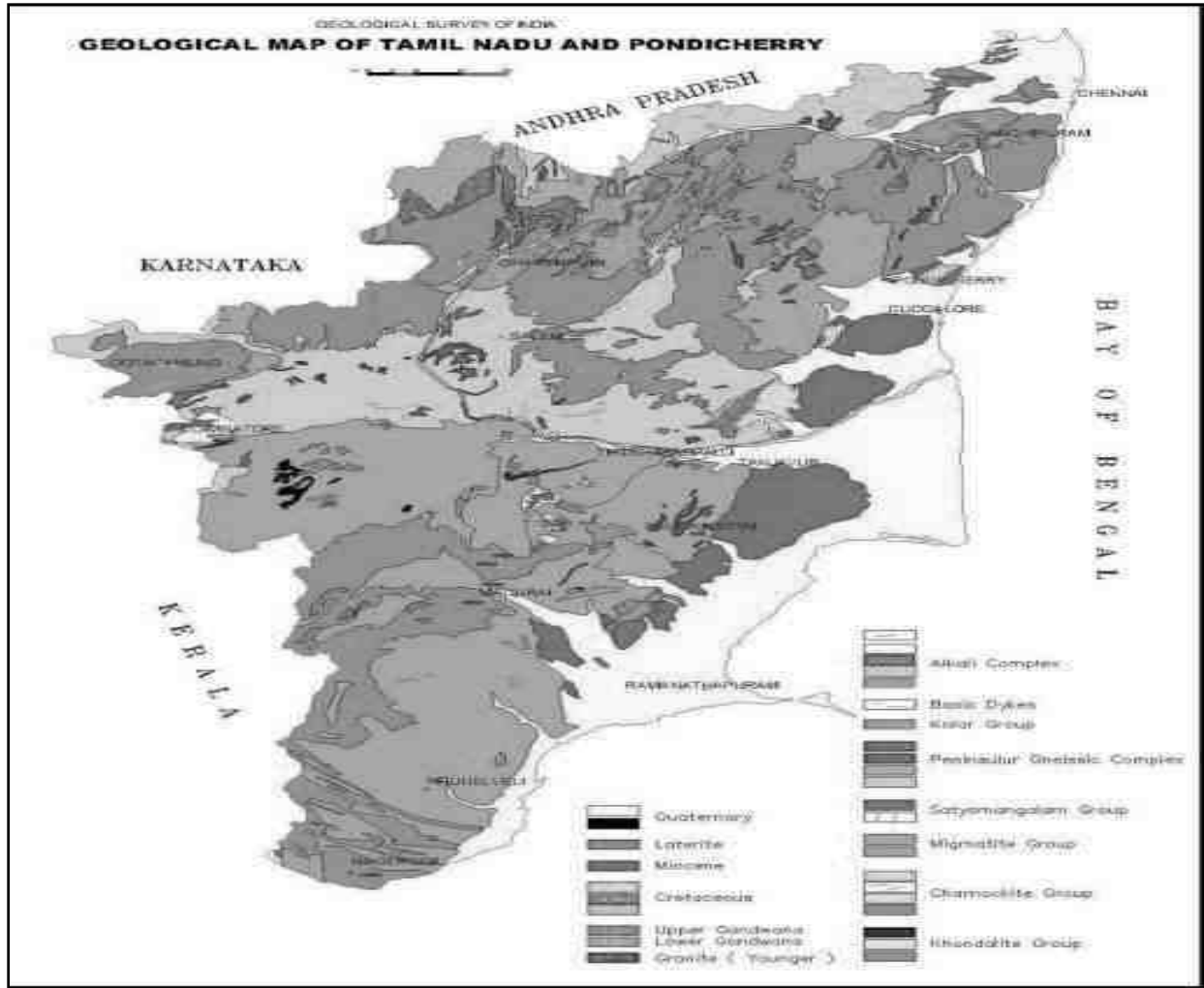
The Khondalite Group is represented by Quartzite, Garnetiferous Sillimanite Gneiss and Calc Granulite. Quartzite occurs as thin bands associated with basic Granulites in a Gneissic country in the central part. Garnet Sillimanite Gneiss is restricted to the East where it forms persistent bands upto 50 m width occupying higher elevation of Perumal Malai. The rock is associated with Pyroxene Granulite and Garnetiferous Quartzofeldspathic Gneiss. Calc Granulite is confined to the North East and shows typical ribbed weathering and contains Calcite, Plagioclase, Feldspar, Garnet and Diopside.

The Bhavani Gneissic Complex, comparable to the Peninsular Gneissic Complex, is roughly confined to the Southern half of the area. It is made up of Hornblende-Biotite and Biotite Gneisses exhibiting a distinct fissility. The Gneisses contain enclaves of the

<u>Era</u>	<u>Group</u>	<u>Formation</u>
↑ -----	Recent age -	---- -Topsoil-Red soil (1-2m thick)
-----	Proterozoic -	---- - Acid intrusives –Quartz vein pegmatite veins Granite
-----	Archaean Proterozoic -	---- Migmatites /Basic/Ultra basic Intrusives /Charnockite Group / Khondalite Group

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District



2.6.2. Geology of the lease area

The proposed lease area is an almost flat terrain with small outcrops, 172 m above MSL. Small outcrops of gneissic rocks are exposed on the south side of the lease area. No toxic elements or any other heavy mineral is found in this area. The "Gneissic rock contains Quartz and feldspar identified by grayish white in colour, pearly luster on cleavage faces. The outcrops are clearly visible in the entire strike length of the bands. The outcrops band is mapped using GPS and total station to generate a contoured geological map in 1:1000 scale after georeferencing of the cadastral map.

This lease area is suitable for construction purposes because of its high strength, colour, high density, low porosity etc. the proportion of quartz shall be more than ortho

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

feldspar and thereby chemical resistance resist weathering and uniformly grained materials of sand and grits are useful for making aggregates. The Gneissic rock body running NW 40° direction and dipping 60° towards north, the reddish topsoil covers up to a depth of 1m. At places, quartzo feldspathic and mafic layers are segregated giving rise to banded structures. Biotite and hornblende gneisses are common. The gneisses are highly weathered up to 2mts depth. It is mainly used in fencing stone and Stone crushing units and size reduced in to ½, ¾ and 1½ inches Jelly and M sand, P sand which are mainly used in road and building construction purpose.

2.6.2.1 Exploration

The proposed area is an almost flat terrain with small outcrops exposed. No explorations in like boreholes/trenches are carried out.

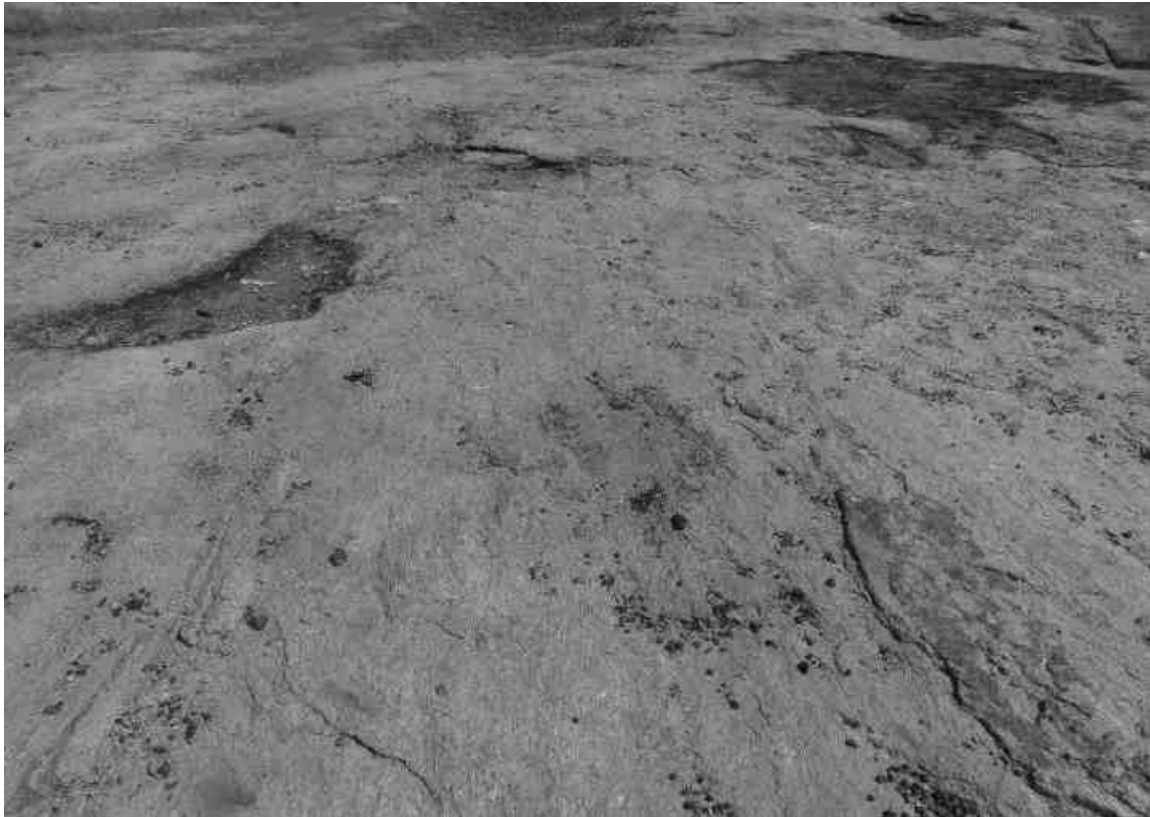


Fig No 2.11 Close view of colour of Rock Formation

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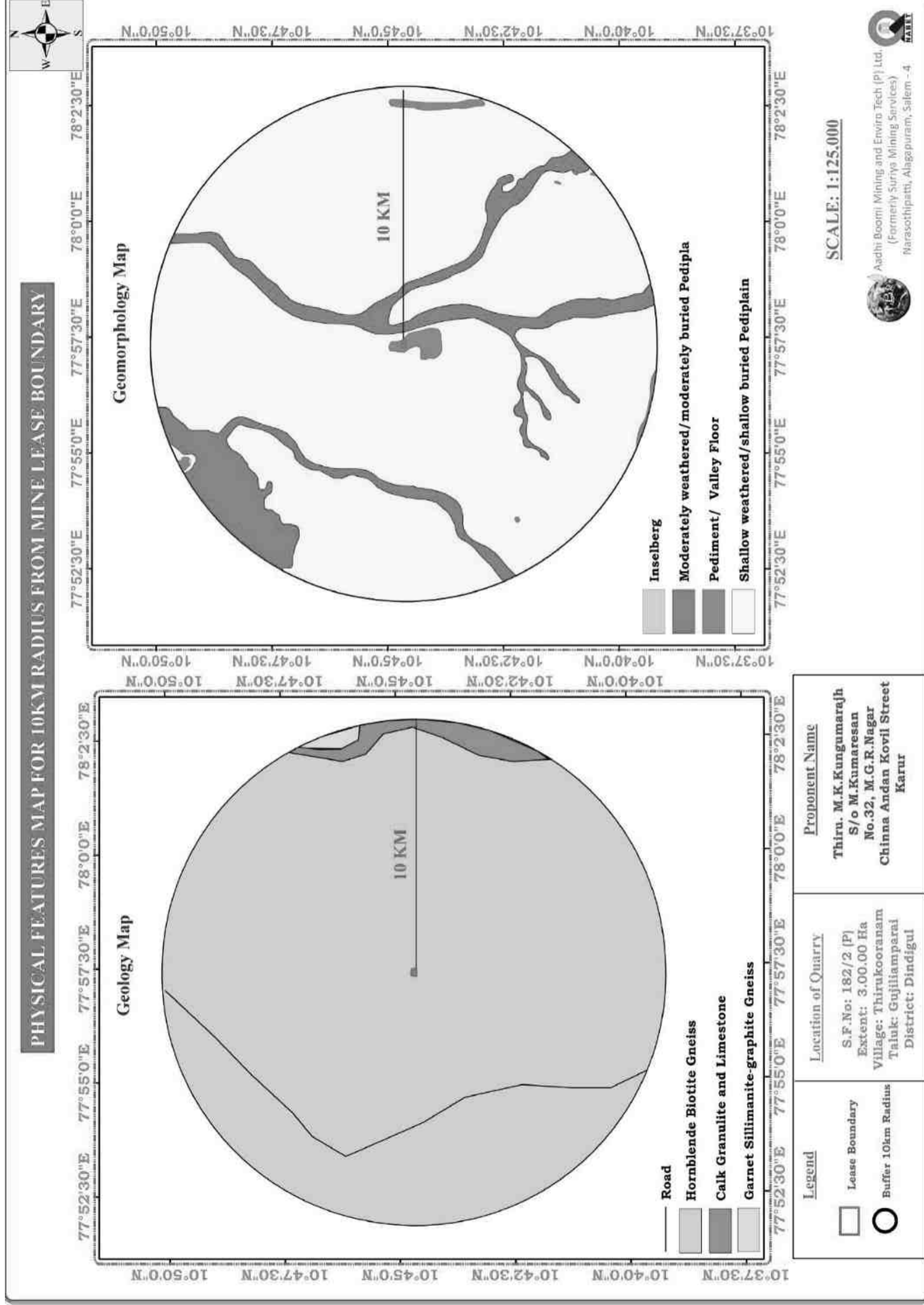


Fig.No.2.12: Regional Geology and Geomorphology Map

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.6.3 Method of Mining

a) Open cast working:

Semi-Mechanized opencast quarrying method will be adopted for exploiting the rough stone. Before opening a mine, several aspects should be considered like construction of semi-permanent structures, planning for the development / production works, formation of faces, lying of approach road to various benches for movement of dumpers, recruitment of man power, deployment of machinery, selection of dump sites, stacking yards etc.

Hydraulic excavators and tippers in combination will be utilized to recover the sizeable rough lumps and deliver to the crushing plant to get the required size of M. Sand, ½, ¾, 1½ inches and Jelly chips, etc. Bench height is designed as 6m based on boom height of excavator (8.5m) and permitted additional height of 1.5m for hard formations as per Reg. 106 (2) (b) of MMR, 1961. The bench slope is 60°. S1 fencing shall be constructed at the top of high benches in order to safe guard the unauthorized entry of men and machinery. In the case of entry and exit of pit(s), G1 fencing as a parapet should be made to control tress passes.

Gravel shall be removed and used for construction and afforestation purposes.

b) Mode of working:

The quarry operation involves drilling, muffle blasting, excavation, loading and transportation of Rough stone and gravel to the needy crusher/other buyers. The production of Rough stone and gravel in this quarry involves the following method which is typical for Rough stone and gravel quarrying in contrast to other major mineral mining.

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 pit head to the needy crusher/other buyers.

2.6.4 Extent of Mechanization

The following machinery is proposed to be exclusively for the development and production work at this quarry. The machinery is proposed to be purchased or engaged on hire basis.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

i) Drilling equipment:

Drilling of shot-holes will be carried out using compressor and Jack Hammers combination on hire basis. Depth of holes shall be 1-2m. The spacing shall be 0.75m and burden shall be 0.60m from the preface. To achieve a correct blasting geometry certain amount of trial blast is prerequisite to effect a perfect pre-determined fragmentation and fly rock control. In case of heavy blasting qualified mine manager has to be appointed for proper calculation of powder factor and control blasting sequencing and arrangement of explosives etc. Details of drilling equipment's are below as

Table No 2.4: Details of drilling equipment

Type	Nos	Dia.of hole	Bucket/ Capacity (m ³)	Make	Motive Power	H.P
Jack Hammer	4	32mm	Hand held	Atlas copco	Air	5.5Kgs/ m ³
Compressor	2	-	-	Ford Track	Diesel	80

ii) Loading Equipment:

Loading of waste and reject materials shall be done by excavator into 15 tonnes tippers from the working place periodically. Such waste and Rough stones shall be dumped in the site earmarked for dumping as shown in the Fig. No. 2.16 (Plates no-VB). The applicant is proposed to engage one hydraulic excavator with 1.2 Metric tons capacity and two tippers of 10 tonnes capacity for internal transport of rejects from the working face to the dumps. Details of loading equipment are tabulated below,

TABLE NO-2.5: Details of loading equipment

Type	Nos	Bucket/Capacity(m ³)	Make	Motive Power	H.P
Hydraulic excavator	1	1.20m ³	Hitachi	Diesel	EX 200

iii) Transportation:

Transport of Rough stone, Rejects and waste shall be done by Tippers of 10 tonne capacity,

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

TABLE NO-2.6: Details of transportation equipment

Type	Nos	Size/Capacity(m ³)	Make	Motive Power	H.P
Tipper	2	10M.T	Ashok Leyland	Diesel	120

iii) Blasting Pattern

The massive formation shall be broken into pieces of portable size by jack hammer drilling and shot hole blasting. Powder factor of explosives for breaking such hard rock shall be in the order of 7 tons per Kg of explosives. Blasting parameter proposed to be adopted for shot holes shall be,

Depth (m) * Burden (m) *Spacing (m)	= Volume (m ³)
1.00 x 0.60 x 0.75	= 0.45 m ³
Quantity of broken rock per hole	= 0.45 x 2.6 = 1.17 MT
Blasting efficiency @90%	= 1.17 x 90% = 1.05 MT/hole
Charge per hole	= 140 gm of 25 mm dia. cartridge.
Quantity of rock broken per day	= 107m ³ or 267 M.T.
Requirement of explosives per day	= 38 Kg (@7 M.T. per Kg explosives)
No. of holes to be drilled per day	= 267MT/1.05= 254 Holes

iv) Types of Explosives

Following explosives are recommended for efficient blasting with safe practice.

TABLE NO- 2.7: Explosives Details

S.No.	Description	Class / Division	Type	Size
1.	Detonators	class – 3 Div -1	Ordinary and Electric (OD & ED)	6.5 x 32
2.	Safety fuse	class - 3 Div - 1	Blue sump fuse coils of 10 m ³ s each	---
3.	Slurry	Class -3 Div -1	Nitro compound slurry	25mm

Slurry explosives will be initiated directly by blue sump fuse with ordinary detonators or electric detonators. The Powder factor for waste rock development shall be 7 Tonnes per Kg. of explosives.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

The following steps shall be adopted to control ground vibration during blasting. Geometry of blasting pattern like burden, spacing and inclination of hole should be

Burden (m)* Spacing (m) Inclination
0.60 x 0.75 70°

- ❖ High strength explosives like slurry in the form of cartridge should be used. ANFO mixture for shot holes should not be used which may cause huge fly rock fragments in view of critical diameter problem.
- ❖ To control vibration abatement, use delay or relay arrangements with specific charges.
- ❖ Charge per hole should exceed the powder factor designed for each hole based on quantum of blasting, strength of rocks, fracture pattern etc.
- ❖ In case any objection from the public, a long trench in the direction of blasting near lease boundary may be opened to a depth of 2m to control longitudinal waves (P-waves) to arrest any damage to infrastructures.
- ❖ If any building lies within 50m, muffle blasting practice may be followed in addition to the regular safety procedures and the charge per blast hole shall not exceed 2kg as specified by DGMS.
- ❖ Any other method of safety measures shall be advised to the Applicant as and when required by the qualified Mine Manager.

v) Storage of explosives

The Applicant is advised to store the explosives as per the Indian Explosives Act, 1958 and the Explosive Rules, 1983. Necessary permissions should be obtained from the Joint Controller of Explosives to store and uses of explosives in the quarry in the magazine permit under Form -23 or Agreement shall be made with holder of Form-22 who can supply and fire explosives as per safety practices. However, blasting in the quarry shall be done as per MMR 1961 under the supervision of Mines Blasting certificate holder appointed under Reg160 of Metalliferous Mines Regulations, 1961.

2.7 Land Use Pattern of the Core Zone

The proposed area is flat terrain, composed of gravel with elevation about 173m above mean sea level. The table indicating the area put on use at start of plan and additional requirement during plan period for calculation of net area and the area considered for reclamation has given below.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

Table No 2.8: Computation of present and proposed land use pattern

S.No	Head	Area put on use at start of plan (Ha) (Present)	% of Use	Total Area used at the end of plan (Ha)
i)	Mining area	----	---	1.64.60
ii)	Road	----	---	0.01.10
iii)	Green belt & Safety area	----	---	0.64.30
iv)	Labor shed	----	---	0.00.80
v)	Virgin	3.00.0	100%	0.67.20
Total		3.00.0	100%	3.00.0

2.8 ESTIMATION OF RESERVES

a) GEOLOGICAL RESOURCES

The geological resources is estimated by cross sectional method is as 419040m³ of Rough Stone & Gravel up to a depth of 20m from the surface, having considered the depth of mining, recovery, safety barriers etc. A detail of estimation of geological resources is given in the Table no –2.9.

TABLE NO-2.9: Computation of Geological Resources and Reserves

SECTION	L (m)	W(m)	D(m)	Volume m ³	Recovery @95%	Reject @5%
AB-X1Y1	50	120	18	108000	102600	5400
AB-X2Y2	50	116	18	104400	99180	5220
AB-X3Y3	50	113	18	101700	96615	5085
AB-X4Y4	53	110	18	104940	99693	5247
TOTAL				419040	398088	20952

Total Geological resources up to a depth of 20m = 419040m³

Total Geological reserves @ 95% = 398088m³

Total Reject @ 5% = 20952m³

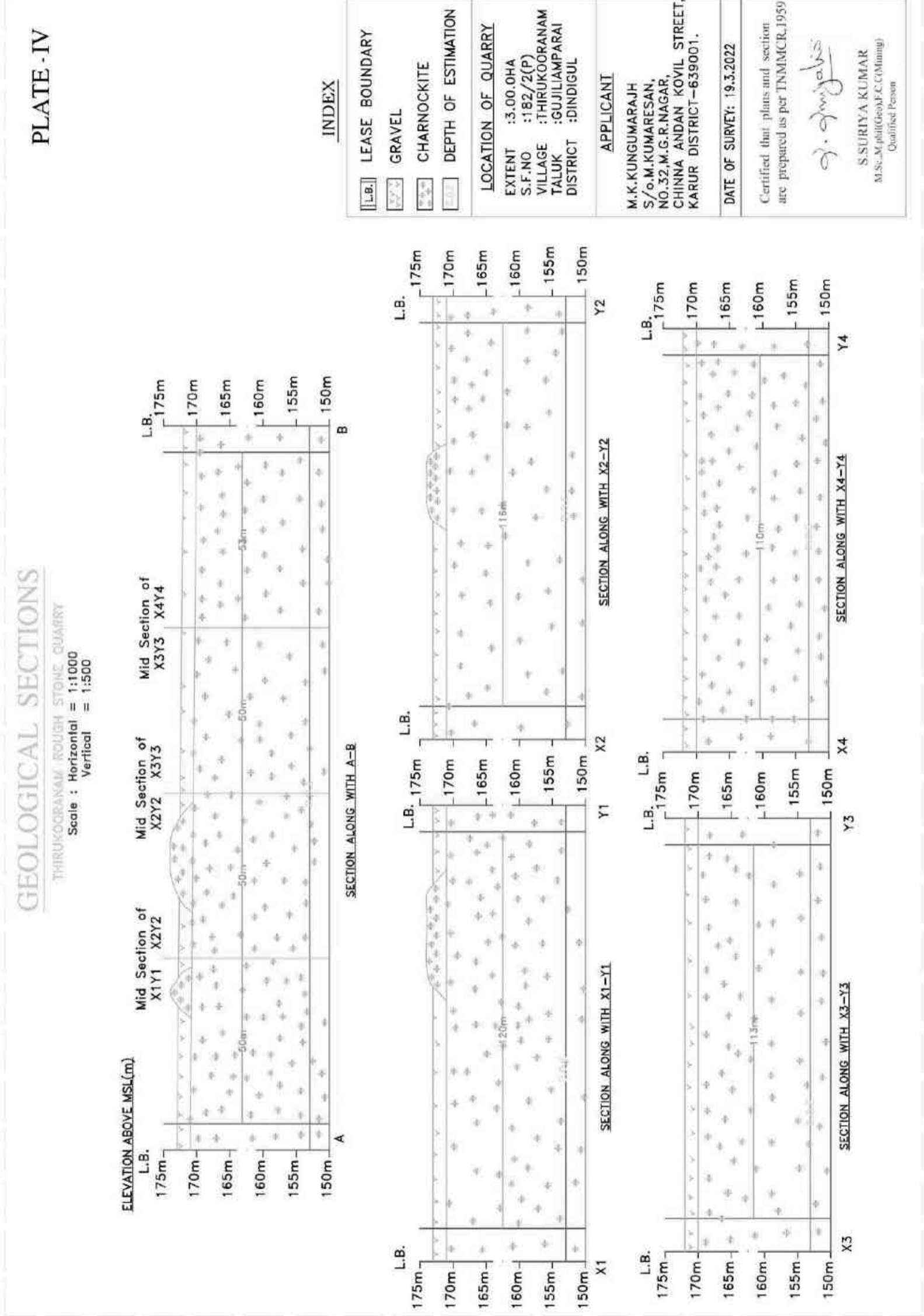


Fig.No.2.13: Geological Cross Section (Plate - IV)

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

b) MINEABLE/RECOVERABLE RESERVES:

The mineable\recoverable reserves is estimated by cross-sectional method having considered the recovery factor, depth of mining, safety barriers etc. The mineable reserves are estimated as 322936m³ of Rough Stone & 33360m³ of Gravel to a depth of mining 20m from the surface. Details of estimation of mineable reserves are given in Table no. 2.10

Table No-2.10: Computation of Mineable/Recoverable Reserves

SECTION	L (m)	W(m)	D(m)	Volume m ³	Reserves @95% (m ³)	Reject @5% (m ³)
AB-X1Y1	48	116	6	33408	31738	1670
	42	104	6	26208	24898	1310
	36	92	6	19872	18878	994
AB-X2Y2	50	112	6	33600	31920	1680
	50	100	6	30000	28500	1500
	50	88	6	26400	25080	1320
AB-X3Y3	50	109	5	27250	25888	1363
	50	97	6	29100	27645	1455
	50	85	6	25500	24225	1275
AB-X4Y4	51	106	5	27030	25679	1352
	45	94	6	25380	24111	1269
	39	82	6	19188	18229	959
TOTAL				322936	306789	16147
GRAVEL DEVELOPMENT						
AB-X1Y1	38	86	2	6536	—	6536
AB-X2Y2	21	92	2	3864	—	3864
AB-X3Y3	50	113	2	11300	—	11300
AB-X4Y4	53	110	2	11660	—	11660
TOTAL				33360	—	33360
GRAND TOTAL				356296	306789	49507

Note:

Total Mineable reserves to a depth of 20m	=	322936m ³
Total Mineable Rough Stone reserves @ 95%	=	306789m ³
Total Rough Stone Reject @ 5%	=	16147m ³
Total Gravel	=	33360m ³
Total Waste Ratio (16147m ³)	=	16147/306789
	=	1: 0.052

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

The recovery factor is taken as 95% from the top bench up to the bottom. The life of the mine is computed as 10 years at an average production rate of **30679m³**per annum for the depth up to 20m from the surface. **Further reserves below 20m shall be estimated after assessing water Table and necessary permission from DGMS under Reg.111 of MMR, 1961.**

2.9 Year Wise Production and Development

The five years period of production and the generation of rejects are described in the year-wise development/production schedule as tabulated for Rough Stone & Gravel in Table no-2.11. **The five years production is designed up to a depth of 14m.** The year-wise development/production plan is shown in Plate no- V-VB (Fig No: 2.14-2.16) and the composite Plan of year-wise sections is given in Plate VI (Fig No 2.17).

Table No: 2.11. Computation of year wise production

YEAR	L (m)	W(m)	D(m)	Volume	Recovery @95% (m3)	Reject @5% (m3)
I	30	116	6	20880	30506	1044
	18	104	6	11232		562
II	18	116	6	12528	29959	626
	24	104	6	14976		749
	6	112	6	4032		202
III	25	112	6	16800	30210	840
	25	100	6	15000		750
IV	19	112	6	12768	29486	638
	25	100	6	15000		750
	6	109	5	3270		164
V	30	109	5	16350	32120	818
	30	97	6	17460		873
TOTAL				160296	152281	8015

GRAVEL DEVELOPMENT

I	34	120	2	8160	—	8160
II	49	116	2	11368	—	11368
III	55	113	2	12430	—	12430
TOTAL				31958	—	31958
GRAND TOTAL				192254	152281	39973

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

Total quantum of production (ROM)	=	160296m ³
Total production for the five years@95%	=	152281m ³
Total Reject @5%	=	8015m ³
Total topsoil	=	31958m ³
Total Waste Ratio (8015m ³)	=	8015/152281
	=	1: 0.052

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

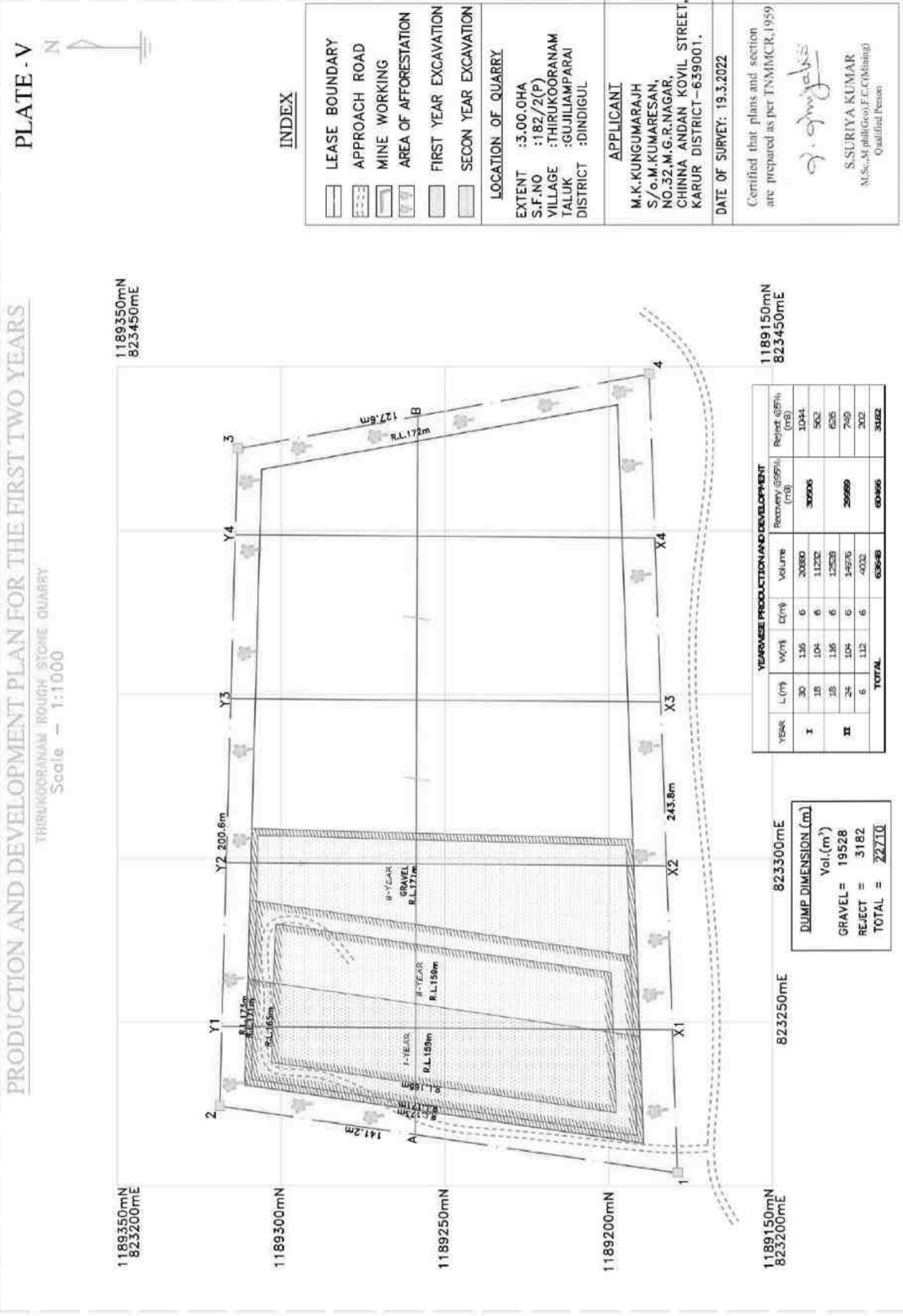


Fig.No.2.14: Year Wise Development and Production Plan for the 1st and 2nd year

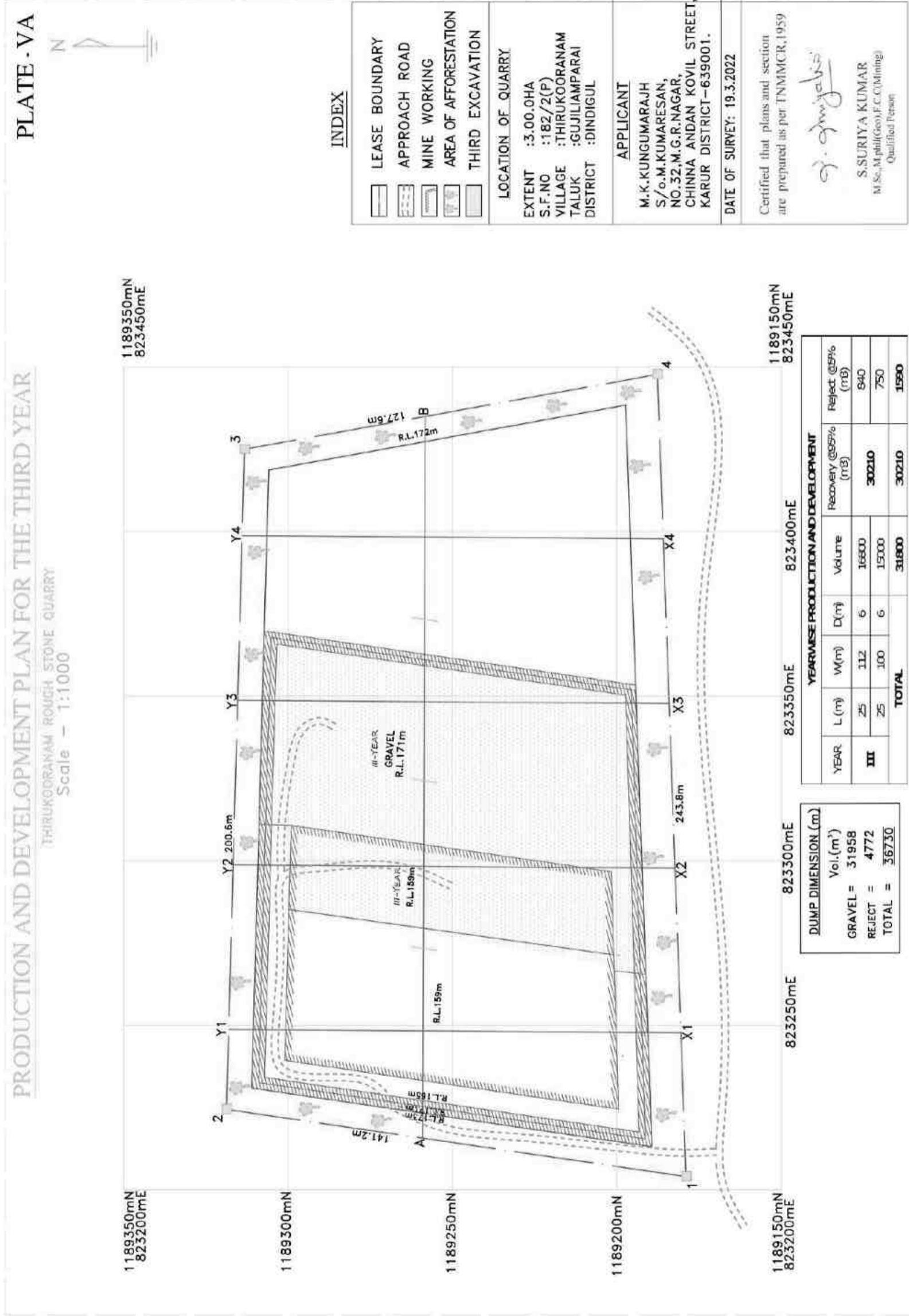


Fig.No.2.15: Year Wise Development and Production Plan for the 3rd year

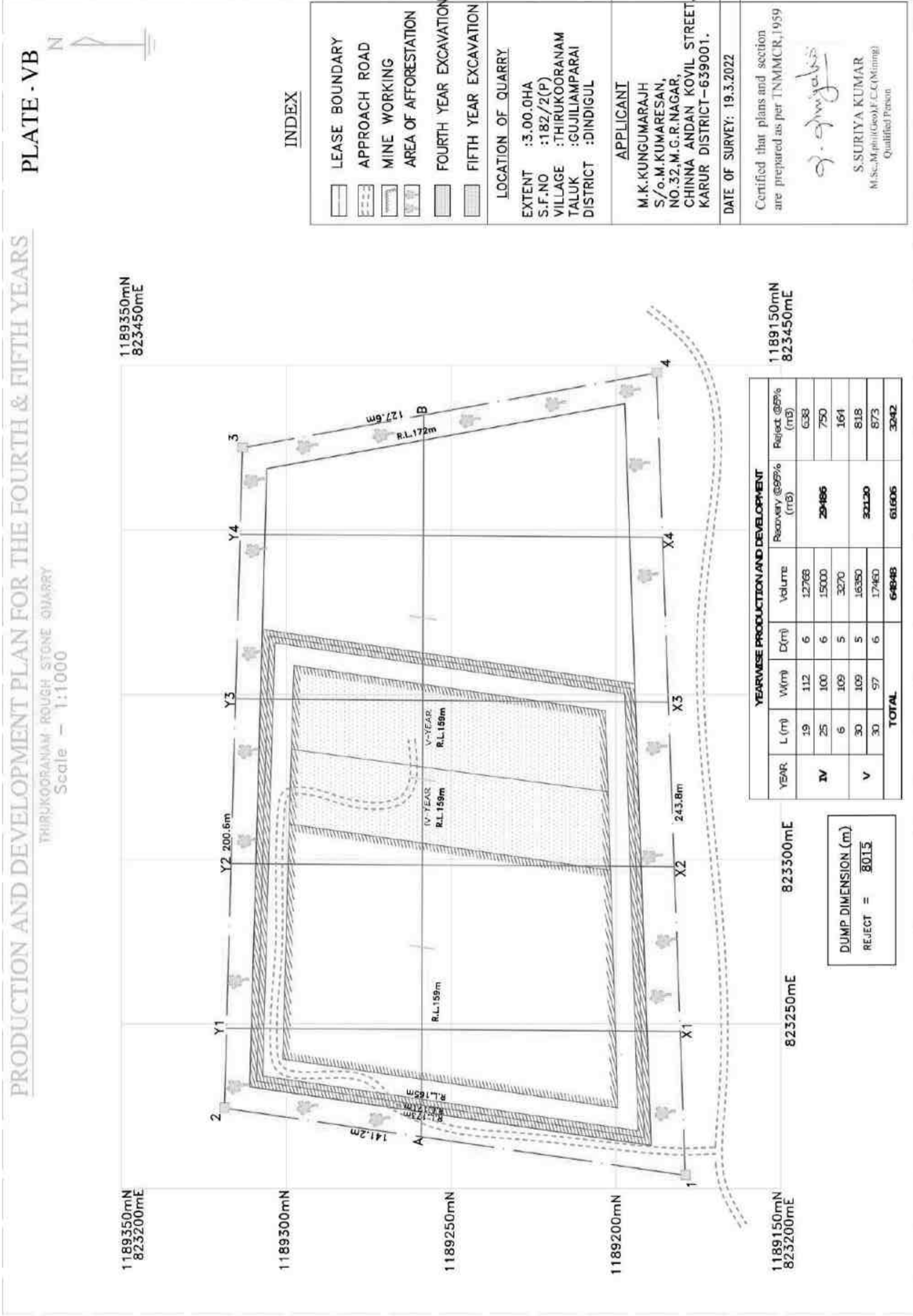


Fig.No.2.16: Year Wise Development and Production Plan for the 4th and 5th year

SECTIONS OF PRODUCTION AND DEVELOPMENT PLAN

THIRUKOORANAM ROUGH STONE QUARRY

Scale : Horizontal = 1:1000
 Vertical = 1:500

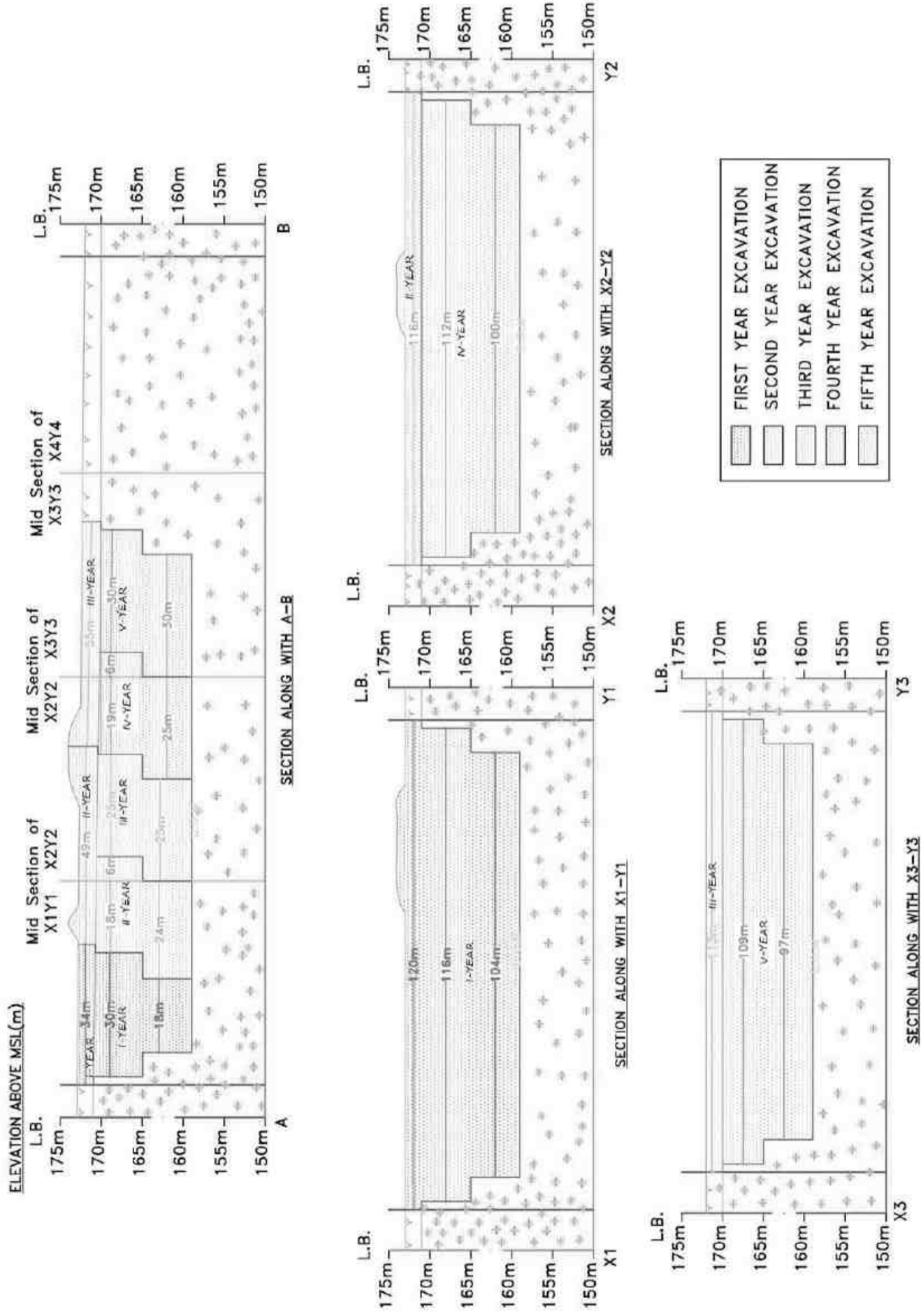


Fig.No.2.17: Section of Production and Development Plan (Plate - VI)

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.10 Stacking of Mineral Rejects and Disposal of Waste

Rough Stone rejects which amounts to 5% of the total excavation; about **8015m³** will be generated for mining up to 14m depth from surface. It is revealed in the final mine closure plan showing the ultimate depth of mining and ultimate pit configuration. Maximum height and spread of dumps for the first five years are given as under

Table No 2.12: Computation of rejects materials

Year	Gravel (m ³)	Overburden /Waste (m ³)	Rough Stone Rejects @ 5% (m ³)	Total
First	8160	----	1606	9706
Second	11368	----	1577	12945
Third	12430	----	1590	14020
Fourth	---	----	1552	1552
Fifth	---	----	1691	1691
Total	31958	----	8015	39973

Top soil shall be removed and stacked separately along lease boundary as earth bund which will be used for afforestation purposes. All the rejects shall be dumped within the lease area.

Table No2.13:YEAR-WISE DUMP DIMENSION (m³)

Description		Volume (m ³)
Gravel	=	31958m ³
Reject	=	8015m ³
Total	=	39973m³

2.11 Conceptual Mining Plan/ Final Mine Closure Plan

Conceptual Mining Plan is prepared to determine the ultimate pit limits, depth of mining and final slope angle adapted with an object of long-term and systematic development of bench lay-outs, selection of permanent dump(s), avoidance of re-handling, selection of sites for construction of infrastructures, lying of roads. Kindly refer Table No-2.14 and Fig.No: 2.18.

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Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

The ultimate pit size is so designed based on certain practical factors such as the economical depth of mining, safety zones followed, available area for mining. The Ultimate pit size of the mine in bench-wise arrived and calculated as hereunder

Table No 2.14: Computation of ultimate pit dimension

<i>Ultimate Pit Dimensions-PIT-I (m)</i>				
Bench	Mineral / overburden	Length(m)	Width(m)	Depth(m)
I	Topsoil	203	113	2
II	Rough stone	199	109	6
III	Rough stone	187	97	6
IV	Rough stone	175	85	6
Total				20

However, mining with 6m vertical bench from horizontal during extraction of blocks will be maintained for optimum exploitation.

The quantum of mineable reserves of the applied area is estimated as **306789m³** up to a depth of 20m from the surface. Out of which, the generated rejects is estimated to be **16147m³**. All rejects materials are dumped along lease boundary and backfilled at the end of mine life.

Description		Volume (m³)
Reject	=	16147
Total	=	16147

2.11.1 Restoration, Reclamation of already mined out area.

As the rate of production of rough stone is 95% for the five years, only 5% rejects are available to backfill in the quarried out pit. The quarried out pit will be used as water storage pond which improves the agricultural activity in the buffer zone.

The quarried pit will be fenced by using Barbed wire fencing to prevent inherent entry of public and cattle.

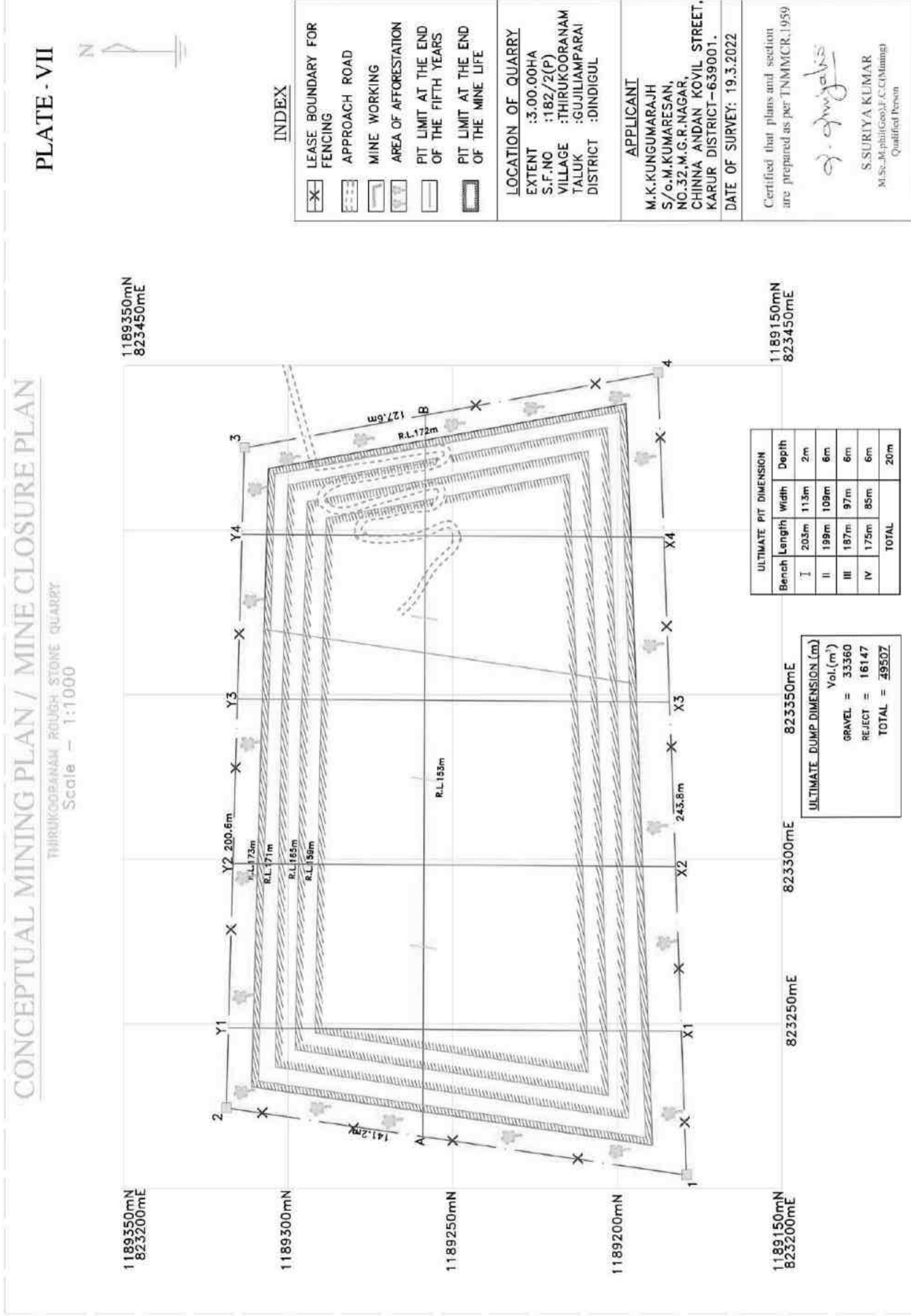


Fig No 2.18 Conceptual Plan

PROGRESSIVE MINE CLOSURE PLAN SHOWING LAND USE AND AFFORESTATION
 THIRUKOORANAM ROUGH STONE QUARRY
 Scale = 1:1000

PLATE - IX

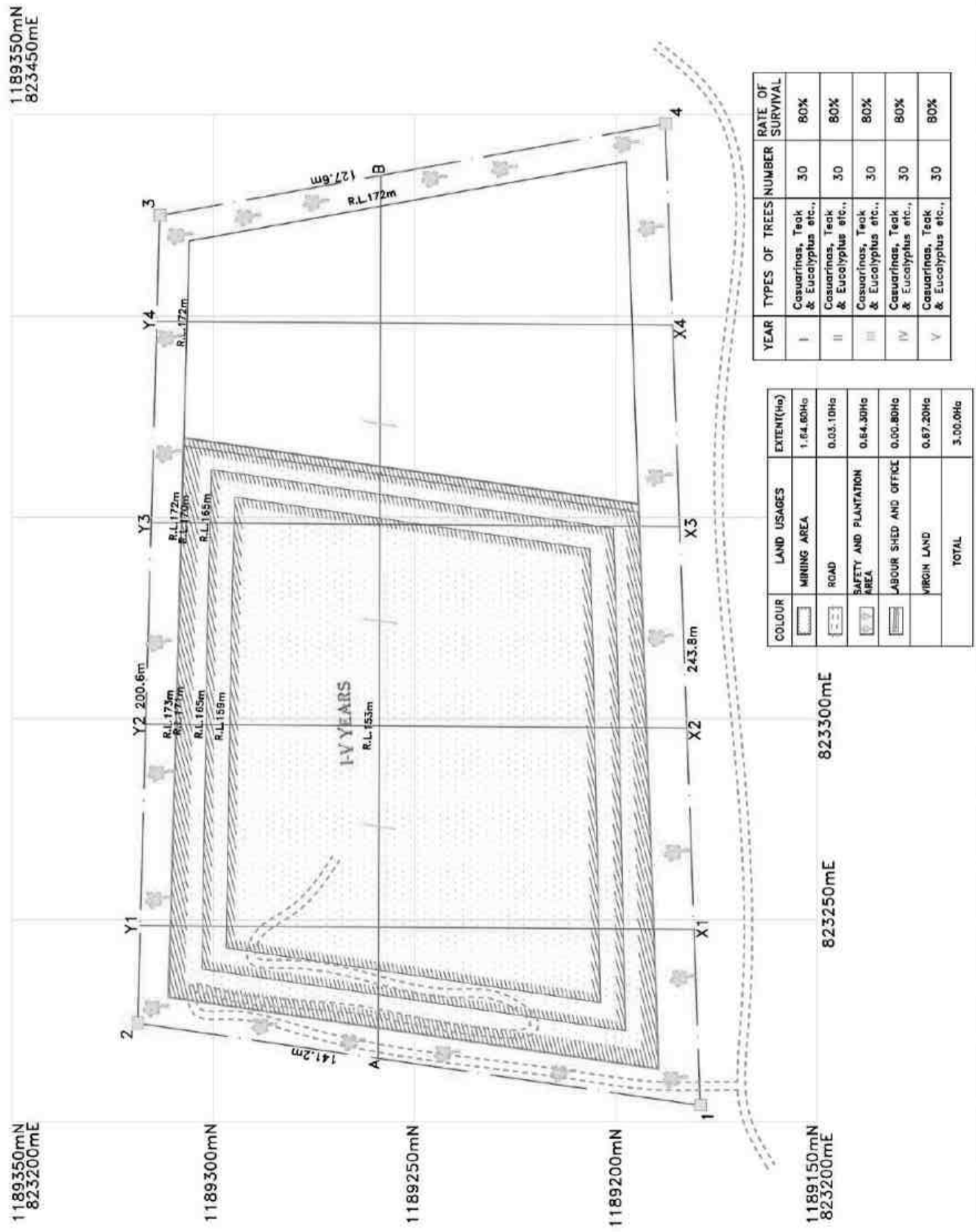
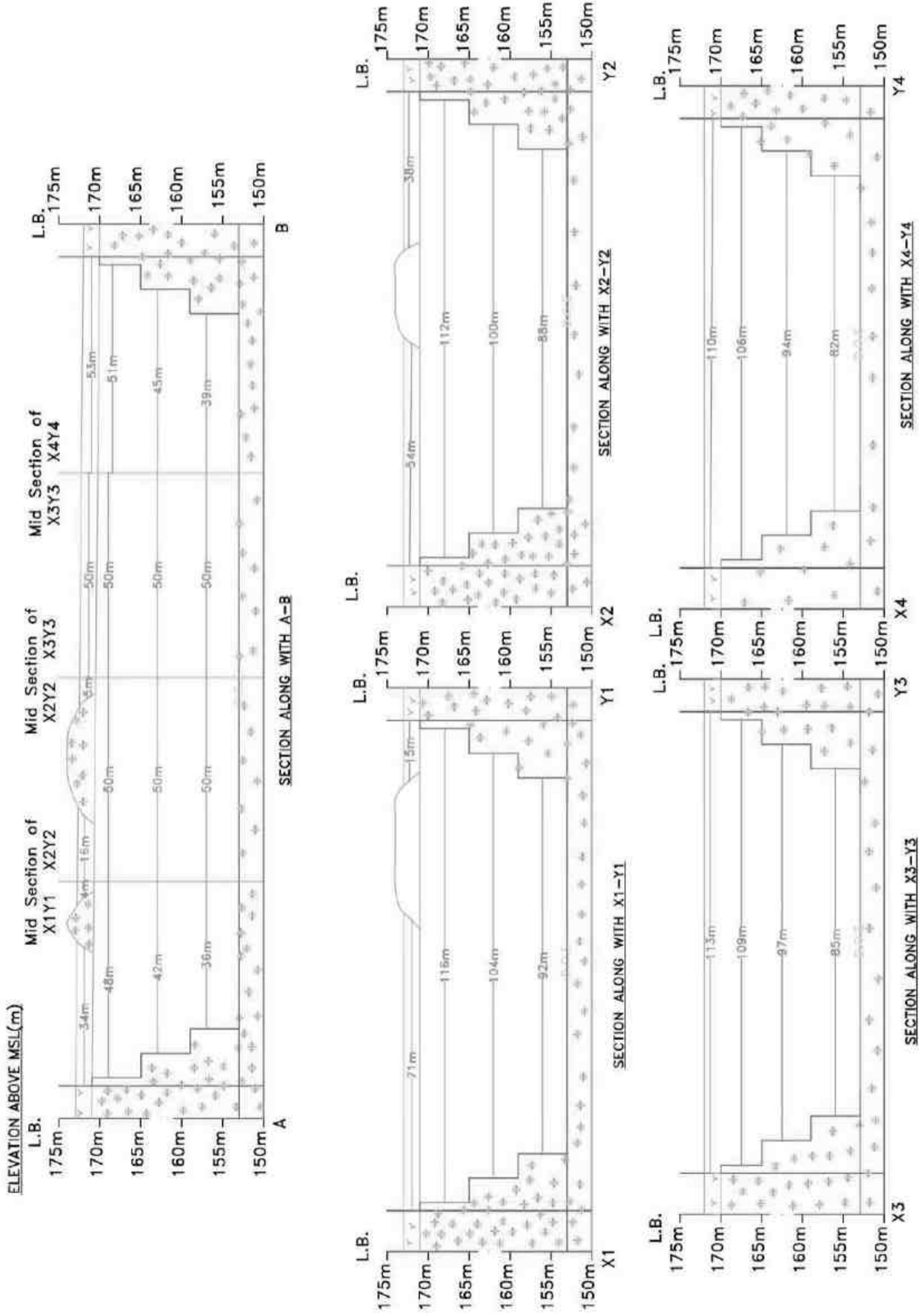


Fig. 2.19: Progressive Mine Closure Plan

SECTIONS OF ULTIMATE PIT LIMIT

THIRUKOORANAM ROUGH STONE QUARRY
 Scale : Horizontal = 1:1000
 Vertical = 1:500



INDEX

- LEASE BOUNDARY
- GRAVEL
- CHARNOCKITE
- ULTIMATE PIT LIMIT
- DEPTH OF ESTIMATION

LOCATION OF QUARRY

EXTENT : 3.00.0HA
 S.F.NO : 182/2(P)
 VILLAGE : THIRUKOORANAM
 TALUK : GUJILIAMPARAI
 DISTRICT : DINDIGUL

APPLICANT

M.K.KUNGUMARAJH
 S/O.M.KUMARESAN,
 NO.32.M.G.R.NAGAR,
 CHINNA ANDAN KOVIL STREET,
 KARUR DISTRICT-639001.

DATE OF SURVEY: 19.3.2022

Certified that plans and section are prepared as per TNMMCR,1959

S. Suriya Kumar

S.SURIYA KUMAR
 M.Sc., M.Phil(Geol), F.C.(Mining)
 Qualified Person

Fig. 2.20: Section of Ultimate Pit Limit

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.12 Employment Potential (Management & Supervisory personal)

**Table No 2.15: Employment Potential of Thiru. M. K. Kungumarajh,
Rough stone quarry**

Management and supervisory personal	Mines manager	1 no
	Foreman	1 no
	Mate	1 no
	Register keeper (Workman cadre)	1 no
Skilled	Operator	1 No
Semi-skilled	Driver	4 No
Unskilled	Musdoors/Labours	8 No
	Cleaners	2 No
	Register Keeper	1 No
Total		20nos

Table No 2.16: Water Requirements (3.5 KLD)

Domestic & Sanitary	Drinking Water- 0.3KLD Domestic Purposes- 0.7KLD
Dust suppression & Green Belt	Green belt purpose -1.5KLD water sprinkling on haul roads – 0.5KLD Wet drilling operation- 0.5KLD
Source	Drinking water - Mineral water industries by water canes. Dust suppression, Green belt - water tank

2.13 Amenities

2.13.1 Sanitary facilities

Semi-permanent latrines & urinals shall be maintained at convenient places for use of labours as per the provisions of Rule (33) of the main rules, 1955 separately for males and Females. Washing facilities shall also be arranged as per rule (36) of the mines Rules, 1955.

2.13.2 First Aid facility

First Aid station as per provisions under Rule (44) of the Mines Rules, 1955 will be provided and First aid kits kept in mines office room, the qualified first aid personnel should be appointed or nominated to attend emergency first aid treatment.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

In case of eventuality, the victim will be given first aid immediately at the site and the injured person will be taken to the hospital located in Aravakurichi. The competent and statutory of Foreman / Mate / Permit Manager will be incharge of the First aid.

2.13.3 Labour Health

Periodic medical examination has to be made for occupational health once in a year in addition to attending medical treatment of occupational injuries under Rule 45(A).

2.13.4 Precautionary safety measures to the Labourers

Safety provisions like helmet, goggles, safety belt, safety shoes etc have to be provided as per the circulars and amendments made for Mine labours under guidance of DGMS.

Necessary training will be conducted once in a year to all the employees with the help of qualified and experienced officers to train about the safe and systematic quarrying operation

2.13.5 The Child labor Employment

As per the Mines Act, 1952, no child labors below 18 years of old were engaged for any work in the quarry.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.14 Project Cost

Proposed financial estimate / budget for (EMP) Environment Management

a) Project cost / investment

i)	Land Cost (Patta land)	=	Rs 15,00,000
ii)	Machinery to be used (Hire)	=	Rs 3,00,000*
iii)	Building & Welfare amenities	=	Rs 1,00,000
	Total	=	Rs 19, 00,000

b) EMP Cost

i.	Safety Kits & Personal protective equipment	=	Rs 50,000
ii.	Environmental Monitoring - Air, Water, Noise (Four seasons)	=	Rs 1,50,000
iii.	Sign Boards	=	Rs 50,000
iv.	Green Belt Development	=	Rs 50,000
v.	Water Sprinkling & Tyre Washing	=	Rs 50,000
vi.	Convex mirrors at all turning points	=	Rs 50,000
vii.	Workers' Health Checkup	=	Rs 1,80,000
	a) Pre operation phase		
	b) Post operation phase (Yearly once)		
	Total		=Rs. 5.80 lakhs

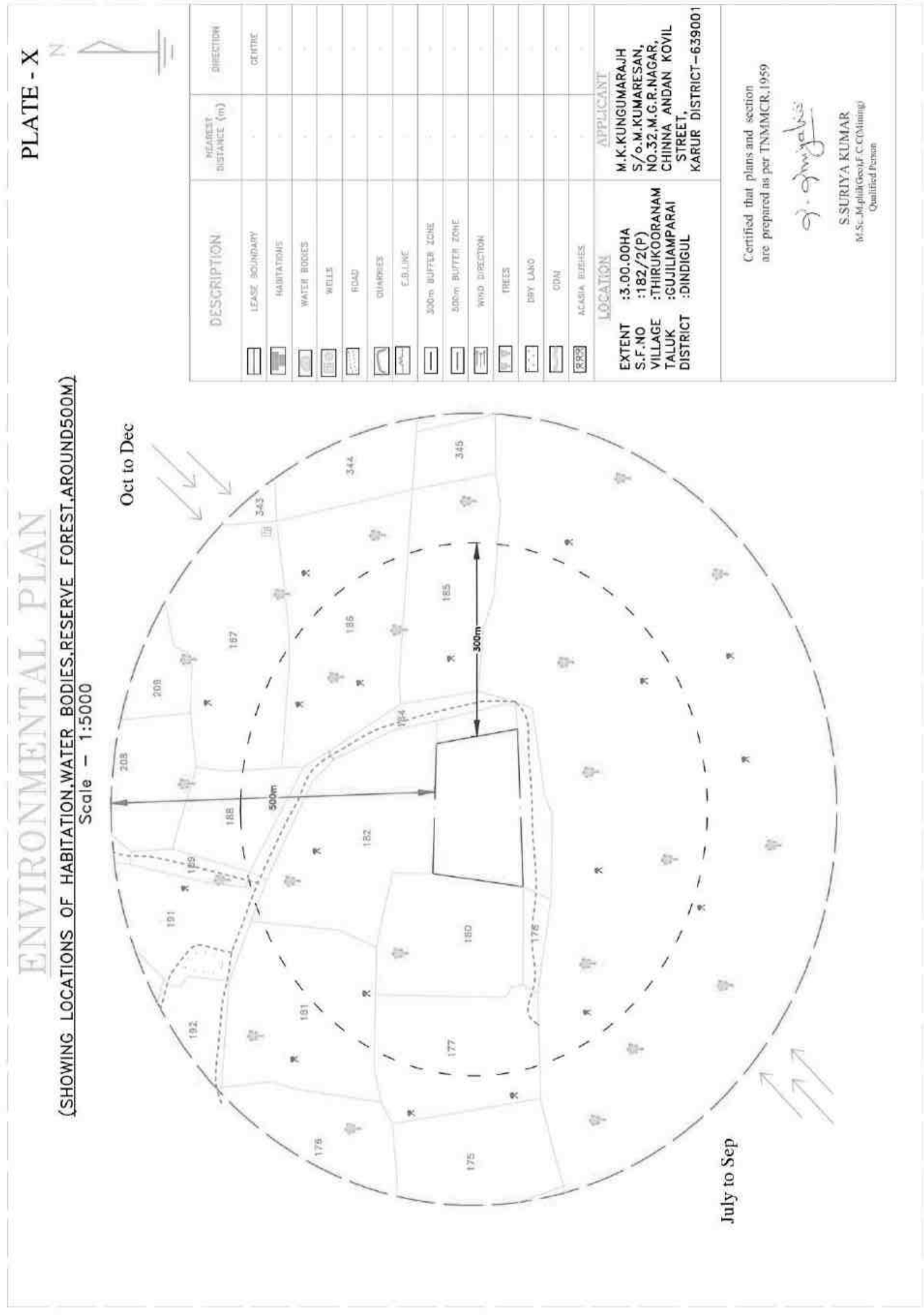


Fig.No.2.21: Environmental Plan

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru. M. K. Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District

2.15 End Use

The excavated Rough stone & gravel is used for building's basement stones and other infrastructure development work in and around the district.

CHAPTER – 3: DESCRIPTION OF THE ENVIRONMENT

3.1 GENERAL

Collection of baseline environmental data of the project influenced area helps to predict the magnitude of impacts that are likely to be caused due to proposed activity of project. It also helps to identify critical environmental attributes required to be monitored during and after the proposed improvements. The baseline status of the project on environment is described section wise for better understanding of the broad spectrum conditions. The baseline environment quality represents the background environment scenario of various environment 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 2022 – May 2022 with CPCB guidelines. Environmental data has been collected with reference to proposed Rough stone and Gravel quarry for:

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

3.2 STUDY AREA

Exploitation of mineral resources from the land through mining causes Environmental and ecological instability, severe land degradation besides biological physical and socio-economic imbalance. The impact of the mining activities can be quantified through Environmental Impact Assessment Studies within the impact zone. The findings of EIA studies help in preparation of the environmental management plan for mitigating the adverse impacts. For the purpose of studying the baseline status of the environment, core zone and buffer zone are considered for Impact Assessment.

The core area for the purpose comprises mining lease area of 3.00.0 Ha and located in S.F.No. 182/2 (P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, TamilNadu. Geographical coordinates of the project site are 10°44'36.82"N to 10°44'41.38"N latitude, 77°57'17.33"E to 77°57'25.31"E longitude. The buffer zone comprises a 10 km from around the core area. This section contains a description of the existing baseline environmental status of the area surrounding the core zone. The

data collected has been used to define the environmental scenario of the area, against which the potential impacts of the project has been assessed.

3.3 STUDY PERIOD

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The scope of the study includes preparation of Environmental Impact Assessment study with detailed characterization of various environmental components such as, air, noise, water, land, biological and socio economic and other impacts of mining like hydrogeological disturbances of the area around 10 km radius around the mine located at Thirukooranam Village of Dindigul District, Tamil Nadu. The scope covers all the conditions outlined in the TOR prescribed by SEIAA, Tamil Nadu for this mining project vide Letter No. SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022. EIA study was conducted during the period of 1st March 2022– 31st May 2022 to assess the Impact of this project to the environment and society.

3.4. BASELINE ENVIRONMENT

3.4.1. Scope of Baseline Data Collection

The scope of baseline data collection with respect to project activity covers the following environmental components.

- **Site Meteorology:** Collection of micro meteorological data on wind speed, Wind direction, temperature, relative humidity and solar radiation on hourly basis continuously during the study period.
- **Ambient Air Quality:** Collection of AAQ data at five locations for PM₁₀, PM_{2.5}, SO₂ and NO_x.
- **Noise Environment:** Collection of noise levels at five locations on hourly basis to compute the day equivalent and night equivalent.
- **Water Environment:** Collection of water samples from various sources in and around mine site within 10 km radius were collected for assessment of the existing physico-chemical and bacteriological quality.
- **Land Environment:**
 - ❖ **Soil quality:** Collection of soil samples from five locations within 10 km radius of in site for analysis of the Physico-chemical characteristics.

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

- ❖ **Land use and land cover:** Assessment of land use and land cover pattern of the study area through Remote sensing Technique.
- ❖ **Hydrology:** Collection of information on surface water bodies is to assess the interference with project activities.
- ❖ **Hydro Geology:** Collection of information on ground water status (Quality, quantity and ground water table) is to assess impact of mining on subsurface water bodies.
- **Ecology and Biodiversity:** Collection of primary data to understand baseline ecological status, important floristic and faunal elements, sensitive habitat and rare species; from field observation; collection of data from local village about importance and status of plants and animals. Compare the data so generated with authentic past records to understand changes with respect to proposed project; Identification of sensitive locations or Protected as per Wildlife Conservation and Protection Act, 1972.
- **Socio-economic Environment:** Collection of details of the project affected persons does draw Rehabilitation & Resettlement. Collection of socio-economic status of various villages and amenities exists within an area of 10 km around the project area.

3.5 LAND ENVIRONMENT

3.5.1 Land use of Study Area

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Landsat8 having 30 m spatial resolution and date of pass March 2021 satellite image with reference to Google Earth data. In order to strengthen the baseline information on existing land use pattern, the following data covering approx. 10°44'36.76"N to 10°44'41.38"N latitude and 77°57'17.29"E to 77°57'25.28"E longitude and elevation 174 meter are used as per the project site confined within that area. Land use pattern of the study area as well as the catchment area was carried out by standard methods of analysis of remotely sensed data and followed by ground truth collection and interpretation of satellite data. The outcome of land use study is presented below in subsequent tables and figures.

Table No 3.1 DATA SPECIFICATION USED FOR PRESENT STUDY

Satellite Image	Sensor	Spatial Resolution	Date of Acquisition
Landsat8	*OLI & TIRS	30m	March 2021

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

* Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS)

	Bands	Wavelength (micrometers)	Resolution (meters)
Landsat 8 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) Launched February 11, 2013	Band 1 - Coastal aerosol	0.43 - 0.45	30
	Band 2 - Blue	0.45 - 0.51	30
	Band 3 - Green	0.53 - 0.59	30
	Band 4 - Red	0.64 - 0.67	30
	Band 5 - Near Infrared (NIR)	0.85 - 0.88	30
	Band 6 - SWIR 1	1.57 - 1.65	30
	Band 7 - SWIR 2	2.11 - 2.29	30
	Band 8 - Panchromatic	0.50 - 0.68	15
	Band 9 - Cirrus	1.36 - 1.38	30
	Band 10 - Thermal Infrared (TIRS) 1	10.60 - 11.19	100
	Band 11 - Thermal Infrared (TIRS) 2	11.50 - 12.51	100

3.5.2. Objective

The objectives of Land use studies are:

- To determine the present land use pattern as per EIA/EMP norms by MoEF.
- To determine the drainage pattern present in the study area.

3.5.3 Data Used

A. Remote sensing data

- Landsat8-30m Resolution, OLI &TIRS (Sensor)

B. Collateral Data

- Survey of India Toposheet bearing Toposheet No. 58F/14 (1:50,000 Scale) and the Toposheet map representing the project site is shown in Figure 3.1.

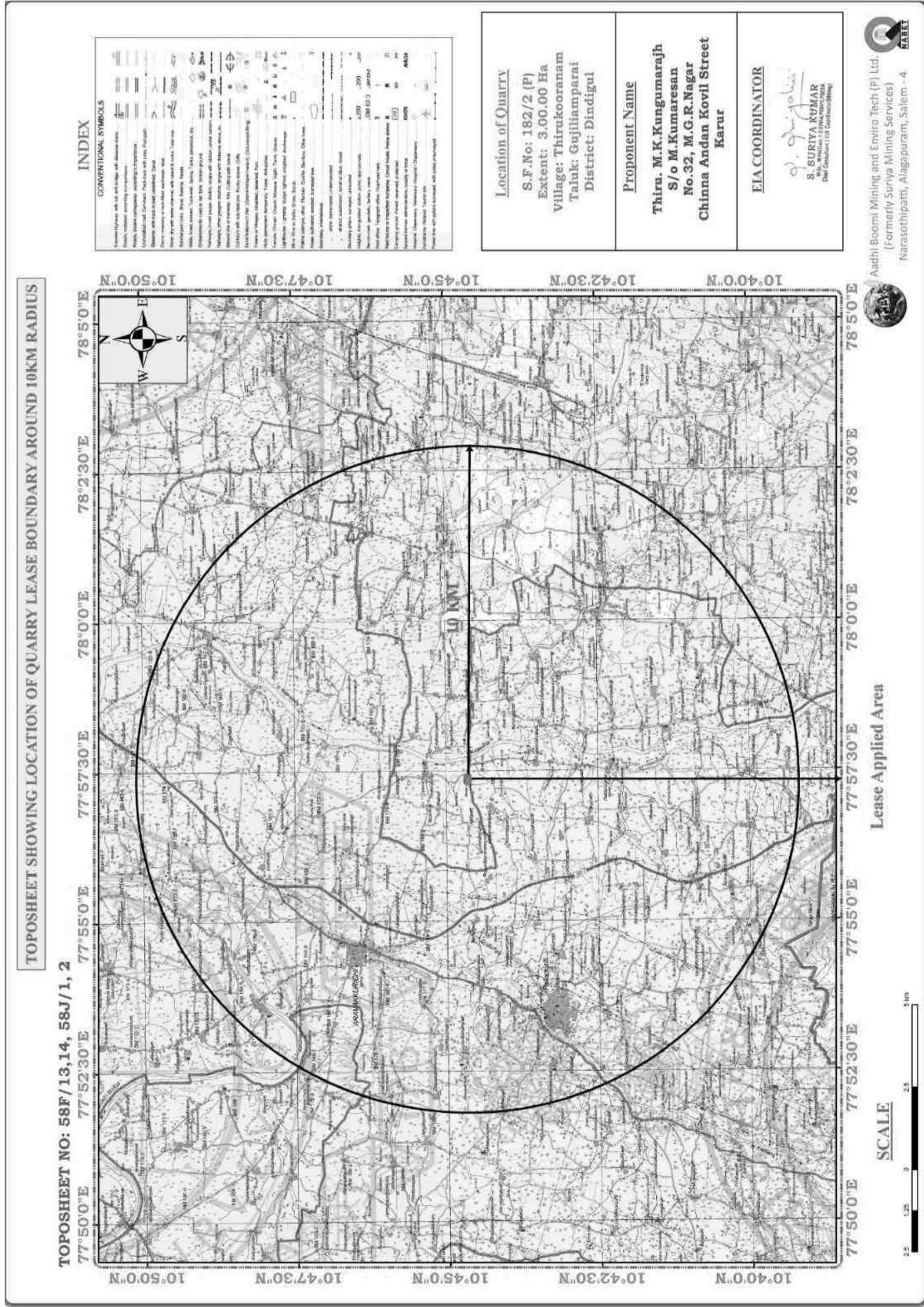
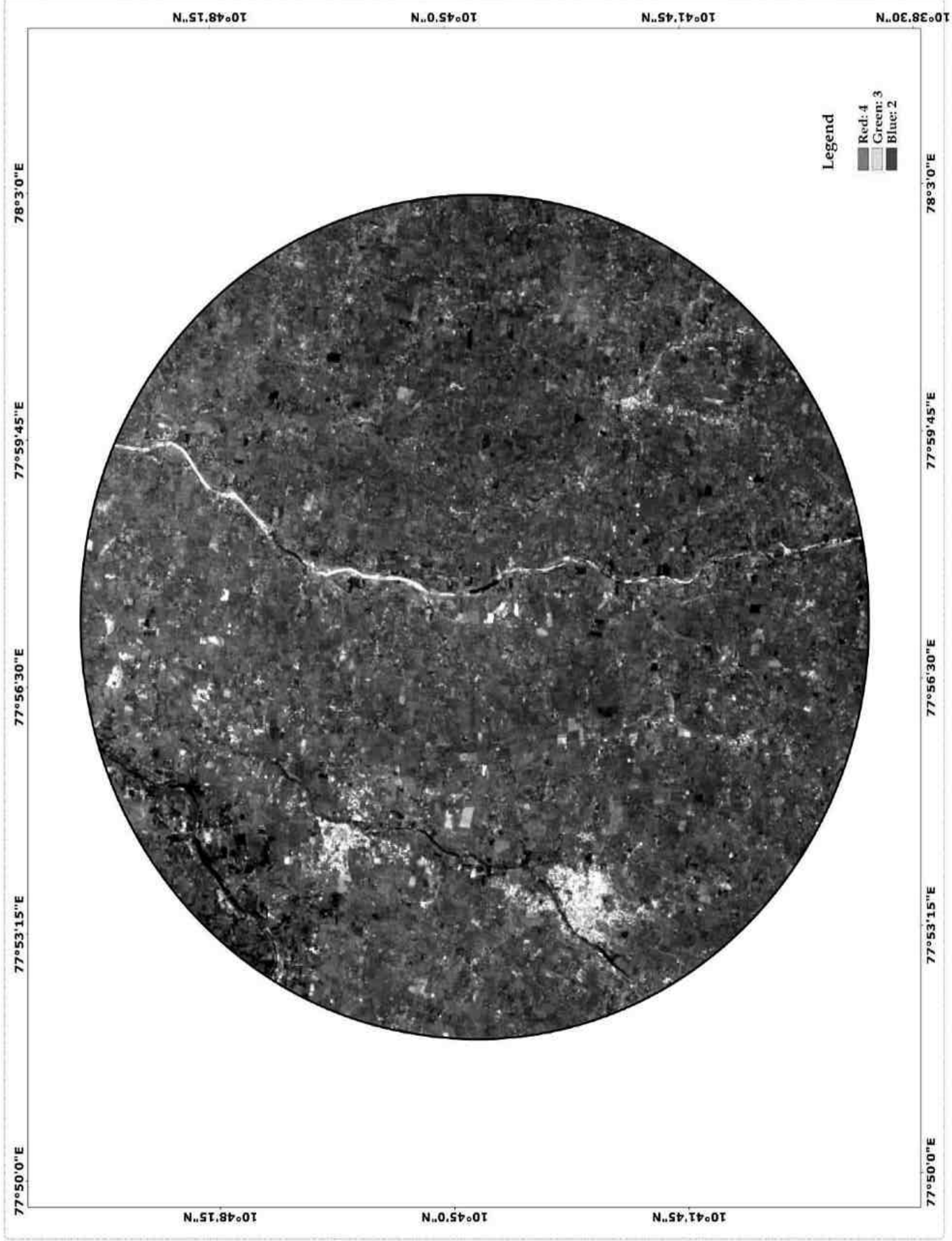


Fig No 3.1: Project Site Located in the Topo Map

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Lansat-8 Image Showing 10km Radius from the Lease Area



Source: LANDSAT-8, Mar 2021, USGS.

Fig No 3.2: Project Site Located in the LANDSAT8

INDEX

LOCATION

S.F.No: 182/2 (P)
Extent: 3,00.00 Ha
Village: Thirukooranam
Taluk: Gujliamparai
District: Dindigul

APPLICANT

Thiru. M.K.Kungumarajh
S/o M.Kumaresan
No.32, M.G.R.Nagar
Chinna Andan Kovil Street
Karur

LEGEND

- Lease Boundary
- Buffer Zone 10km Radius

SCALE

0 0.75 1.5 3 4.5 km

Prepared by



3.5.4 Methodology

The land use pattern of the study area was studied by analyzing the available secondary data published in the District Primary Census abstract of the year 2001 & 2011. Salient features of the adopted methodology are given below:

- Acquisition of satellite data
- Preparation of base map from Survey of India Toposheet
- Data analysis using visual interpretation techniques
- Ground truth studies or field checks using GPS
- Finalization of the map
- Digitization using head up vectorization method
- Topology construction in GIS
- Area calculation for statistics generation
- Masking

The spatial resolution and the spectral bands in which the sensor collects the remotely sensed data are two important parameters for any land use survey. Landsat8 data offers spatial resolution of 30 m and 185 kilometer (115 mile) wide swath of the Earth in 15-30 meter resolution covering wide areas the data is collected in 11 visible bands namely **Band Number μm Resolution**

1	0.433–0.453	30 m
2	0.450–0.515	30 m
3	0.525–0.600	30 m
4	0.630–0.680	30 m
5	0.845–0.885	30 m
6	1.560–1.660	30 m
7	2.100–2.300	30 m
8	0.500–0.680	15 m
9	1.360–1.390	30 m
10	10.6-11.2	100 m
11	11.5-12.5	100 m

The shapes, sizes, colours, tone and texture of several features are visible in Landsat8 data. Four spectral bands provide high degree of measurability through band combination including FCC generation, bands rationing, classification etc. These Hence, Landsat8 data having 30 m spatial resolution having pan chromatic imagery has been used for land use mapping. The digital image processing was performed on

ERDAS Imagine 8.5 and ArcGIS 10.8 software system on high-configured computer. This software package is a collection of image processing functions necessary for pre-processing, rectification, band combination, filtering, statistics, classification, etc. Apart from contrast stretching, there are large numbers of image processing functions that can be performed on this station. Arc map is used for final layout presentation.

The satellite data from the compact disc is loaded on the hard disk and by studying quick look (the sampled image of the appropriate area ;) the sub-scene of the study area is extracted.

Supervised classification using all the spectral bands can separate fairly accurately, the different land use classes at level I on the basis of the spectral responses, which involve the following three steps:

1. Acquisition of ground truth
2. Calculation of the statistics of training area
3. Classification using maximum likelihood algorithm

The training areas for classification were homogeneous, well spread throughout the scene with bordering pixels excluded in processing. Several training sets have been used through the scene for similar land use classes. After evaluating the statistical parameters of training sets, the training areas were rectified by deleting no congruous training sets and creating new ones.

3.5.5 Pre-field Interpretation of Satellite Data

The True Colour Composite (TCC) of Landsat8 imagery having 30 m spatial resolution satellite data at 1:50,000 scale was used for pre-field interpretation work. Taking the help of Toposheet, geology, geomorphology and by using the image elements, the features were identified and delineated the boundaries roughly. Each feature was identified on image by their image elements like tone, texture, colour, shape, size, pattern and association. A tentative legend in terms of land cover and land use was formulated. The sample area for field check is selected covering all the physiographic, land use/land cover feature cum image characteristics. Fig 3.2 shows the TCC of 10 km radius of Landsat8 Imagery.

3.5.6 Ground Truth Collection

Both Toposheet and imagery were carried for field verification and a transverse plan using existing road network was made to cover as many representative sample areas as possible to observe the broad land use features and to adjust the sample areas according to field conditions. Detail field observations and investigations were carried out and noted the land use features on the imagery.

3.5.7 Post Field Work for Land Use/Land Cover Classification

The base maps of the study area were prepared, with the help of Survey of India Toposheet on 1:50,000 scale. Preliminary interpreted land use and the land cover features boundaries from Landsat8 sensor OLI & TIRS having 30m spatial resolution, False Color Composite were modified in light of field information and the final thematic details were transferred onto the base maps. The final interpreted and classified thematic map was cartograph. The cartographic map was categorically differentiate with standard color coding and described features with standard symbols. All the classes were identified and marked by the standard legend on the map. The following Land Cover classes were derived and classified as under:

1. Mining/Existing quarry
2. Built-up Land
3. R.F/Hilly Rock area
4. Agriculture Land
5. Barren Land
6. Water bodies like
 - Godavananar River – 435m – E
 - Kodavananar Check dam – 450m – E
 - Alamarathupatti lake – 1.3km – NE
 - Small odai – 1km – NE
 - Amaravathi river – 8.2km – NW
 - Nanganji River – 5.1km – W. Total Water bodies of 10 km radius.

3.5.8 Land Use/Land Cover Classification- Interpretation

3.5.8.1 Slope and Drainage Interpretation

The drainage pattern is dendritic (Fig 3.3) and the flow direction of the streams is southerly direction and controlled by the N-S trending shear zone. The streams

originating in the Javadi reserve forest disappear in the colluvium of the bazada zones which is the characteristic feature of the drainage system.

Remote Sensing has the ability of obtaining synoptic view of a large area at one time and very useful in analyzing the drainage morphometry (Rudraiah, 2008). Visual interpretation of satellite imagery in analysis of geological, landforms and land erosion characteristics in conjunction with drainage pattern facilitates effective delineation of distinct features to evaluate the influence of drainage morphometry on landform characteristics and their processes. Horton's law of stream lengths suggests a geometric relationship between the number of stream segments in successive stream orders and landforms (Horton, 1945). The drainage has been delineated using satellite data with the reference of SOI Toposheet of 1:50,000 scale.

3.5.8.2 Linear Aspects of the Drainage system

The linear aspect describes the components of a typical drainage basin as stream order, stream number, bifurcation ratio, and stream length and stream length ratio.

3.5.8.3 Stream Order (u)

The designation of stream order is done following Strahler's method (Strahler 1964), in which two first order streams join a stream segment of order 2; two of orders 2 join a segment of order 3 and so on. Based on the Strahler's method, the stream orders are classified up to four orders in the study area was 10km radius.

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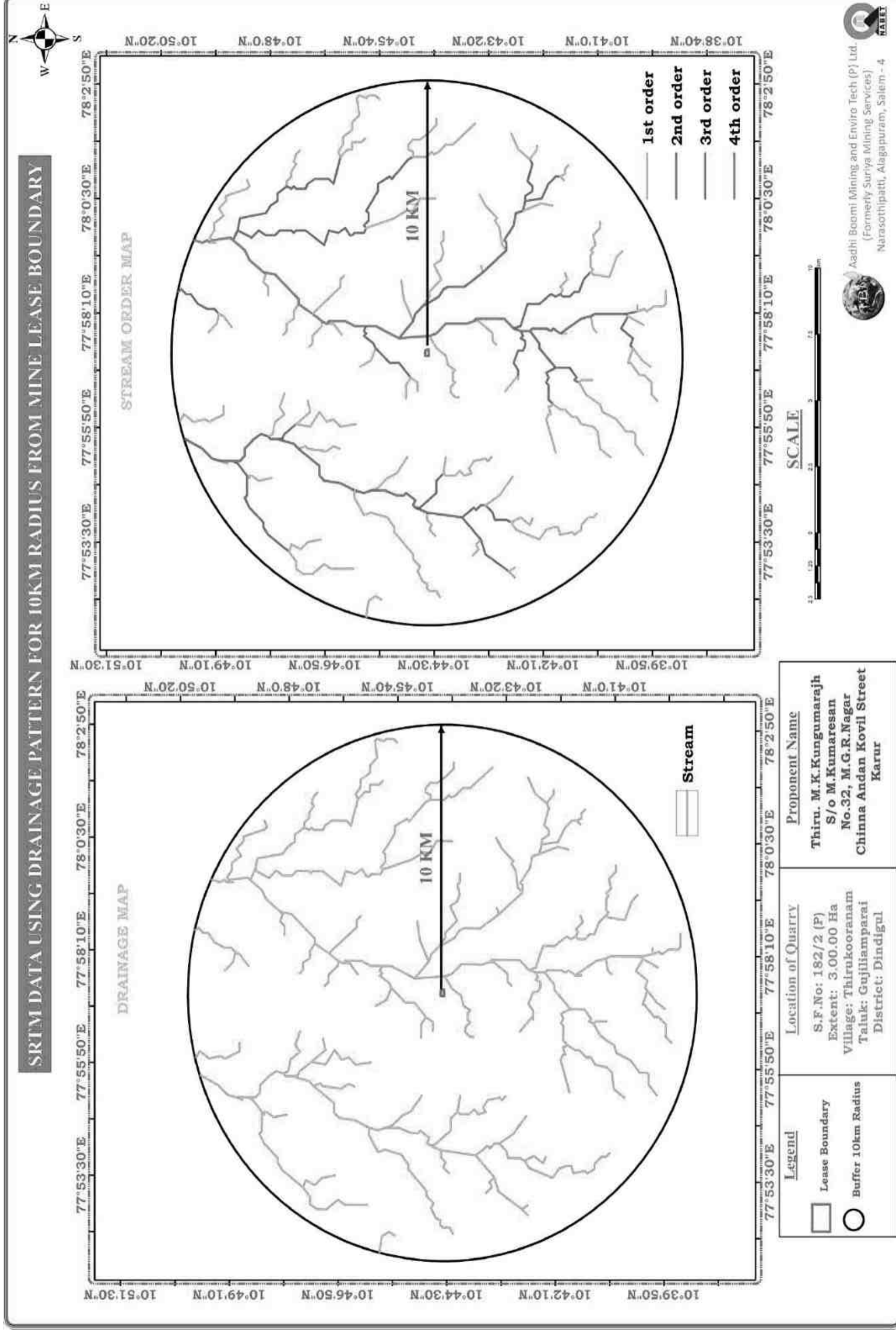


Fig No 3.3: Represents the River/Streams (Drainage) of the study area within 10 km radius from the project site

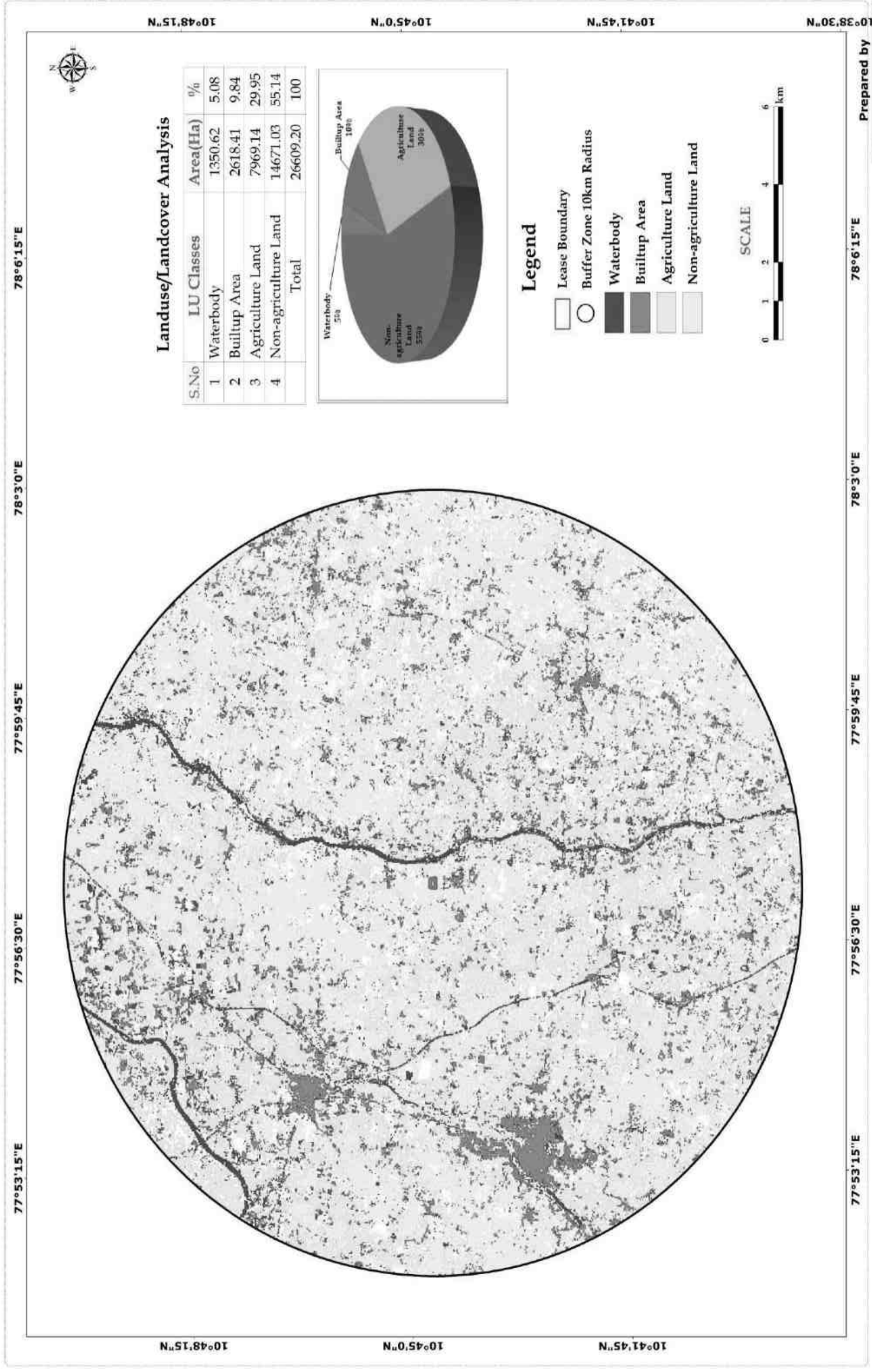
3.5.9 Land Use and Land Cover (LULC) for 00-10 km radius (26690.20 Ha)

The Land Cover classes were extracted following a Visual interpretation method or on screen digitization of the Landsat8, sensor OLI &TIRS having 30 m spatial resolution image. These were later verified by using SOI Toposheet and Google Earth imagery. Polygon layers for each class were digitized and the respective areas were calculated. The Land Cover classes and their coverage can be seen in the following table 3.2 and its distribution is shown in Figure 3.4 The present Land use/ Cover classes are represented in Figure 3.6.

Total six major land use/ land cover classes were demarcated in the study area and a thematic map of 1:50,000 scales were generated incorporating these classified categories considering the area of the project. Total six major land use/land cover classes were demarcated in the study area following Level 1 classification. A thematic map of 1:50,000 scale was generated incorporating these classified categories considering the area of the project.

The area as a whole represents a plain area. Agriculture land constitutes the dominant category of land use covering as much as 29.95 % (7969.14 hec) of the total area and second dominated area of Non-Agriculture Land covering as much as 55.14% (14671.03ha) of the total area which includes the village settlements, roadways of the study area. Large uncultivated & rural settlements are along the active plain area towards the site location. The land use for quarry manufacturing process which is scattered in whole study area Waterbody as much as 5.08% (1350.62 hec) of the total area. Builtup Land area covered 9.84% (2618.41hec) of the total land use of the study area.

Landsat-8 Image Showing Landuse/Landcover Analysis of 10km Radius from the Lease Area



Source: LANDSAT-8, Mar 2021, USGS.

Fig No 3.4: Landsat8 - LU/LC DETAILS OF 10 KM RADIUS

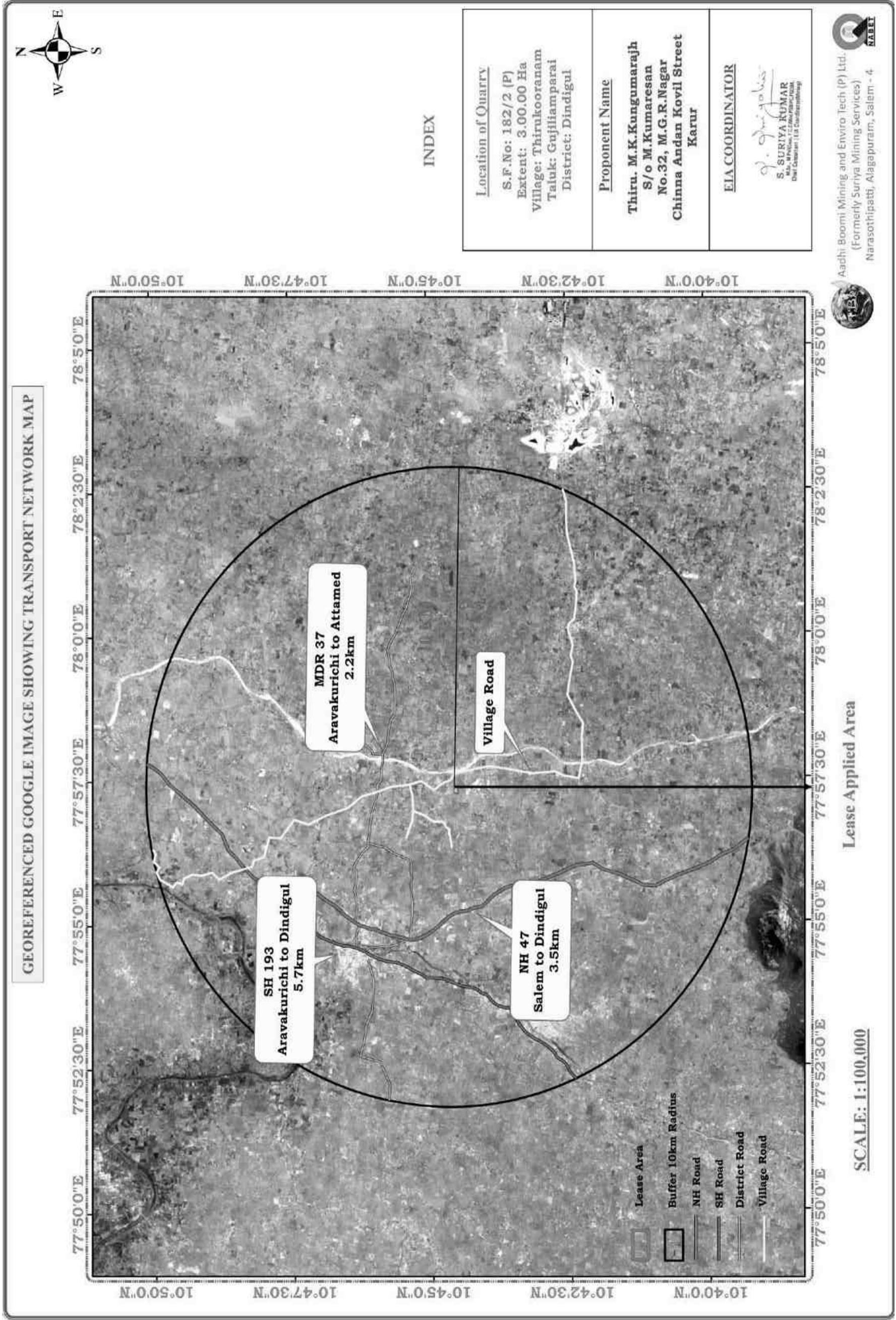


Fig No 3.5: Toposheet showing Road Accessibility details of 10 Km Radius

Table No 3.2 LU/LC CLASSES AND THEIR COVERAGE IN SQ. KM OF 10 KM RADIUS

S.No	LU Classes	Area(Ha)	%
1	Water body	1350.62	5.08
2	Built-up Area	2618.41	9.84
3	Agriculture Land	7969.14	29.95
4	Non-agriculture Land	14671.03	55.14
	Total	26609.20	100

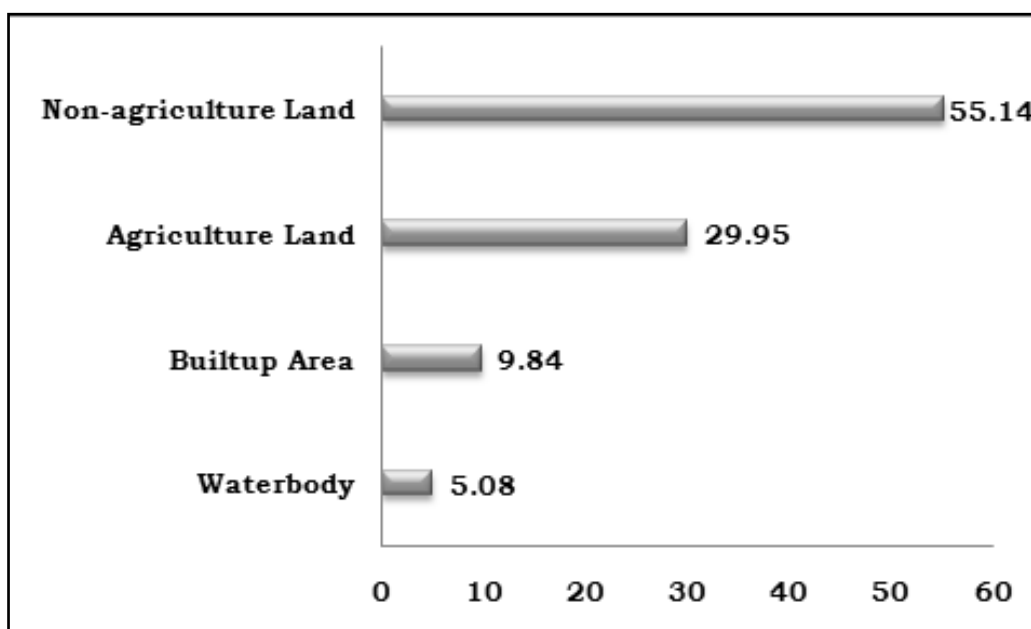


Fig No3.6: Bar Chart Represent the Lu/Lc Details of 10 Km Radius

3.6 Geological structure

The district is essentially a high grade gneissic terrain characterized by highly deformed rocks, which can be classified under three groups as 1) Khondalite Group, 2) Charnockite Group and 3) Migmatite Group. The terrain also exposes basic/ultrabasic and younger acid intrusives.

Sillimanite gneiss, garnet-cordierite gneiss and garnet quartz-feldspar gneiss. Quartzite is an important member of the group, which occurs as linear bands of 5 m to 50 m thick and occupies the crest of linear ridges. It is white or smoky grey and

consists of interlocking grains of quartz with minerals like garnet, biotite, diopside, sillimanite and magnetite as accessories. Magnetite quartzite bands are of restricted thickness. Cal gneiss is grey or green and banded, which shows typical ribbed weathering.

The charnockite (Ac) rock series consists of several naturally occurring rocks which are a product of metamorphosis. Metamorphosis is the continual process of earthly debris being exposed to harsh weather conditions and pressure. This results in the formation of rocks, many of these rocks have a highly important application in various industries. Generally, charnockite is anhydrous and essentially consists of orthopyroxene as its character-defining ferromagnetic mineral along with quartz and feldspar.

The minerals present in a granulite will vary depending on the parent rock of the granulite and the temperature and pressure conditions experienced during metamorphism. A common type of granulite found in high-grade metamorphic rocks of the continents contains pyroxene, plagioclase feldspar and accessory garnet, oxides and possibly amphiboles. Both clinopyroxene and orthopyroxene may be present, and in fact, the coexistence of clino- and orthopyroxene in a metabasite (metamorphed basalt) defines the granulite facies.

Khondalite Group comprises quartzite, calc granulite / crystalline limestone, garnetsillimanite gneiss, garnet-cordierite gneiss and garnet quartz-feldspar gneiss. Quartzite is an important member of the group, which occurs as linear bands of 5 m to 50 m thick and occupies the crest of linear ridges (Fig. 3.8)

3.7 Geomorphology

Geomorphologically, the entire region can be classified into areas occupied by erosional landforms and areas occupied by depositional landforms. Geomorphology is a study of earth structures and also depicts the various landforms relating to the ground water potential zones and also structural features. Geomorphology of an area depends upon the structural evolution of geological formation.

Denudational hills (DU) Carved out of more resistant formations standing as a continuous system of hills, characterized by coarse texture and high relief. Kanniwadi (DH1), Thowar R.F (DH2) subjected to differential erosion and other weathering processes occupy 14.3% of the total area.

Pediments valley floor have been regarded as smooth, gently inclined, surfaces that front receding escarpments, are epigene forms shaped by running water, and are well

represented in arid and semi-arid lands. In the study area found Western and Northern plain.

Shallow weathered Pediplain (PPS) Gently undulating surface of a buried pediplain with a shallow overburden developed by the planation of high relief areas, later subjected to the formation of shallow weathered zone. Groundwater occurrence is restricted to the weathered zone.

Moderately weathered pediplain (PPM) gently undulating surface of a buried pediplain having a relatively thick overburden in the Purana and Gondwana formations, occupies about 53.2% of the total area. Owing to its thick overburden, this area is suitable for bore wells and tube wells.

The plains are dominant in between these hill ranges, in which the district headquarters Dindigul is located. It is undulating plain covered by red soil, except for a stretch of black cotton soil in areas around Dindigul and Ottanchatram. The district is drained by four parallel tributaries of Periya kombai Ar. These ephemeral streams have their origin in the Kannivadi hill. Inselbergs, residual hills, pediments and pediplains are the prominent landforms. Shallow weathered buried plain in the study area. (Fig. 3.8).

3.8 Soil

The major soil types in the district are Red soil, Red sandy soil and Black Cotton soil. Red soils are prevalent in Palani, Natham and Odanchattiram, while Red sandy soils are prevalent in Nilakottai, Dindigul and Vedasandur. Black soil found in all taluks except Kodiakanal. (Fig.3.7).

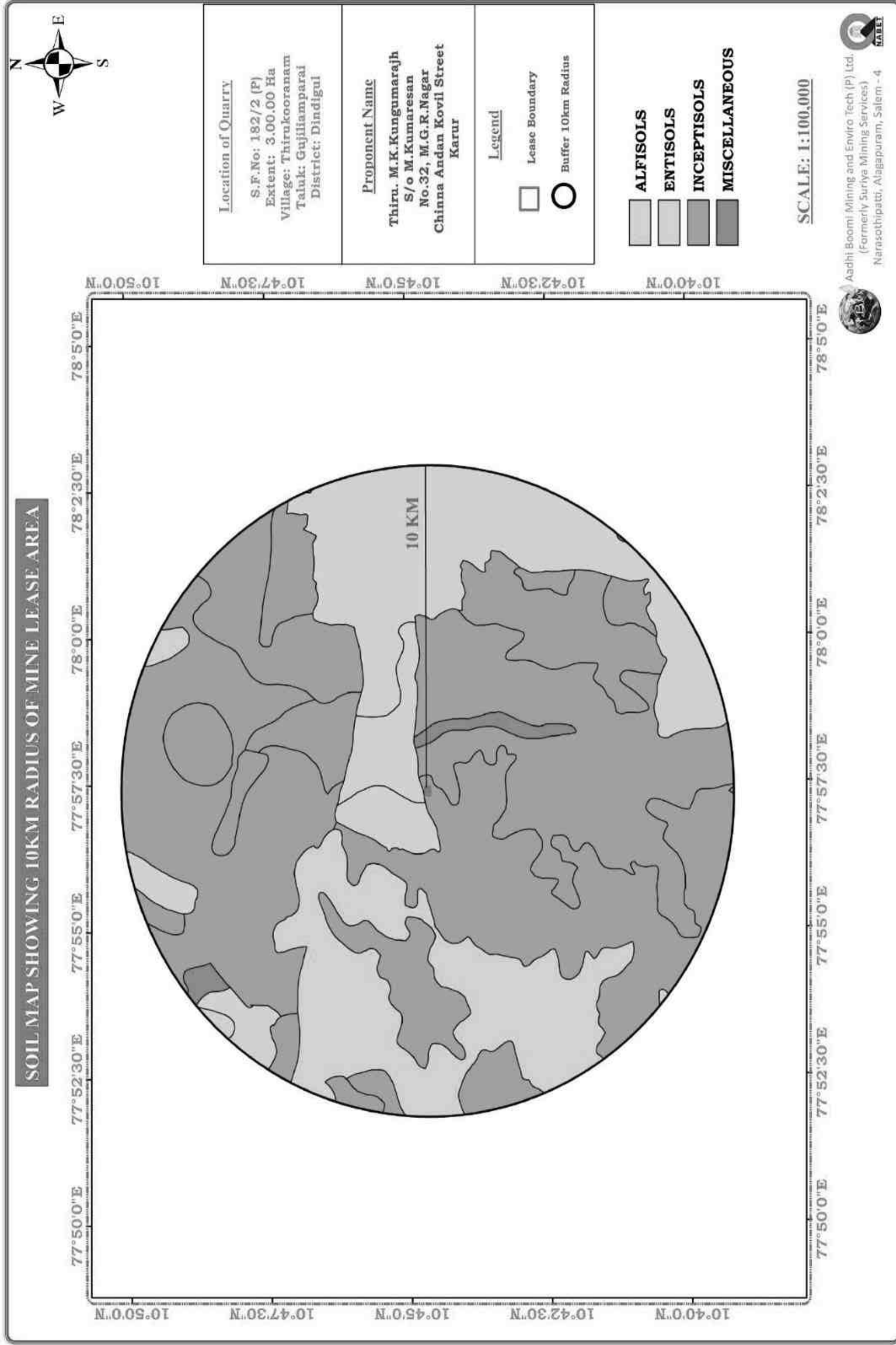


Fig No 3.7: Soil Pattern of 10km Radius

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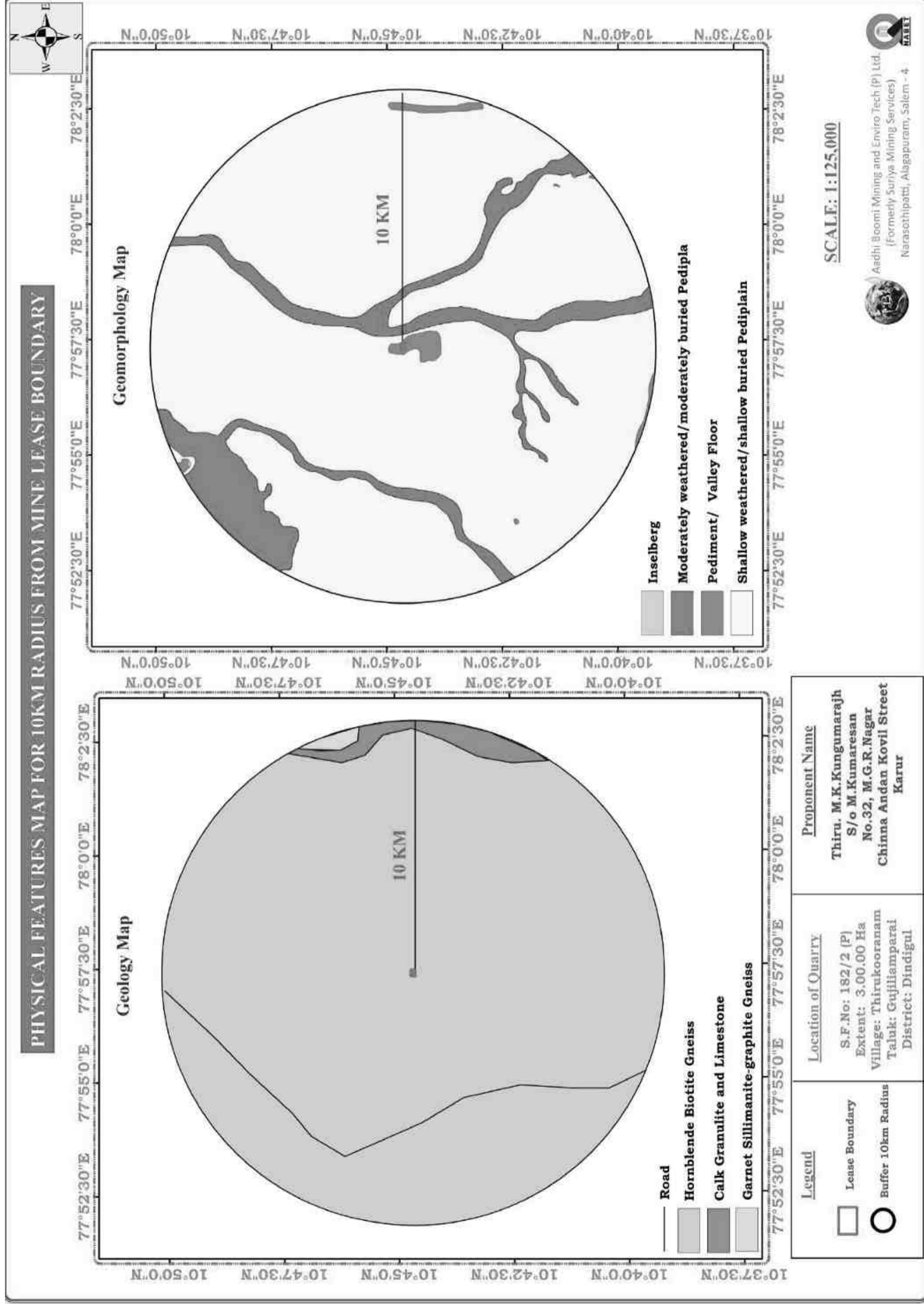


Fig No 3.8: Geology and Geomorphology of 10km Radius

3.9 Contour

Contour lines are the greatest distinguishing feature of a topographic map. Contour lines are lines drawn on a map connecting points of equal elevation, meaning if you physically followed a contour line, elevation would remain constant. Contour lines show elevation and the shape of the terrain in the study area. The contour map was derived from a SRTM data of the study area. Contour interval at 20m, minimum 2m has very plain with fluvial landforms and general terrain is quite elevated at maximum 294m above. To make topographic maps easier to read, because it's impractical to mark the elevation of every contour line on the map, the index contour lines are the only ones labeled. (Fig.3.9)

3.10 Slope

The slope map was derived from a SRTM data of the study area. The slope of the study area was classified into four classes, such as less than 5 Percent/degree gentle, low speed ground motion, sheet erosion and soil erosion, a lot of ground movement and erosion. Slope zone 5-10°, 10-20°, 20-30° slightly steep, a lot of ground movement and erosion, especially landslides that area flat and above 30° very steep, intensive denudation processes and ground movements are common (Fig.3.9).

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Table No 3.3 Slope Nature Process and conditions

Slope Class	Nature, Process and Natural Conditions
$0^{\circ} - 2^{\circ}$ (0-2%)	Flat to almost flat, no meaningful denudation process
$2^{\circ} - 4^{\circ}$ (2-7%)	Gentle, low-speed ground motion, sheet erosion and soil erosion (sheet & rill erosion), erosion swamps.
$4^{\circ} - 8^{\circ}$ (7-15%)	More Gentle, the same as above, but with a higher magnitude.
$8^{\circ} - 16^{\circ}$ (15-30%)	Slightly steep, a lot of ground movement and erosion, especially landslides that are flat.
$16^{\circ} - 35^{\circ}$ (30-70%)	Steep, intensive denudation processes and ground movements are common.
$35^{\circ} - 55^{\circ}$ (70-140%)	Very steep, rocks generally begin to unfold, a very intensive denudational process, have begun to produce rework material.
$> 55^{\circ}$ >140%	Very steep, exposed rocks, a very strong denudational process and prone to falling rocks, rarely grown plants (limited)

Source: Calculation of this slope using van Zuidam classification, 1985.

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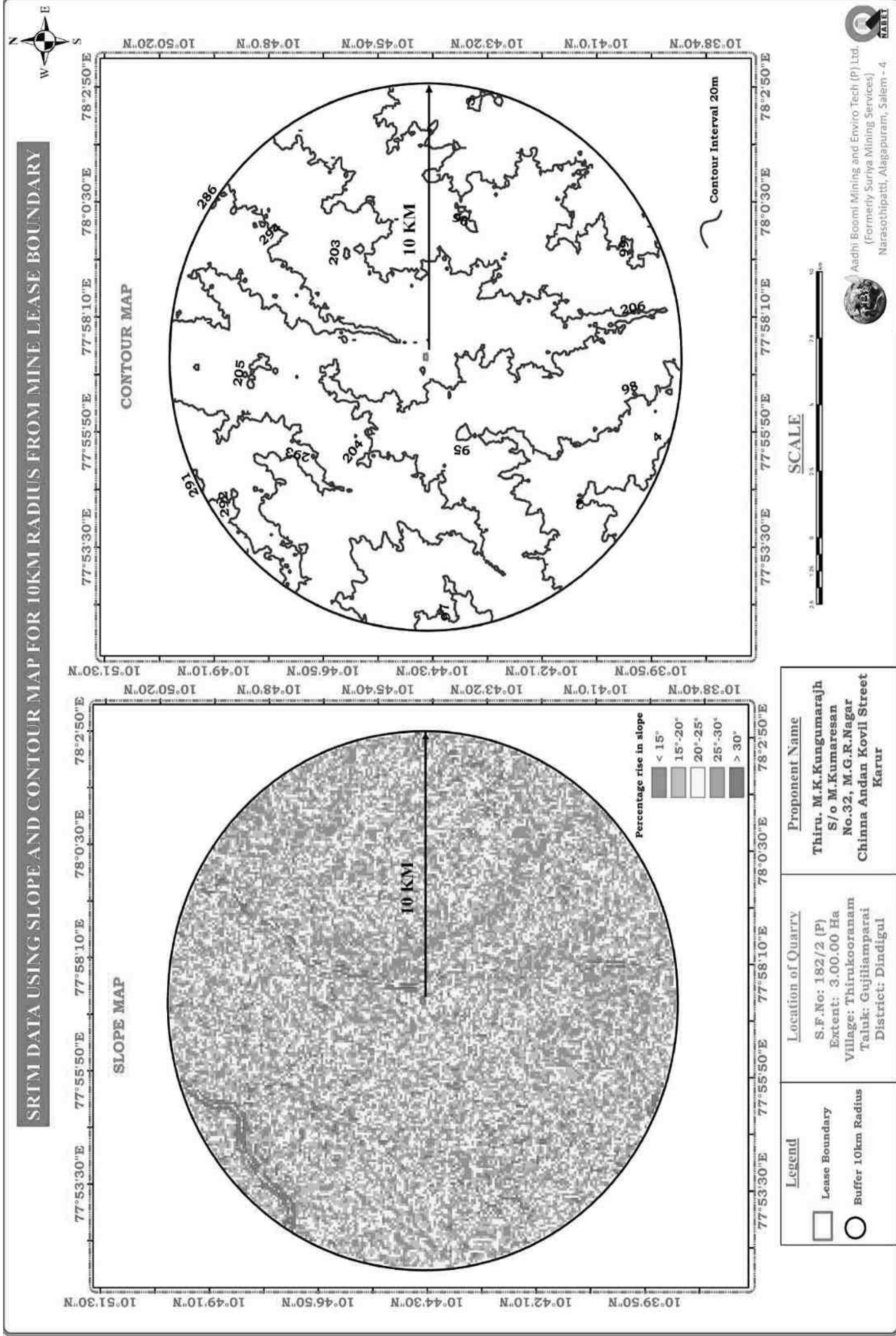


Fig No 3.9: Relief Features of 10km Radius

3.11 CONCLUSION

The most of the land area in the agriculture and non agriculture land entire quarried land will get replaced every year hence there will be no impact on the land use. It is an eco-friendly mining project land.

3.12 METEOROLOGY

Meteorology is the important characteristics in assessing the diffusion pattern of air pollutants released into atmosphere. Meteorological characteristic plays a vital role in assessing possible environment impacts and in preparing environmental management plan. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn from long-term reliable data. Such source of data is India Meteorological Department (IMD), which maintains a network of meteorological stations at important locations. The nearest IMD station for this proposed site is located at Dindigul district.

3.12.1 Regional Meteorology

The Dindigul district receives rainfall during NE monsoon, SW monsoon, summer and winter. The normal annual rainfall varies from 717 mm per year. Dindigul has a tropical climate. The summers are much rainier than the winters in Dindigul. The driest month is March, with 11 mm of rainfall. The greatest amount of precipitation occurs in October, with an average of 180 mm. Kodaikanal and Palani hill ranges of the district receiving the maximum rainfall, due to the surrounding of Western Ghats.

The rest of the district lies in the rain shadow region of the Western Ghats and experiences decent climate throughout the year, except the central and northern parts of the district. However, the eastern part of the district also having a meaningful rainfall and hood climate. The temperature ranges from 22.5°C to 34.3°C in plains and in hilly terrain of the district experiencing a maximum of 22°C in summer and a minimum of 8°C during winter.

3.12.2 Meteorological Data Recorded at IMD Station, Dindigul district

The meteorological parameters were recorded on hourly basis during the study period for parameters like rainfall, wind speed, wind direction and temperature. In the present study, in the month of March, 2022 to May, 2022 meteorological data has been taken to find the dispersion of pollutant concentration. Wind-rose diagram for the study period is shown given below in Fig No. 3.10.

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Table No 3.4: Summary of the Meteorological data for the study period

S. No	Month	Temperature (°C)		Rainfall (mm)	Humidity (%)	Avg. wind speed (mps)
		Max	Min			
1	March, 2022	37	22	45.2	53	2.0
2	April, 2022	38	25		56	1.7
3	May, 2022	36	25		58	2.2

In the present study, in the month of March, 2022 to May, 2022 meteorological data has been taken to find the dispersion of pollutant concentration. Wind-rose diagram for the study period is given below in Fig No. 3.10.

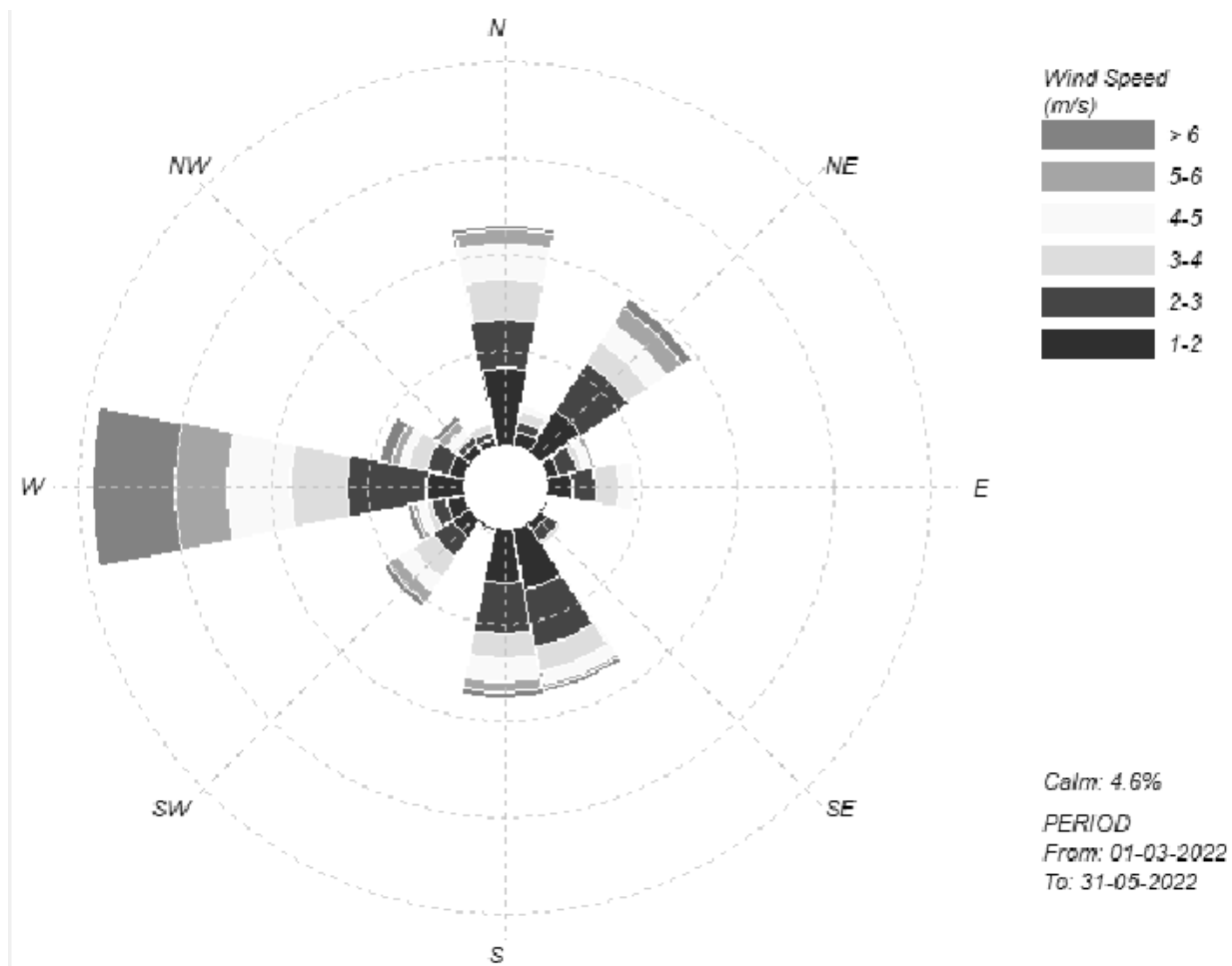


Fig No 3.10: Wind Rose Pattern

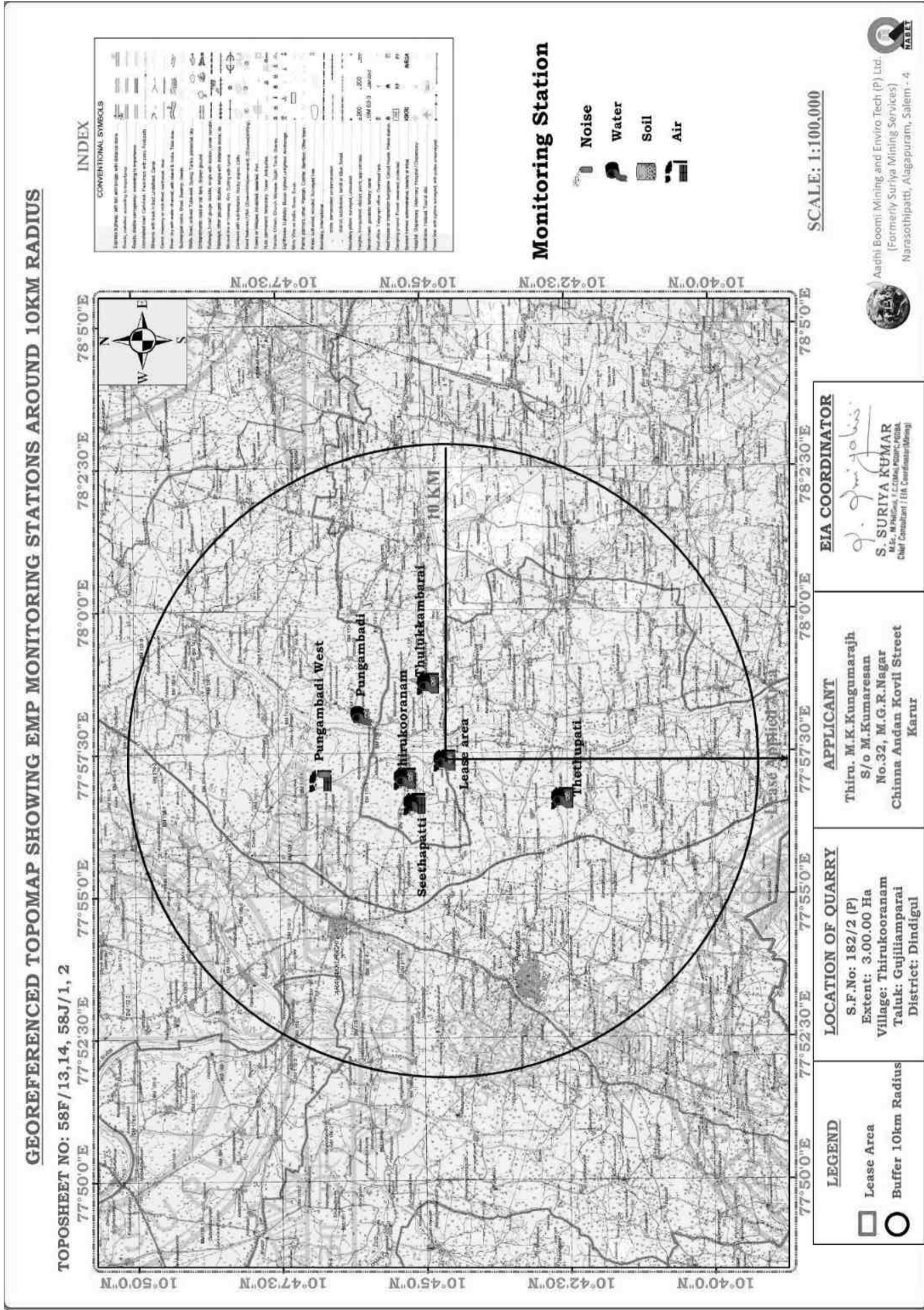


Fig No 3.11 Geo-Referenced Toposheet showing 10km radius of Environmental Monitoring Stations

3.13 AIR ENVIRONMENT

To assess the existing air quality of the study area, the baseline air quality was carried out. This will also be useful for assessing the standards of the ambient air quality of the proposed project after the operation

3.13.1 Ambient Air Monitoring**3.13.1.1 Selection of sampling location**

To assess the ambient air quality, monitoring was carried out on monthly basis in the surrounding areas of the project site. Air quality survey has been conducted for assessing the ambient air quality of the study area at 6 locations over a period of summer season i.e. March 2022 to May 2022. Major air pollutants viz, Particulate matter (PM₁₀ & PM_{2.5}), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) represents the basic air pollutants in the region for Ambient Air Quality Monitoring (AAQM). The ambient air quality monitoring stations are given in Table No 3.5

Table No 3.5 Ambient Air Quality Monitoring Stations

Sampling Code	Location	Latitude	Longitude	Distance (km)	Direction
AAQ 1	Lease area	10°44'39.07"	77°57'21.23"	--	--
AAQ 2	Pungambadi West	10° 46'22.01"	77° 56'58.03"	4.2	N
AAQ 3	Seethapatti	10° 45'7.57"	77° 56'26.05"	1.7	NW
AAQ 4	Thethupatti	10° 39'24.06"	77° 58'30.08"	4.3	SW
AAQ 5	Thirukooranam	10° 44'47.03"	77° 57'50.01"	1.3	N
AAQ 6	Thulukambarai	10° 44'51.02"	77° 58'74.05"	2.5	E

3.13.1.2 Parameters and Monitoring Methodology

Ambient air quality monitoring was conducted over 3 month i.e. from March 2022 to May 2022 at a frequency of twice a week at each station adopting a 24-hours schedule. The sampling equipment was placed at a height of 3 to 3.5 meters above ground level at each monitoring station, thus negating the effects of wind blow ground dust. Ambient Air quality monitoring was conducted in respect of the following parameters:

- ☒ Particulate Matter (PM₁₀) Particulate Matter (PM_{2.5})
- ☒ Sulphur Dioxide (SO₂) Nitrogen Dioxide (NO₂)

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Fig A. Core Zone



Fig B. Seethapatti Village



Fig C. Thethupatti Village



Fig D. Thirukooranam Village



Fig E. Thulukambarai Village

Fig No 3.12: Air Sampling at Five stations

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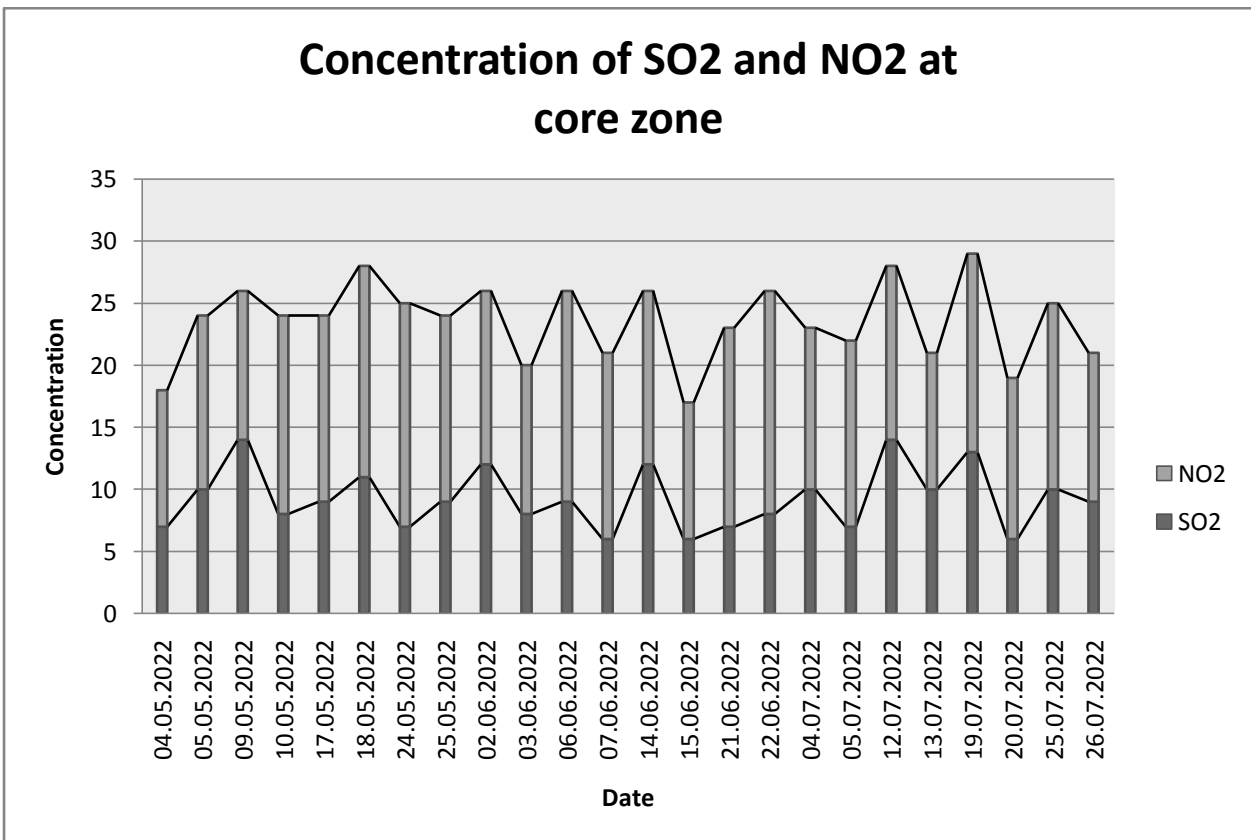
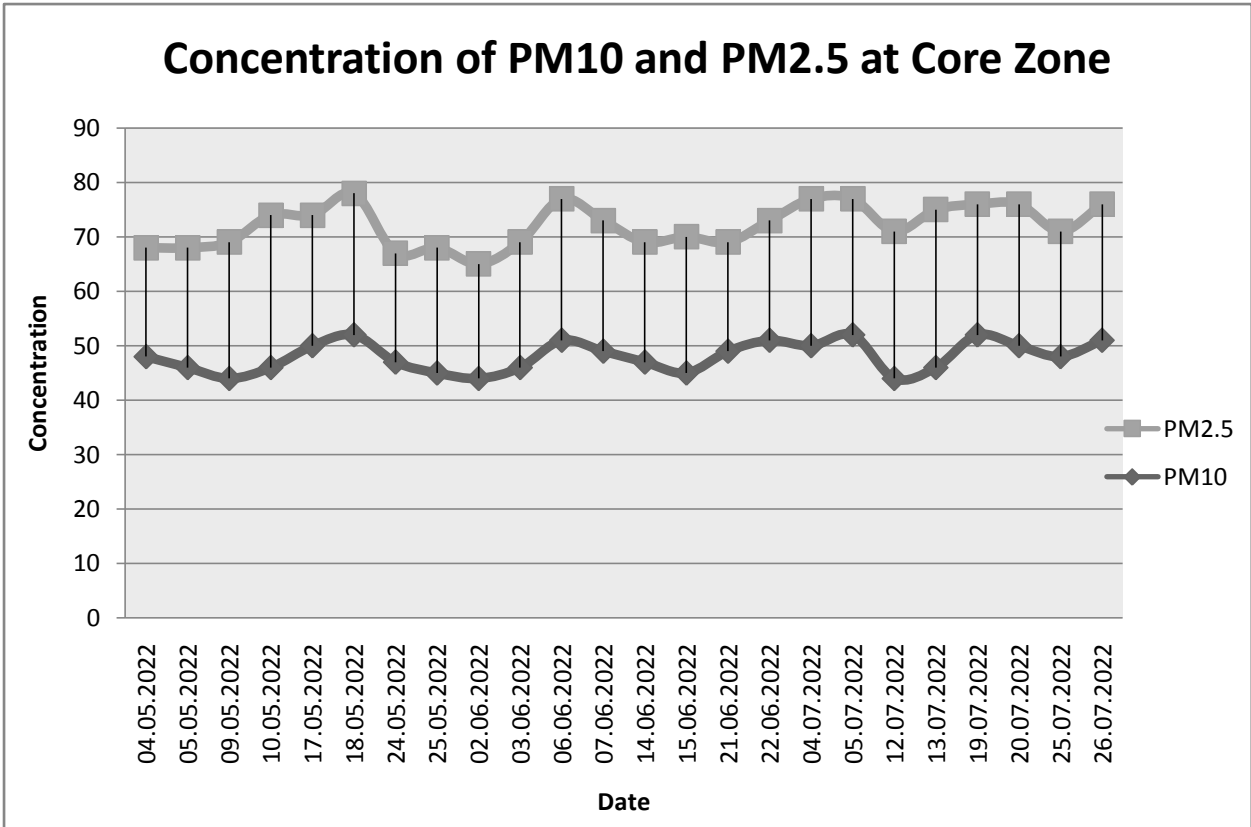
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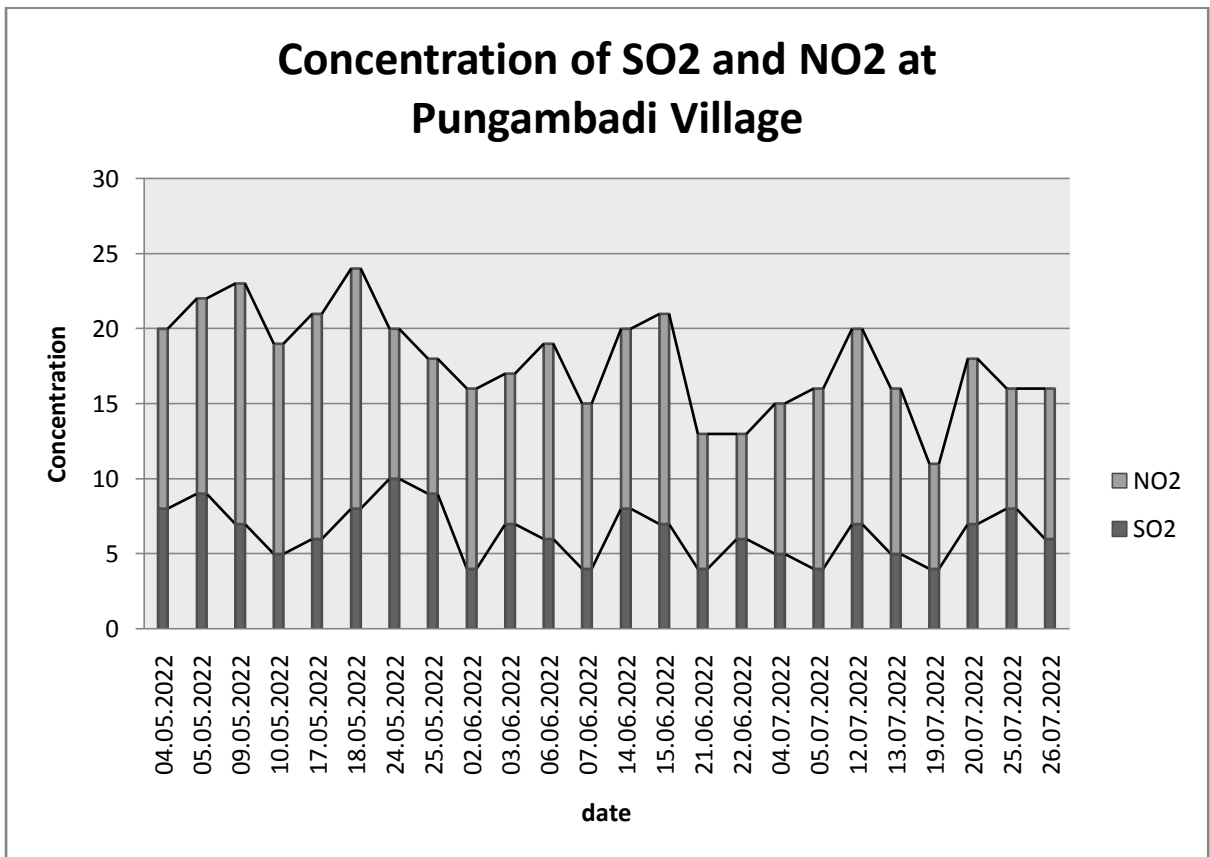
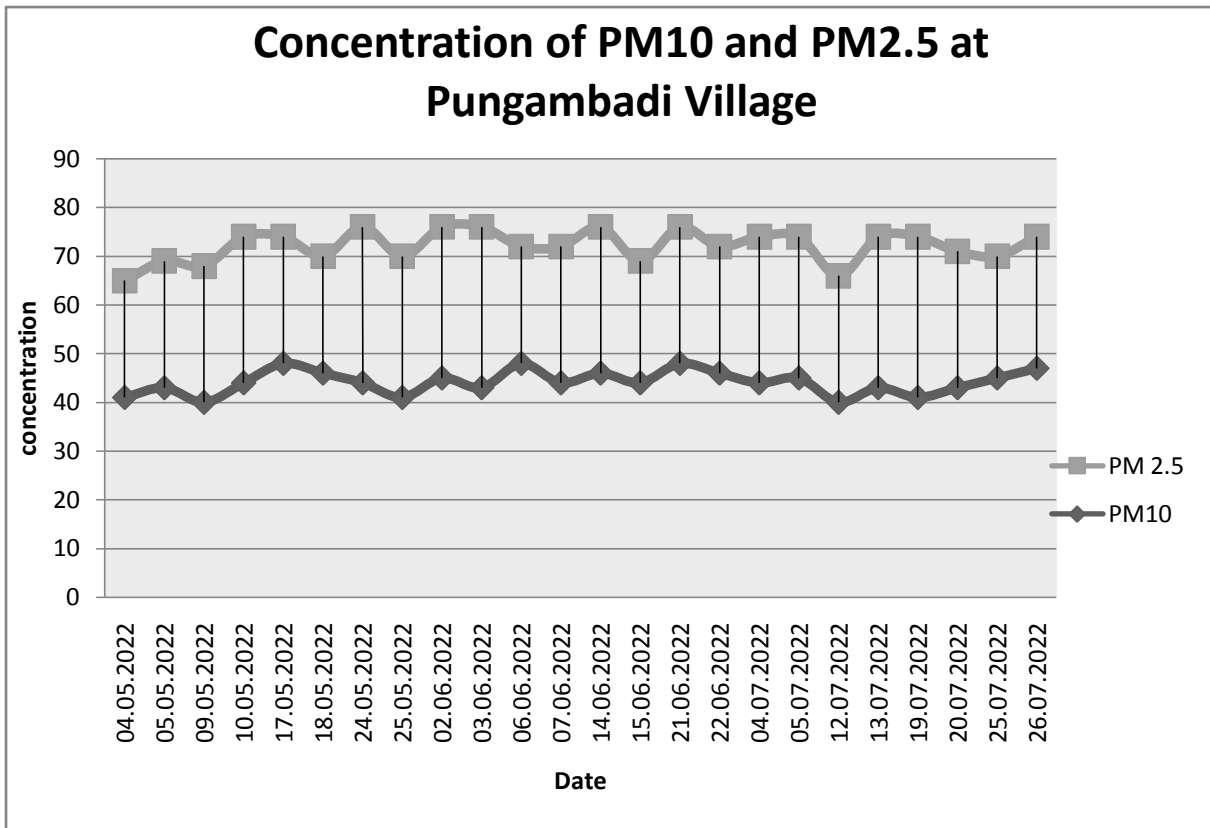
3.13.2 Monitoring Result

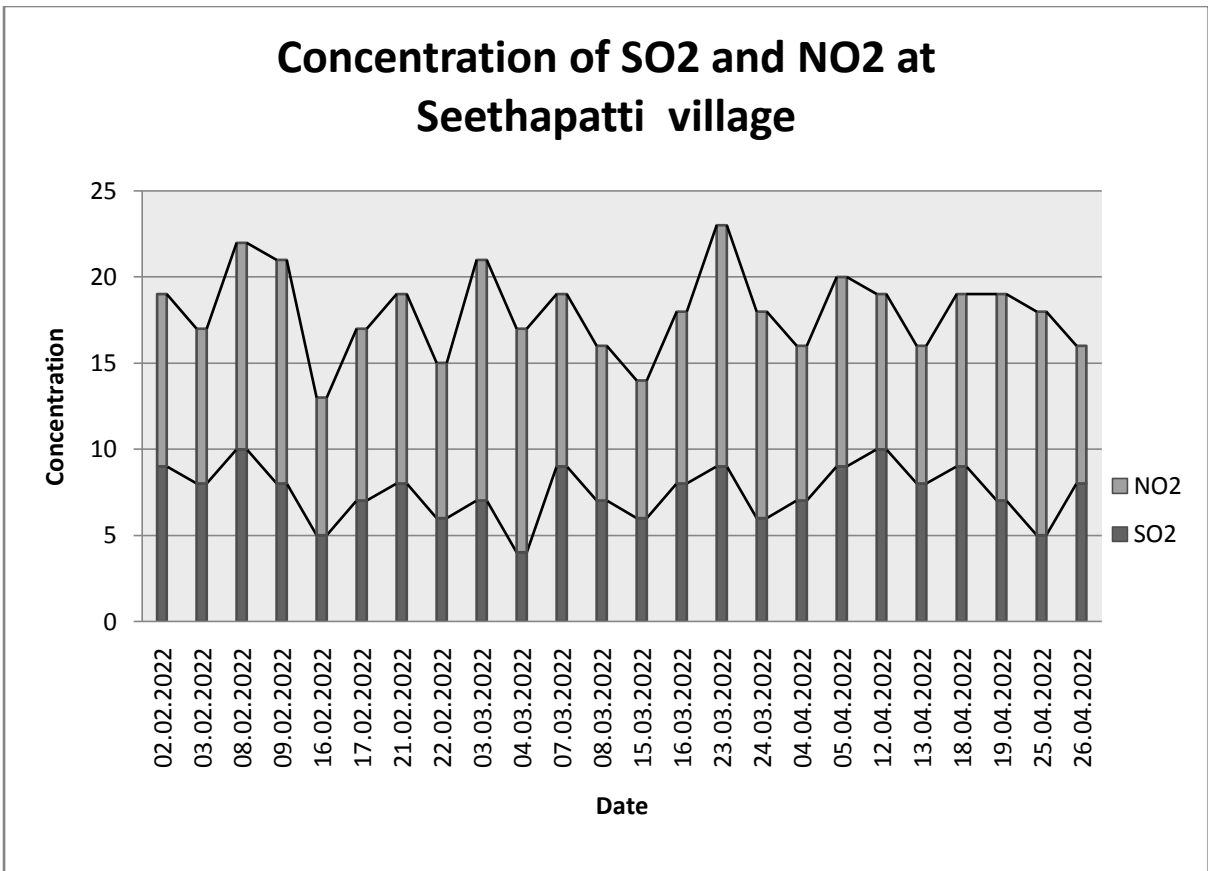
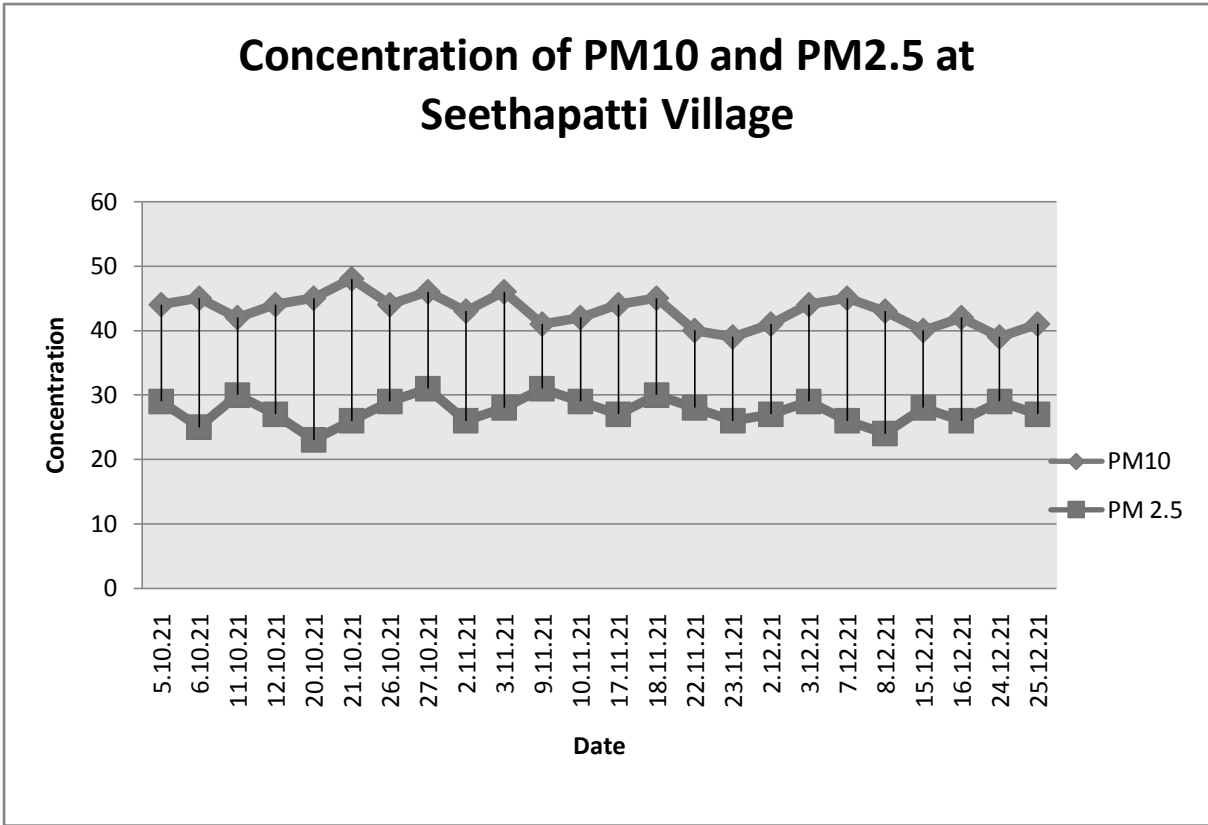
Statistical Analysis of Ambient Air Quality in the study area for the monitoring period are shown parameter wise in Table No 3.6

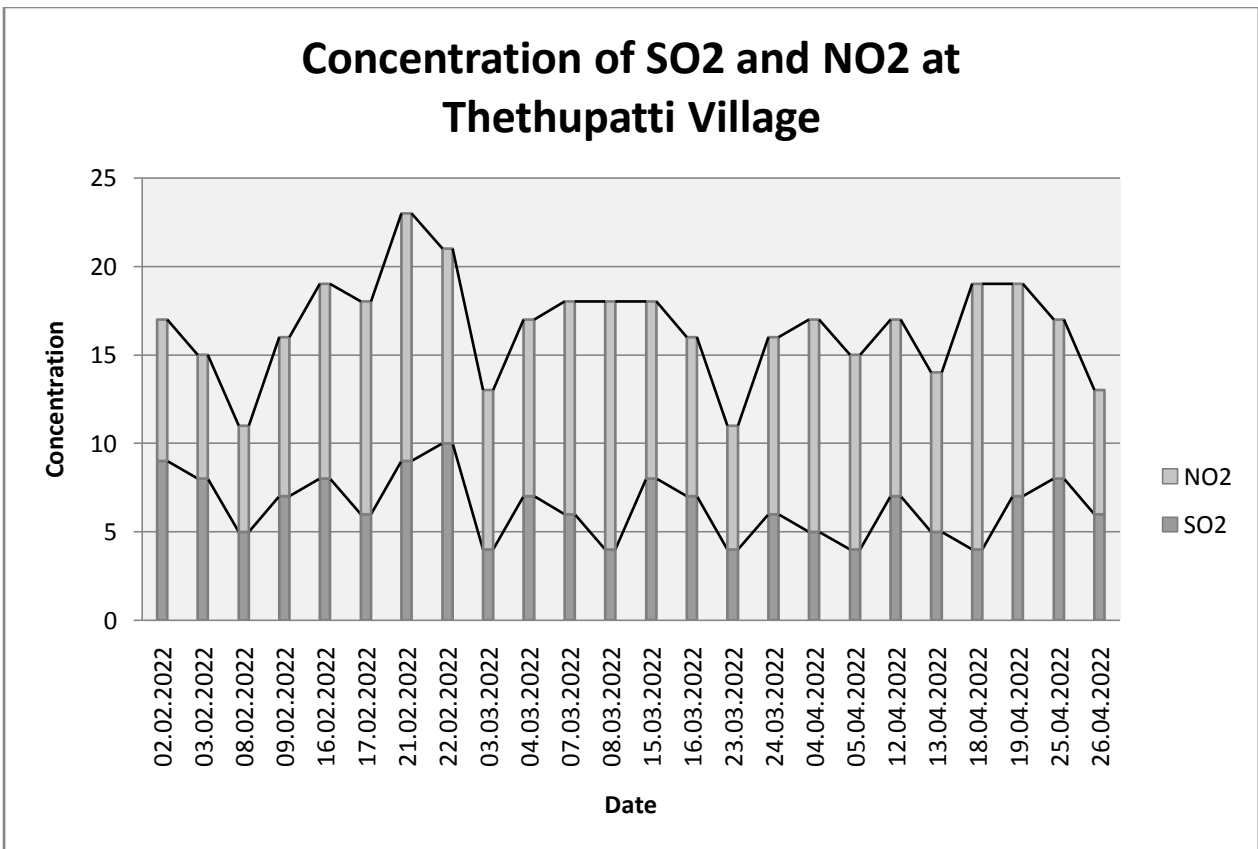
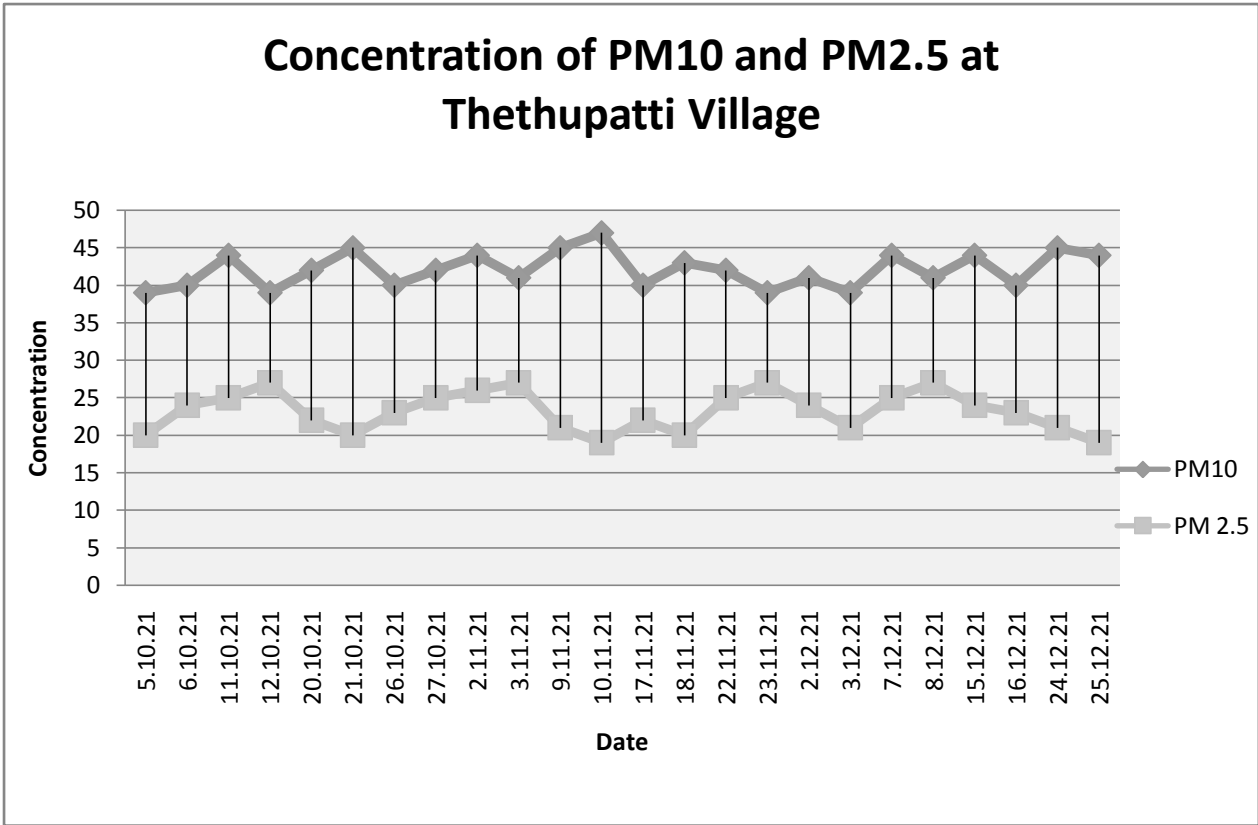
Table No 3.6 Summary of Ambient Air Quality Results

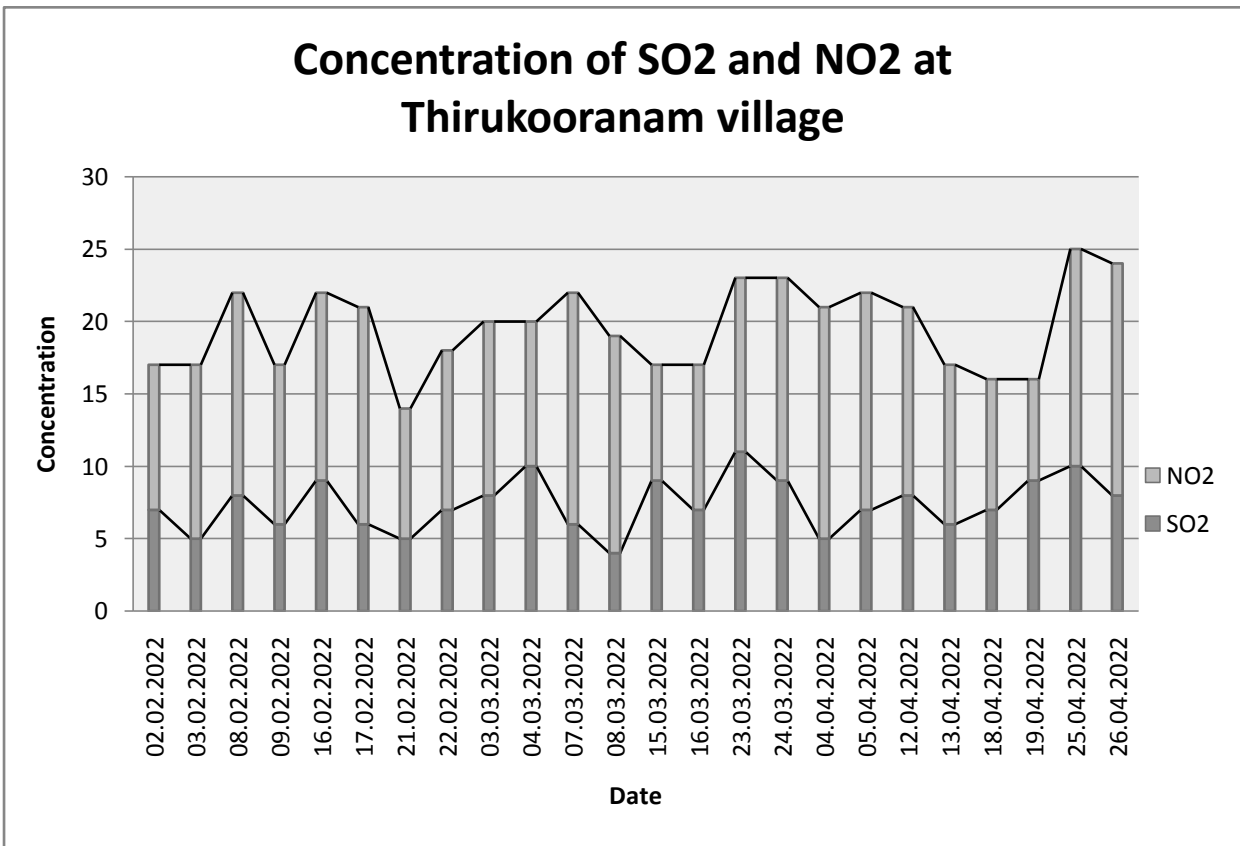
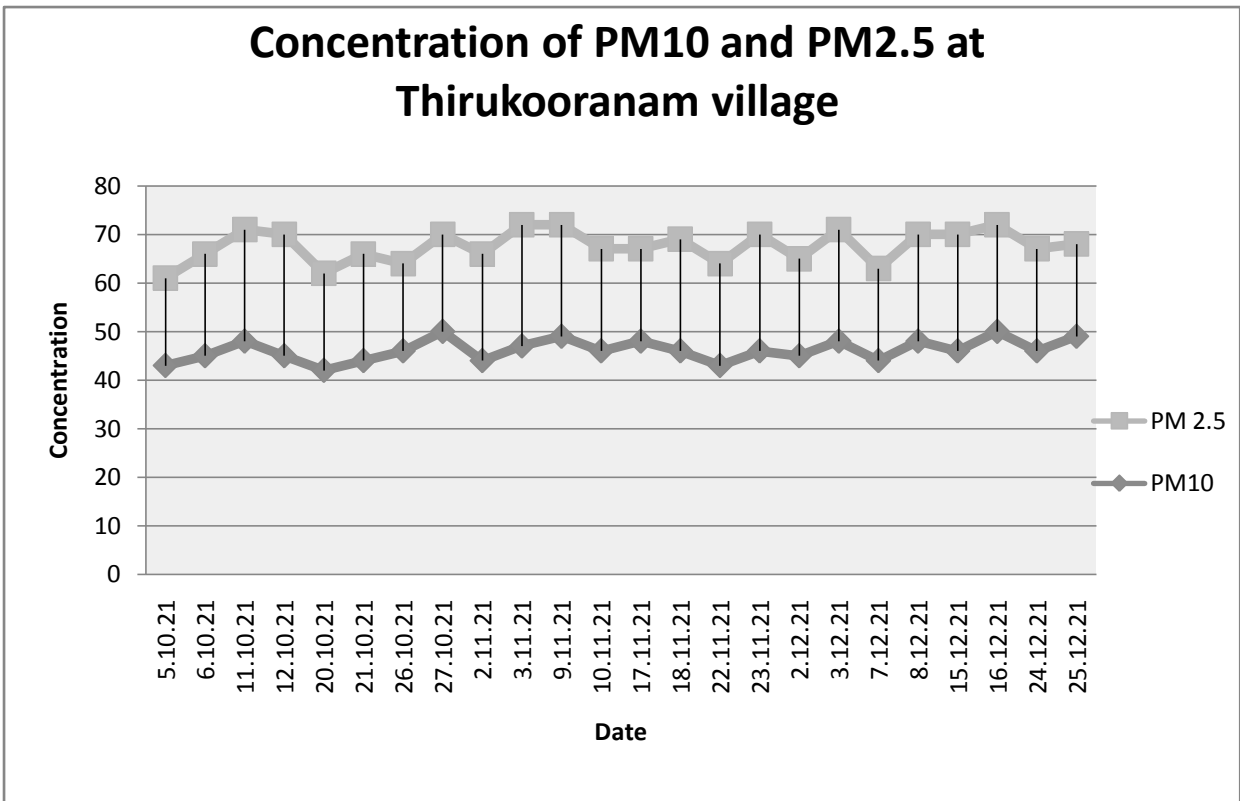
Code	Locations	Parameters	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m)
AAQ 1	Lease Area	Maximum	52	29	14	18
		Minimum	44	20	6	11
		Average	48.0	24	9	14
		98%	52	28.5	14	17
AAQ 2	Pungambadi Village	Maximum	48	33	10	16
		Minimum	40	24	4	7
		Average	44	28	6	11
		98%	48	32.5	9.5	16
AAQ 3	Seethapatti Village	Maximum	48	31	10	15
		Minimum	39	22	4	6
		Average	43	27	7	10
		98%	47	31	10	14
AAQ 4	Thethupatti Village	Maximum	46	27	10	15
		Minimum	39	19	4	6
		Average	42	23	6	10
		98%	45	27	9.5	13.5
AAQ 5	Thirukooranam Village	Maximum	50	25	11	16
		Minimum	42	18	4	7
		Average	46	21	7	12
		98%	49	24	10	16
AAQ 6	Thulukambarai Village	Maximum	52	32	12	18
		Minimum	44	19	4	8
		Average	48	26	8	13
		98%	51	31.5	12	17
NAAQS			100	60	80	80











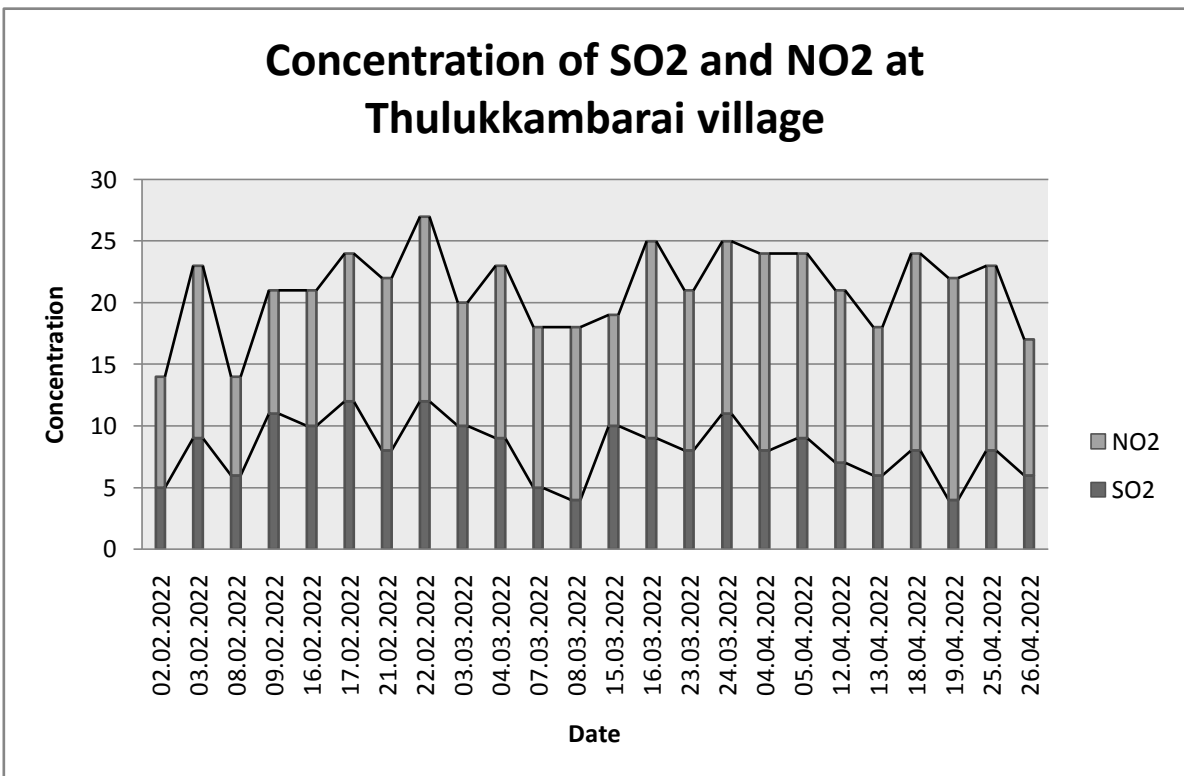
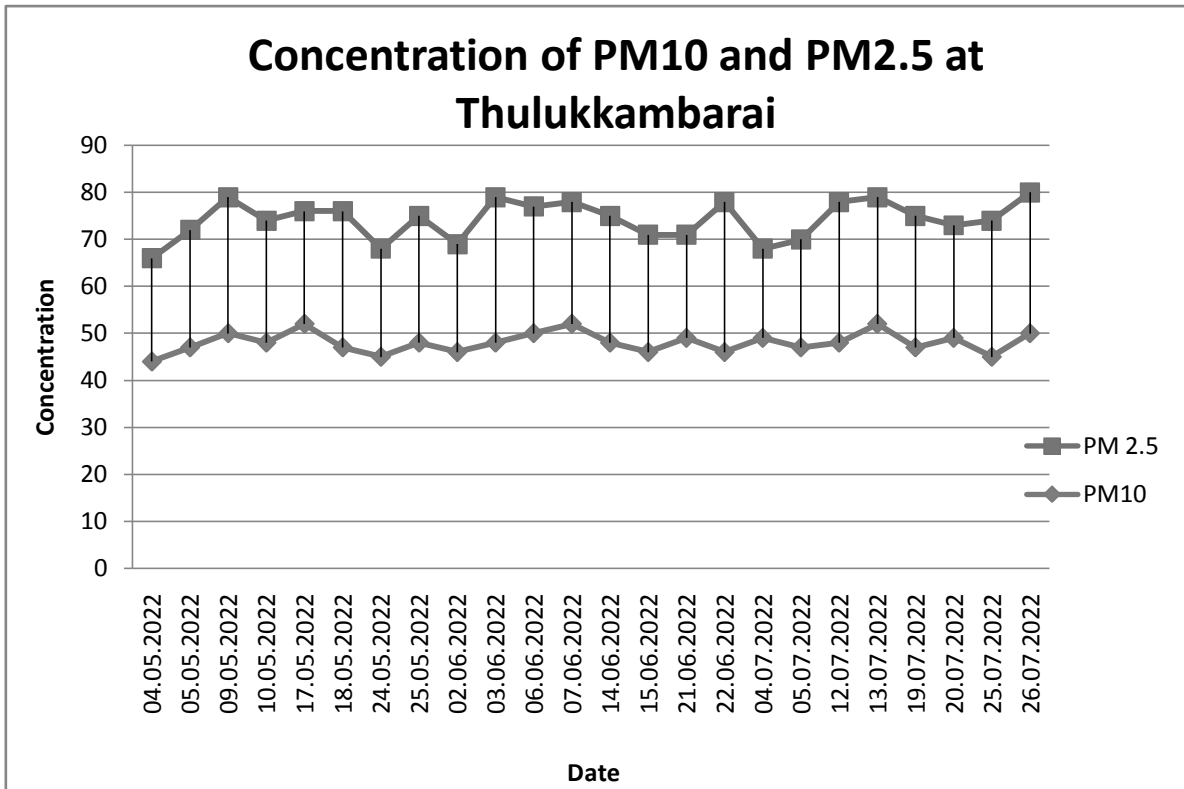


Fig No 3.14: Variation in Concentration of air pollutants

3.13.3 Observation

(i) Particulate Matter (PM_{2.5})

The average PM_{2.5} level at six stations was varied from 21µg/m³ to 28µg/m³ for the monitoring period 1st March, 2022 to 31st May, 2022. The maximum concentration was recorded at Pungambadi village of 33µg/m³ and the minimum concentration was recorded at Thirukooranam village of 18µg/m³.

(ii) Particulate Matter (PM₁₀)

The average PM₁₀ level at six stations was varied from 42µg/m³ to 48µg/m³ for the monitoring period 1st March, 2022 to 31st May, 2022. The maximum concentration was recorded at lease area and Thulukkambarai village of 52µg/m³ and the minimum concentration was recorded at Seethapatti and Thethupatti village of 39µg/m³.

(iii) Sulphur Dioxide (SO₂)

The average SO₂ level at six stations was varied from 6µg/m³ to 9µg/m³ for the monitoring period 1st March, 2022 to 31st May, 2022. The maximum concentration was recorded at lease area and followed by Thulukkambarai village of 14µg/m³ and 12 µg/m³ respectively. The minimum concentration was recorded at Seethapatti and Thethupatti village of 4µg/m³.

(iv) Nitrogen Dioxide (NO₂)

The average NO₂ level at six stations was varied from 10µg/m³ to 14µg/m³ for the monitoring period 1st March, 2022 to 31st May, 2022. The maximum concentration was recorded at Thulukkambarai Village of 18µg/m³ and the minimum concentration was recorded at Seethapatti and Thethupatti village of 6µg/m³.

Based on comparison study of results with NAAQS for monitored parameters, it is interpreted that ambient air quality of the monitored locations can be considered good as all the results of tested parameters are well within the limits of NAAQS prescribed by CPCB.

3.14 NOISE ENVIRONMENT

A preliminary reconnaissance was undertaken for identification and evaluation of the present noise status on the general population. Therefore, noise level measurement was carried out at each ambient air quality station and also at site. The objectives of Noise environment studies are:

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

- To assess the ambient noise level in the study area.
- To characterize the noise pollution area.
- To predict the temporal changes in the ambient noise level of the area.

The baseline noise levels were taken to assess the Impact of Noise on the workers in the mine site and on the nearby settlements due to mining machineries, movements of vehicles etc. Ten locations were identified based on the activities in the study area in dB (A) scale. Georeferenced Top map showing location of noise sampling is given in the Fig No.3.17. The Noise recording stations are shown below in Table No. 3.7 and Fig No. 3.15.

Table No 3.7 Noise Monitoring Stations

Sl. No	Location	Station code	Distance (km)	Direction
1	Lease area	N1	--	--
	Lease boundary pillar (North)	N2	0.1	N
	Lease boundary pillar (South)	N3	0.1	S
	Lease boundary pillar (East)	N4	0.1	E
	Lease boundary pillar (West)	N5	0.1	W
2	Pungambadi West	N6	4.2	N
3	Seethapatti	N7	1.7	NW
4	Thethupatti	N8	4.3	SW
5	Thirukooranam	N9	1.3	N
6	Thulukambarai	N10	2.5	E

3.14.1. Method of Monitoring

Sound Pressure Level (SPL) was measured at nine locations; one reading per hour was taken for 24 hours. The day time noise levels were monitored during 6 am to 10 pm and night time levels during 10 pm to 6 am at all the monitoring locations within the study area. Noise monitoring location of core zone and buffer zone are given in the Fig No.3.15.



Fig A: Noise Sampling at Core Zone



Fig A. Seethapatti Village



Fig B. Thethupatti Village



Fig C. Thirukooranam Village



Fig D. Thulukambarai Village

Fig No.3.15: Noise Sampling at Core Zone and Buffer Zone

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

For each location, day and night time Leq values have then been computed from the hourly Leq values such that comparison could be made with the national ambient noise standards.

Table No 3.8 Summary of Ambient Noise Level during study period

Sample code	Location	Decibel dB (A)		TNPCCB Standards
		Day Time	Night Time	
N1	Lease area	46.0	36.4	Industrial – 75 dB(A) Residential – 55 dB(A)
N2	Lease boundary pillar (North)	48.2	37.2	
N3	Lease boundary pillar (South)	45.7	35.0	
N4	Lease boundary pillar (East)	46.5	35.8	
N5	Lease boundary pillar (West)	47.6	36.8	
N6	Pungambadi West	42.2	33.4	
N7	Seethapatti	40.4	31.0	
N8	Thethupatti	45.3	35.1	
N9	Thirukooranam	45.6	35.3	
N10	Thulukkambarai	47.6	36.4	

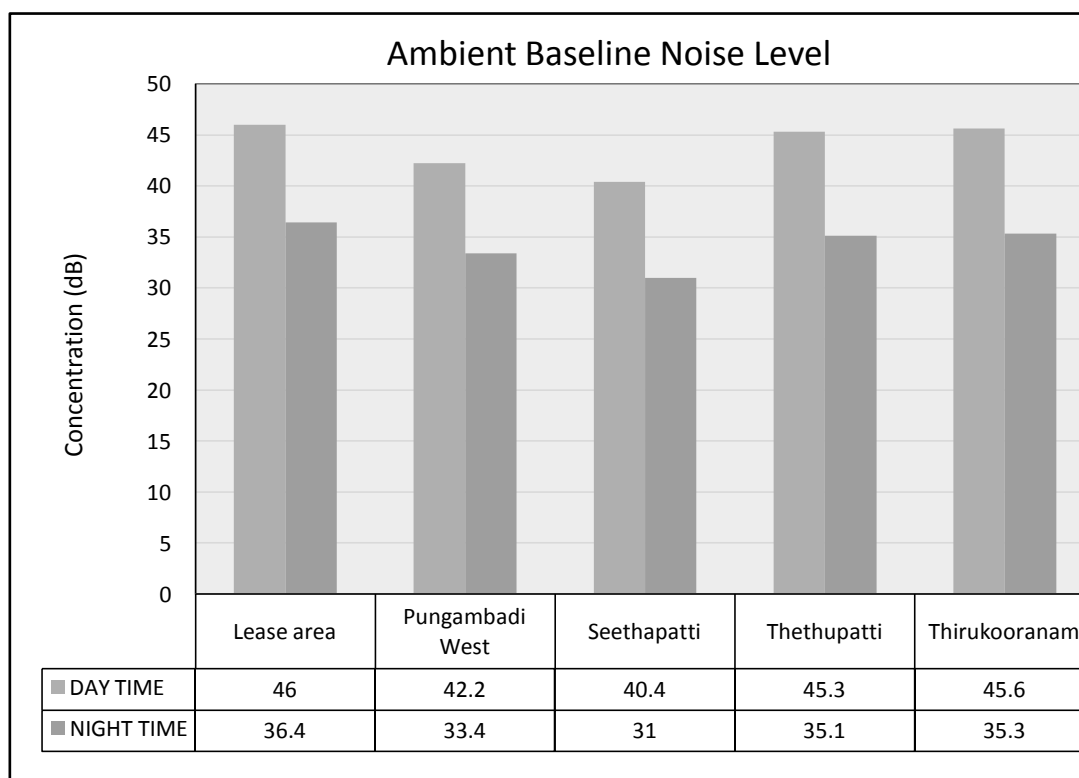


Fig No 3.16: Ambient Baseline Noise Level

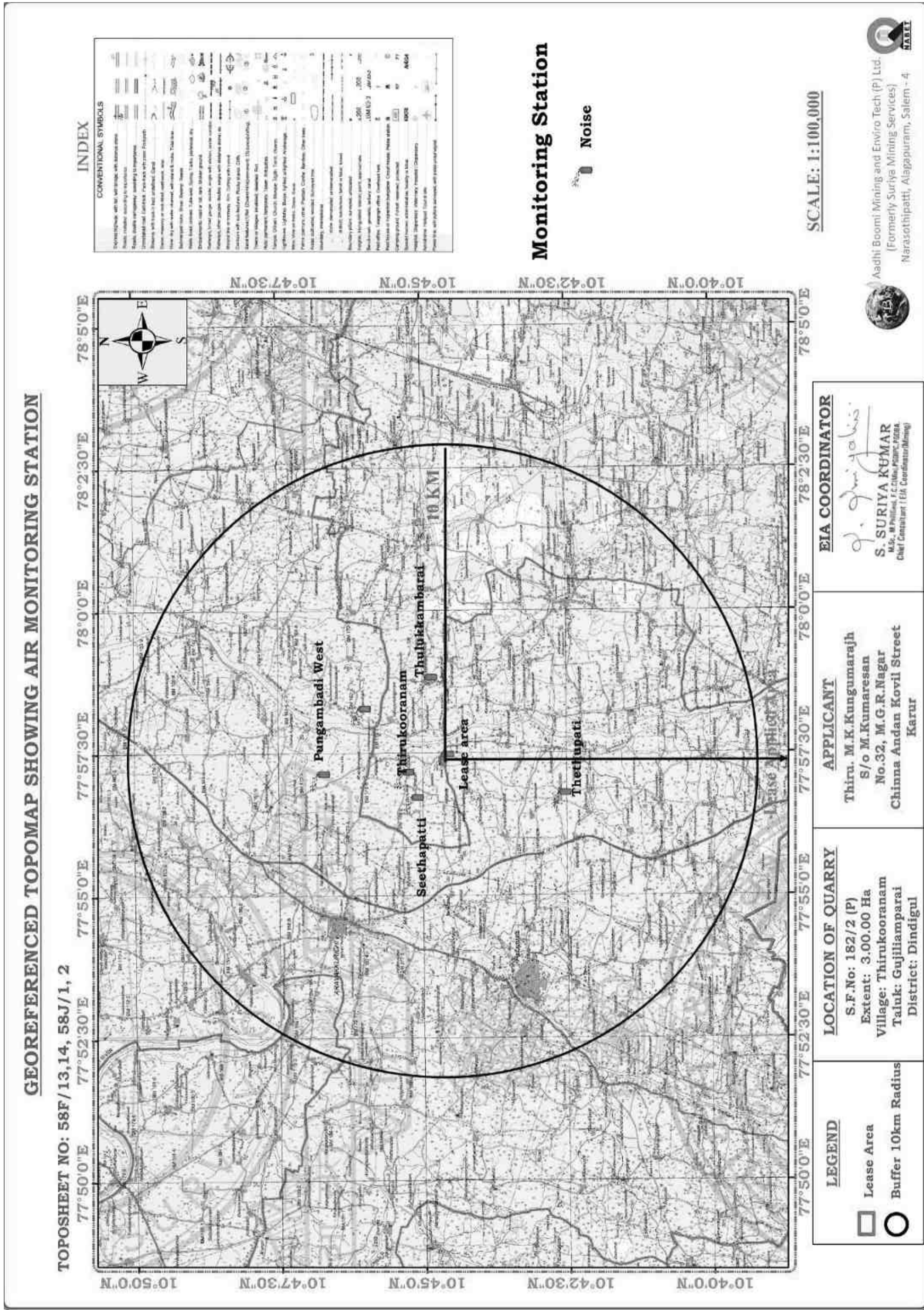


Fig No 3.17: Georeferenced Toposheet showing Noise sampling locations

3.14.2 INTERPRETATION

Day Time Noise Levels: The day time noise levels at Core zone were observed as 46.0 dB (A) being well within the Industrial area prescribed limit of 75 dB (A) whereas the noise levels at all locations of Buffer zone were observed to be in the range of 40.4–47.6 dB (A) being well within the Residential area prescribed limit of 55 dB (A) as per CPCB Standard for Industrial Areas.

Night Time Noise Levels: The night time noise levels at all locations of buffer zone villages were observed to be in the range of 31.0-36.4 dB (A) being well within the residential area prescribed limit of 45 dB (A) whereas the Noise level in the core Zone was observed as 36.4 dB (A) which is also within the prescribed limit of 70 dB (A) as per CPCB Standard for Industrial Areas.

3.15 WATER ENVIRONMENT

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

- ❖ Identification and Location of major surface and ground water sources
- ❖ Location of the project site
- ❖ Water samples were collected and analysed for physical, chemical and biological parameters characteristics as per IS 10500:2012

Five Water samples were collected one from core zone and four from the buffer area. Samples for chemical analysis were collected in polyethylene bottles. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analyzed for projecting the existing water quality (baseline values) status of ground and surface water in the study area. Photographs of Core and Buffer Zone water sampling locations are given in the Fig No. 3.18. Details of water sampling locations are present in Table No. 3.9. In addition, water quality details are given in the Table No. 3.10. The following image of Georeferenced Topomap showing locations of water samples are given in the Fig No.3.19.

Table No 3.9 Water Sampling Locations

Sampling code	Location	Latitude	Longitude	Distance (km)	Direction
WQ 1	Lease area	10°44'39.07"N	77°57'21.23"E	--	--
WQ 2	Pungambadi	10 ⁰ 46'22.4" N	77 ⁰ 56'57.9" E	4.2	NW
WQ 3	Thethupatti	10 ⁰ 39'22.7" N	77 ⁰ 58'27.4" E	4.3	SW

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WQ 4	Thirukooranam	10 ⁰ 44'45.9"	77 ⁰ 57'51.6"	1.3	N
WQ 5	Thulukambarai	10 ⁰ 44'55.1"	77 ⁰ 58'41.5"	2.5	E



Fig A. Water Sampling near Core Zone





Fig B. Water Sampling at Different Buffer Zone

Fig No.3.18: Water Sampling at Core Zone and Buffer Zone

Table No: 3.10 Summaries of Water Quality Results

Parameters	Units	As Per IS 10500:2012		PROTOCOL: APHA 23 rd Edition 2017	Core Zone	Pungam badi	Thethup atti	Thiruko oranam	Thulukk ambarai
		Requirement (Acceptable limit)	Permissible limit in the absence of alternate source						
pH value at 25°C	-	6.5 – 8.5	6.5 – 8.5	4500 H ⁺ B	8.4	7.48	7.34	7.24	7.34
Turbidity	NTU	1	5	2130 B	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
Electrical conductivity at 25°C	Micro mhos/ cm	-	-	2510 B	4990	882	5794	1350	5790
Total Suspended Solids	mg/l	-	-	IS:3025: P.17:1984:R.2012	20	2	10	2	12
Total Dissolved Solids	mg/l	500	2000	IS:3025: P.16:1984:R.2012	2510	493	3710	756	3722
Total Hardness as CaCO ₃	mg/l	200	600	2340 C	1200	95	1676	270	1542

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Calcium as Ca	mg/l	75	200	IS 3025: P.40:1991:R.2019	360	36	404	59	351
Magnesium as Mg	mg/l	30	100	IS 3025: P.46:1994:R.2019	73	1	162	24	161
Total Alkalinity as CaCO ₃	mg/l	200	600	IS 3025: P.23:1986:R.2019	138	275	300	100	300
Carbonate	mg/l	-	-	IS 3025: P.51:1986:R.2017	34	BDL (DL:1)	BDL (DL:1)	BDL (DL:1)	BDL (DL:1)
Bicarbonate	mg/l	-	-	IS 3025: P.51:1986:R.2017	104	275	300	100	300
Chlorides as Cl	mg/l	250	1000	4500 Cl ⁻ B	954	668	1907	753	2003
Sulfates as SO ₄	mg/l	200	400	4500 SO ₄ E	63	13	107	20	107
Total Iron as Fe	mg/l	0.3	0.3	3500 Fe B	0.01	0.04	2	0.07	2
Silica (Reactive) as SiO ₂	mg/l	-	-	4500 SiO ₂ C	-	-	-	-	-
Total Coliforms	MPN / 100ml	Shall not be detectable in any 100 ml		IS:1622-1981 Amd.4 RA 2012	170	27	220	30	220
E.coli	MPN / 100ml	Shall not be detectable in any 100 ml		IS:1622-1981 Amd.4 RA 2012	<2	<2	<2	<2	<2

3.15.1. Interpretation

Ground Water Quality results were compared with Acceptable limits for Drinking Water as per the Standard IS 10500:2012. Some parameters of Water samples did not meet the acceptable limits of IS 10500: 2012.

- pH of the water samples ranged from 7.24 -8.4. pH in water samples collected from all the locations are within the acceptable limits limit.
- EC was found to be in the range of 882-5794, is found high in all the locations.
- Carbonates except in Core Zone (34 mg/l) was all found to be Below Detectable Limit
- Iron in water samples collected from core, Pungambadi and Thirukooranam was found to be within permissible limit. The other two locations was found to be 2 mg/l, is beyond the Required/Permissible limit.
- Total Dissolved Solids found in the range of 493 - 3722 mg/l. Highest value was recorded in Thulukkambarai, Thethupatti, Core zone, Thirukooranam and was found the limits exceeds the required limit of 500 mg/L as per CPCB norms.
- Total Hardness of water sample varied between 95-1676 mg/l and the maximum value recorded at Thethupatti village. The entire four samples' except Pungambadi village TH exceeds the Acceptable limit.
- Chloride in the water samples ranged from 753 - 2003 mg/l. Highest Chloride value was recorded in Thulukkambarai village followed by Thethupatti, Core zone, Thirukooranam and Pungambadi. All the five water samples taken for analysis exceed the acceptable limit.
- Turbidity from all the water samples was found below detectable limit.
- Sulphates in all the water samples were found within the Acceptable limit.
- On Microbiological parameters, the water sample from core and buffer zone contain few counts of Total Coli forms and E.coli was found <2 MPN Index/100ml at 95 percent confidence limit.

Prolonged consumption of water containing high TH causes Cardio vascular problems, diabetes, skin diseases, rashes, reproductive failure and renal failure. For

the excellent quality of drinking the water must be treated with reverse osmosis process to overcome above mentioned such impacts on human body. Boiling of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

3.16 Hydro Geology of the District

The major part of the district is underlain by Archaean crystalline metamorphic complex. The important aquifer systems encountered in the district are classified into

- i) Fissured, fractured and weathered crystalline formations consisting of charnockites, Granite Gneisses and
- ii) Valley fill sediments (Unconsolidated Sediments) comprising clay, sand, silt and kankar Valley fill sediments have been observed along valley portions in the depth range of 35 to 40 m bgl in Natham and Sanarpatti blocks.

They are characterized by deeper water levels showing high fluctuations. Groundwater occurs under watertable condition. In general, dug wells are used to extract groundwater from these zones and the wells can yield about 200 Cu.m per day and can sustain pumping of 3 – 4 hrs in a day. In case of crystalline formations, groundwater occurs under water table condition in weathered and shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from place to place from less than a metre to a maximum of 40 m bgl. The number of saturated fracture zones varied from 1 to 6 occurring at depths between 10 and 164 mbgl.

The ground water exploration in deeper aquifer reveals that in about 11 per cent of the wells drilled, the yield was more than 3 lps, whereas in about 15 per cent of the wells, the yield ranges from 1 to 3 lps. A few of the wells have been abandoned due to poor yield. Dug wells are used extract groundwater from weathered formation while deeper fractures are tapped through bore wells and dug cum bore wells.

The yield of open wells in the district tapping the weathered mantle of Crystalline rocks generally ranges from 100 to 400 lpm for draw down ranging from 2 to 4.5 m. The dug wells can sustain a pumping of 3-4 hrs in a day The wells tapping the deep seated fracture system can yield about 1 – 5 lps and can sustain a pumping of 6-8 hrs a day.

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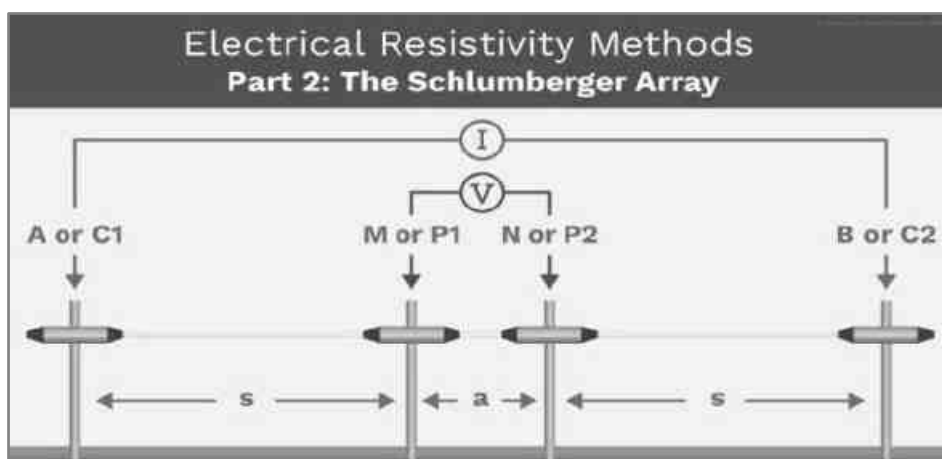
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The depth to water level during pre monsoon (May 2006) in the district varied from 0.12 to 13.10 m bgl. Out of 20 wells, 10% of wells had depth to water level in the range of 0- 2 m bgl, 40% in the range of 2 – 5 m bgl, 45% in the range of 10 – 20 m bgl and 5% more than 20 m bgl.

The depth to water level during post monsoon (Jan 2007) varied from 0.90 to 14.90 m bgl and out of 20 wells, 25% of wells had depth to water level in the range of 0- 2 m bgl and 2 – 5 m bgl. 40% of the wells had depth to water level in the range of 10 – 20 m bgl and 10% more than 20 m bgl.

3.16.1. Geophysical Electrical Resistivity Survey The Schlumberger Array

Geophysical Electrical Resistivity survey conducted in schlumberger Configuration (VES) method using IPI2win Software. The Schlumberger array is an array where four electrodes are placed in line around a common midpoint. The two outer electrodes, A and B, are current electrodes, and the two inner electrodes, M and N, are potential electrodes placed close together. With the Schlumberger array, for each measurement the current electrodes A and B are moved outward to a greater separation throughout the survey, while the potential electrodes M and N stay in the same position until the observed voltage becomes too small to measure (source). At this point, the potential electrodes M and N are moved outward to a new spacing. As a rule of the thumb, the reasonable distance between M and N should be equal or less than one-fifth of the distance between A and B at the beginning. This ratio goes about up to one-tenth or one-fifteenth depending on the signal strength. The Schlumberger array is commonly used for vertical electrical sounding (VES) for groundwater and aggregate minerals. Vertical electrical sounding (VES) using the Schlumberger array provides better resolution.



Schlumberger Array



Model DDR-3 Electrical Resistivity Meter

The resistivity surveys were carried by the consultants in the site at selected one point at Tested in the proposed Project site. The vertical electrical sounding (VES) using digital resistivity meter is carried out and the apparent resistivity curves are obtained. Ipi2win software is used and the data are interpreted. The computer output of geo-electric layers gives the apparent resistivity curve, depth wise resistance and interpreted layers with corresponding resistivity.





Fig No 3.20: Photos Showing Geophysical Survey conducted at the lease area

3.16.2 Pump Test

The site is located is a flat ground with deposit in charnockite. There are few bore wells in the around 10 km radius buffer zone. One of the bore well is located which is reported total depth to be 32.5m in depth and gives moderate yield. The bore well is fitted with 2 HP submergible pumps and water is pumped at intervals for Agriculture purpose.

The bore well recorded static water level of 32.5m and pumping level goes below 75.3m in 60 minutes pumping. In order to avoid dry run of bore and ensure sustainability of yield, the bore well is pumped at intervals. The discharge of the well is measured by volumetric method from the time taken to fill the ground level sump and the estimated discharge is 67 litres per minute (Lpm). The pumping test is conducted in the bore well on 5th july 2022 and the drawdown and recovery data are given in Table No 3.11 and 3.12.

The pumping head is more than 170m and the water level sounder with cable length of 105m were used for recording the fluctuation in water level during pumping and recovery period. The observed recovery data is used to get aquifer characteristics by applying the recovery formula. The semi-log plot is given in Fig No.3.21. and the estimated Transmissivity value of 0.16 m²/day.

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Fig No.3.21: Pump test survey conducted on bore well around 1Km radius from lease area

Table no 3.11 Pump test

Site name with coordinates	Ishethra International Residential School, Pungambadi West, 10°46'22.10"N, 77°56'58.30"E			
Location and Project details	Ishethra International Residential School, Pungambadi West, Aravakuruchi Taluk, Karur District			
Block	Aravakuruchi			
District & State	Karur & Tamil Nadu			
Type of well	Bore well : 30 feet depth (9m)			
Date of test & start time	05.05.2022 ; 11.00 hours			
Diameter of well(mm)	165			
Distance from the observation well(mm)	No observation well			
Capacity of the pump	2 HP			
Discharge (lpm)	67 LPM			
Measuring point (m)	Ground level			
SWL in m below measuring point	32.5			
Clock Time (HH/MM)	Time since pumping	Pumping Water Level	Draw down (m)	Remarks

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	started (Mints)	(m bmp)		
11.00	0	32.5	0	Pump started
11.01	1	34.8	2.3	
11.02	2	36.6	4.1	Discharge 95 LPM
11.03	3	38.2	5.7	
11.04	4	40.2	7.7	
11.05	5	42.0	9.5	
11.06	6	43.3	10.8	
11.07	7	44.2	11.7	
11.08	8	46.5	14	
11.09	9	48.3	15.8	
11.10	10	50.1	17.6	
11.12	12	53.2	20.7	
11.14	14	56.0	23.5	
11.16	16	58.2	25.7	Discharge 95 LPM
11.18	18	60.8	28.3	
11.20	20	62.5	30	
11.25	25	66.3	33.8	
11.30	30	69.2	36.7	
11.35	35	71.5	39	
11.40	40	73.1	40.6	
11.45	45	74.0	41.5	
11.50	50	74.5	42	
11.55	55	74.9	42.4	
12.00	60	75.3	42.8	Pump stopped

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Table no. 3.12 Recuperation Test

Time in Hours	Time since pump stopped (min) (t')	Time since starting of pumping (min) (t)	Water Level (m bmp)	Residual Drawdown RDD (m)	t/t'
12.00	0	100	75.3	42.8	0
12.01	1	101	73.5	41	101
12.02	2	102	71.6	39.1	51
12.03	3	103	69.2	36.7	34.33
12.04	4	104	67.6	35.1	26
12.05	5	105	65.3	32.8	21
12.06	6	106	64.3	31.8	17.66
12.07	7	107	63.5	31	15.28
12.08	8	108	62.1	29.6	13.5
12.09	9	109	61.5	29	12.11
12.10	10	110	60.2	27.7	11
12.12	12	112	59.2	26.7	9.33
12.14	14	114	58.6	26.1	8.14
12.16	16	116	57.1	24.6	7.25
12.18	18	118	56.5	24	6.55
12.20	20	120	55.8	23.3	6
12.25	25	125	54.9	22.4	5
12.30	30	130	53.7	21.2	4.33
12.35	35	135	52.6	20.1	3.85
12.40	40	140	51.2	18.7	3.5
12.45	45	145	50.4	17.9	3.22
12.50	50	150	49.6	17.1	3
12.55	55	155	48.5	16	2.81
13.00	60	160	47.5	15	2.66

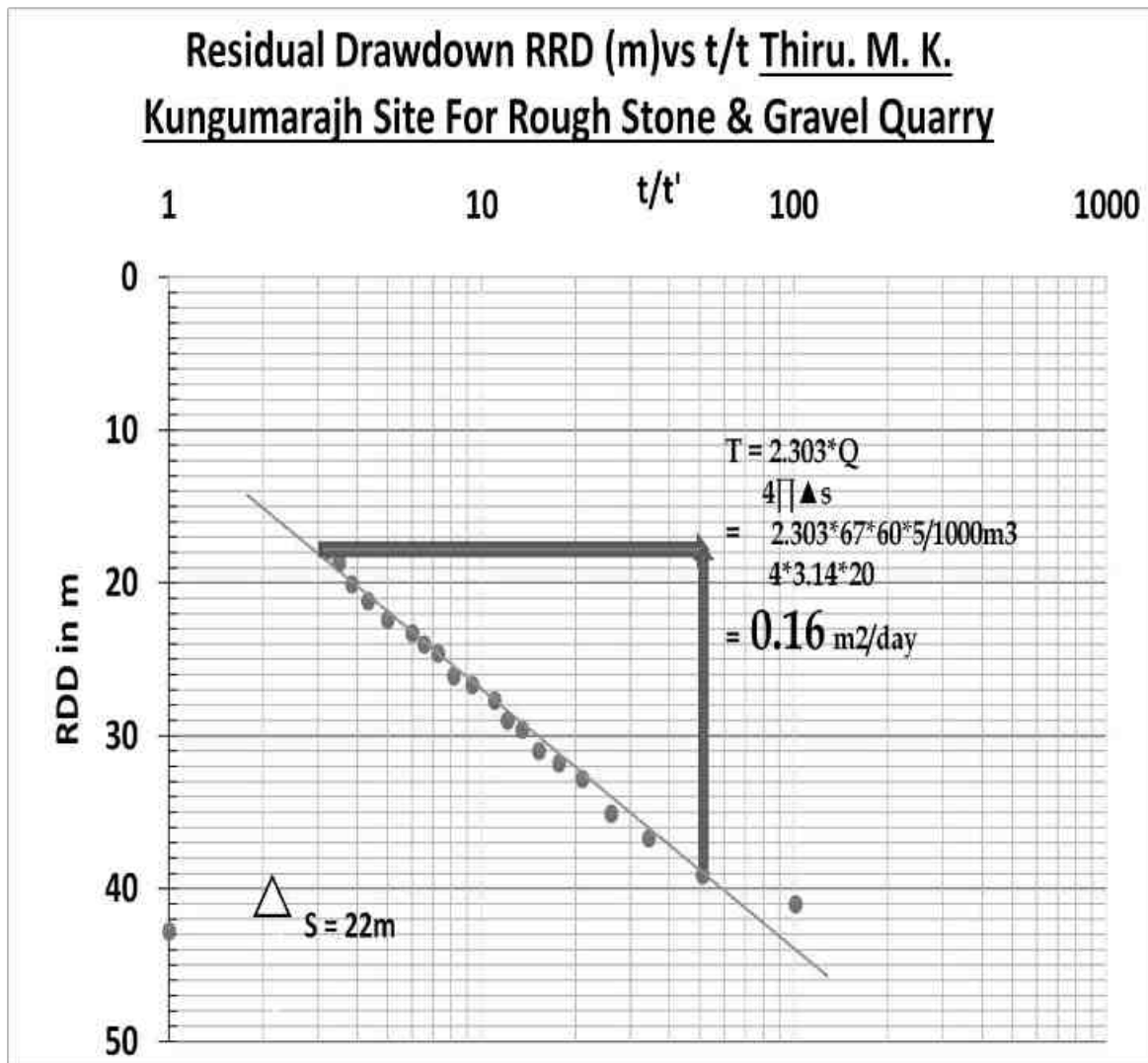


Fig No 3.21: PUMP TEST – Draw down/Recuperation measurements

3.16.3 Study on Bore wells within the radius of 1Km





Fig No 3.21 (a): Well inventory survey data recording around 1km Radius

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Table no. 3.13. Details on number of Bore wells within the radius of 1km

S.No	Location details	Latitude & Longitude & MSL	Type of well	Water level
1	Thirukooranam Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°44'41.0"N, Long: 77°57'24.8"E Elevation=179MSL	Bore well Total depth=170m	25.5m
2.	Thirukooranam Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°45'7.44"N Long: 77°57'26.79"E Elevation=175MSL	Bore well, Total Depth =210m	27.3m
3.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°46'13.47"N Long: 77°57'10.47"E Elevation=179MSL	Bore well, Total Depth=300m	72.5m
4.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°46'22.1"N Long: 77°56'58.3"E Elevation=185MSL	Bore well, Total depth=170m	32.5m
5.	Malapatty Village, Gujiliamparai Taluk, Dindigul District	Lat: 10°44'47.6"N Long: 77°57'50.3"E Elevation=173MSL	well, Total depth=21m	10.5m
6.	E.Amarathupatty Village Gujiliamparai Taluk, Dindigul District	Lat: 10°44'45.5"N Long: 77°57'50.8"E Elevation=177MSL	Bore well, Total depth=150m	12.5m
7.	E.Amarathupatty Village Gujiliamparai Taluk, Dindigul District	Lat: 10°44'45.5"N Long: 77°57'50.8"E Elevation=199MSL	Bore well, Total depth=180m	15.6m

3.17 SOIL ENVIRONMENT

Dindigul district is characterized by Red loam, Black soil, Laterite Soil, Red sandy Soil. Red Loam is found in most of the blocks of the district such as Dindigul East, Dindigul west, Athoor, Oddanchatram, and Veda sandur. While laterite soil is found in all blocks of the district and Black soil is found along the Oddanchatram Taluk. Red sandy Soil is predominant in this district. Generally district is undulating plain covered by red soil, except for a stretch of black cotton soil in areas around Palani and Nilakkottai.

3.17.1 Methodology

Soil quality study has been carried out at the site and in the study area of 10km radius around the project site during March 2022 – May 2022 to understand the physico-chemical nature of the soil. The frequency and methodology of soil quality

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sampling process is given in Table No. 3.14. The soil quality sampling monitoring locations are given in Table No. 3.15. The soil analysis results and discussion is given in Table No. 3.16. Locations of the soil sampling villages core and buffer zone are given in Fig No.3.22 and Georeferenced Soil Map of around 10km radius is given in Fig No.3.23. The sampling locations have been identified with the following objects:

1. To determine the baseline soil characteristics of the study area.
2. To determine the impact of the project on soil characteristics and
3. To determine the impact on soil on fertility from agricultural productivity.

Table No: 3.14. Frequency and Methodology for Soil Sampling & Monitoring

S.No	Particulars	Details
1	Frequency	One sample from each station— once during the Study Period
2	Methodology	Soil Sample has been collected as per the CPCB standard and

Table No: 3.15 Soil Sampling Locations

Sampling code	Location	Latitude	Longitude	Distance (km)	Direction
S 1	Lease area	10°44'39.07"N	77°57'21.23"E	--	--
S 2	Pungambadi	10 ⁰ 46'22.4" N	77 ⁰ 56'57.9" E	4.2	NW
S 3	Thethupatti	10 ⁰ 39'22.7" N	77 ⁰ 58'27.4" E	4.3	SW
S 4	Thirukooranam	10 ⁰ 44'45.9"	77 ⁰ 57'51.6"	1.3	N
S 5	Thulukambarai	10 ⁰ 44'55.1"	77 ⁰ 58'41.5"	2.5	E



Fig A. Soil Sampling Location at Core zone



Fig B. Soil Sampling at Pungambadi



Fig C. Soil Sampling at Thethupatti



Fig D. Soil Sampling at Thirukooranam



Fig E. Soil Sampling at Thulukambarai

Fig No.3.22 Soil Sampling at Core Zone and Buffer Zone

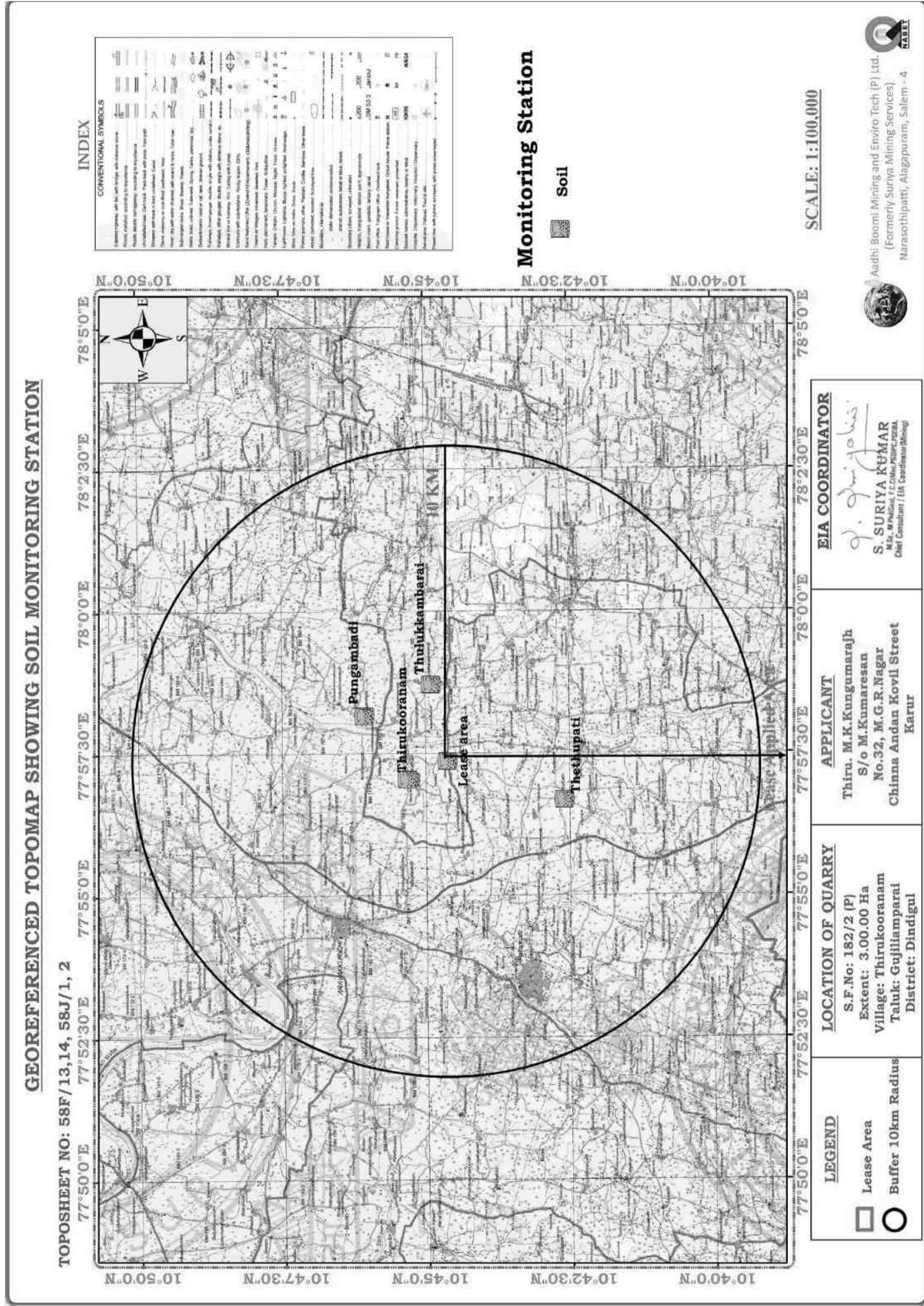


Fig No 3.23: Georeferenced Toposheet showing soil sampling locations

Table No 3.16 Result of Soil Sample Analysis

S.No	Parameters	Core Zone	Pungambadi	Thethupatti	Thirukooranam	Thulukambarai
1	pH value (10% Solution)	6.65	7.76	8.39	8.74	8.92
2	EC@ 25°C (Micromhos/cm) (10% solution)	101	64	934	537	491
3	Moisture %	0.11	1.4	0.43	2.01	1.3
4	Bulk Density g/cc	1.27	1.13	1.04	1.00	1.07
5	Texture %	Sand =48 Silt =36 Clay=16 Loam	Sand =56 Silt =16 Clay= 28 Sandy Clay Loam	Sand =36 Silt =20 Clay=44 Clay	Sand = 44 Silt =16 Clay=40 Clay	Sand =52 Silt =12 Clay =36 Sandy Clay
6	Alkalinity %	-	-	-	-	-
7	Calcium mg/Kg	0.37	0.0005	0.0002	0.001	0.0007
8	Organic Matter %	0.48	0.68	2.1	1.67	0.63
9	Magnesium mg/Kg	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	0.0006
10	Chlorides %	3.9	0.001	0.013	0.003	0.020
11	Water Holding Capacity %	64	60	68	64	52

3.17.2 Observation

Physical characteristics of soil were characterized through specific parameters viz bulk density, pH, electrical conductivity. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be 6.65 to 8.92. The soil analysis result shows that, the pH of the soil samples collected were found to be neutral to slightly basic. Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil and was found to be in the range 64-934 micromhos/cm. Texture of the soil is Loam, Sandy Clay Loam, Clay and Sandy clay in samples analysed. Total organic carbon of the soil varies from 0.68 to 2.1%. From the soil analysis result it can be concluded that the soil of the area is highly fertile and suitable for agricultural purpose.

3.18 BIOLOGICAL ENVIRONMENT

Dindigul district is bound by Erode, Tirupur, Karur and Trichy Districts on the North, by Sivagangai and Trichy District on the East, by Madurai District on the South and by Theni and Coimbatore Districts and Kerala State on the West. It is spread over on area of 6266.64 Sq. Km. It is located between 10°05" and 10°09" North latitude and 77°30" and 78°20" East longitude. It has an average elevation of 280.11 meters above mean sea level.

i) FLORA AND FAUNA

A) Flora

Distribution of Flora in Dindigul District as follows

The important floras in the Dindigul district are Teak, Kumil, Rose wood, Sandana, Vembu, Mahagani, Pala, Seehakai, Nellikai, Blue gum, Pine and Silavagai are some important timber species. Coffee, Tea, Agricultural crops, Fire wood and Pulpwood plantations are being cultivated in hilly areas of Palani and Kodaikanal hills, which is a part of Western Ghats.

Paddy, Black gram, Maize, Cholan, Groundnut, Cotton, Tamarind, Mango, Banana, Grape, Tomato are mainly cultivated as Cash crops.

B) Fauna

The Important wild animals in Dindigul district are Gaur, Barking deer, Bison, Elephant, Kadaman, spotted deer, Leopard, Sloth bear, Nilgiri thar, Giant squirrel, Common Macaque, Wild Dog, Grizzled squirrel and Wild pig. The Grizzled Squirrel is found in (Siruvattukadu) Northern Slope Reserved Forests of Oddanchatram Range near Siruvattukadu and Pachalur villages. The Slender Loris is found in Ayyalur, Natham and Sirumalai Ranges in large numbers.

ii) TYPES OF FOREST IN DINDIGUL DISTRICT

Total extent of Shola forests is 2337 Ha and of Grass land is 16627 Ha. Dindigul District forest consists of 84564.87 Ha of Reserved Forest, 19730 Ha of Reserved Land and 44,000 Ha of Hill Preservation Areas. It is ecologically very sensitive and is a part of Western Ghats bio-diversity. It contains many endangered and threatened species of plants, different rare species of fauna like grizzled squirrel and Slender Loris are found here. Forest contains many medicinal plants and they are used in the local and Siddha health care system. Forest Department has established a Medicinal Plants Conservation Area (MPCA) in Alagarmalai RF of Alagar Kovil Range in this Division.

iii) RIVERS

The main rivers that flow across the Dindigul district are Kodaganaru, Palar, Kuthiraiyar, Porandalar, Amravati, Manjalar, Varadhamanathi and Maruthanathi.

iv) RESERVOIRS/ DAMS

There are nine dams in the district such as Kamarajar Dam, Dharmathupatti Dam, Varadamanadhi Dam, Manjalar Dam, Marudhanadhi, Parapalar Dam, Pannapatti, Palar-Porandalar Dam, Kuthiraiyar Dam. Irrigation is the most important function of these dams. Apart from irrigation Kamarajar Dam and Palar- Porandalar Dam supply water to Dindigul and Palani respectively.

Reserve forest/ National Park/Sanctuary

The forests of Dindigul are the part of bio-diverse Western Ghats. This area is ecologically very sensitive and economically important for agricultural products and food supply of India. Trees such as Silavagai, Sandana vembu and Mahagani were the most prevailing in this region. Different rare faunal species like Grizzled squirrel and

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Slender loris were found in this region. The important Reserve forests in Dindigul district are as follows:

- Sirumalai Reserved Forest
- Dindigul Reserve Forest
- The Palani Hills Wildlife Sanctuary and National Park is a proposed protected area in Dindigul District.

There are no Reserve Forest, Wildlife Sanctuary and National park present near to 10km radius of mining lease area.

3.18.1 Crop Patterns in Dindigul District

Dindigul district is primarily agro-based. About 70% of the total population earns their livelihood directly or indirectly through agriculture. There are about 165 Rice Mills in and around Dindigul. Tapioca is one of the major crop in the district. Different types of food products are manufactured from tapioca in the district. Dindigul city is an important wholesale market for cotton, onions and groundnuts (peanuts). Paddy and cholam are cultivated in major areas in the district. Groundnut has also been cultivated in the district. These three products yield in the district recorded high amongst others. Cotton and Ragi are the products with least yield in the district.

Table No 3.17 Details of Important crops in Dindigul district

Sl. No	Common name	Scientific name	Family
1.	Paddy	Oryza sativa	Poaceae
2.	Maize	Zea mays	Poaceae
3.	Red gram	Cajanus cajan	Fabaceae
4.	Horse gram	Macrotyloma uniflorum	Fabaceae
5.	Groundnut	Arachis hypogaea	Fabaceae
6.	Kambu	Pennisetum glaucum	Poaceae
7.	Cholam	Sorghum bicolor	Poaceae
8.	Grapes	Vitis vinifera	Vitaceae
9.	Sugarcane	Saccharum officinarum	Poaceae

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

10.	Green gram	Vigna radiata	Fabaceae
11.	Cotton	Gossypium herbaceum	Malvaceae
12.	Gingelly	Sesamum indicum	Pedaliaceae
13.	Coconut	Cocos nucifera	Arecaceae
14.	Black gram	Vigna mungo	Fabaceae

3.18.2. Study Area Ecology

The Core mining area is at Thirukooranam village with few numbers of shrubs. Buffer zone is comprised of agricultural land. The following methods were applied during base line study of flora, fauna and diversity assessment.

3.18.3. Methodology of Sampling

A methodology of Sampling Flora and fauna studies were carried out during the Summer Season (March, 2022 to May 2022) 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. None of the specimens were collected as voucher specimens and for the herbarium. It is basically done through field observations only. The study of flora is conducted as per the guidelines of the Ministry of Environment Forest and Climate Change (MoEFCC) and Botanical Survey of India (BSI).

The study involved in the collection of primary data by conducting a survey in the field, examination of flora and fauna records in previously published reports and records. Analysis of the information is in view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

The Floral and faunal habitats prevalent in the study area were identified through Quadrant method with random sampling technique. In a quadrant of 10x10 size at an interval of 500m from the core of the mine in all four directions were recorded. A line transect was laid for entire area of 10km to divide 500m segments. Thus randomly distributed quadrants were laid for ecological assessment including frequency, abundance & density of the species.

3.19 DETAILED BASELINE STUDY RESULTS

3.19.1 FLORA

The plant species were identified with the help of plant taxonomy manual, literatures and Botanical Survey of India website. In addition besides the collection of plant species, information was also collected with vernacular names of plant species made by local inhabitants.

3.19.1.2 FLORA IN CORE ZONE

Taxonomically a total of 25 species distributed in 20 families have been recorded from the core mining lease area. Based on habitat classification of the enumerated plants the majority of species were Trees 7 and Shrubs 8 followed by herbs 4 and climber 1. Details of flora with the scientific name were mentioned in Table No. 3.18 and Fig No. 3.24.

3.19.1.3 FLORA IN BUFFER ZONE

Taxonomically a total of 31 species distributed among 26 families have been recorded from the buffer area. Based on habitat classification of the enumerated plants the majority of species were Trees 9 and Shrubs 10 followed by herbs 5 and climber 2. Details of flora with the scientific name were mentioned in Table No. 3.18 and Fig No. 3.24.

Table No. 3.18. Flora diversity - Core and Buffer area of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District.

Sl. No.	Common name	Local name	Family	Scientific name	Core	Buffer
TREES						
1	Neem tree	Veppa Maram	Meliaceae	Azadirachta indica	✓	✓
2	Mango tree	Maa Maram	Anacardiaceae	Mangifera indica	✓	✓
3	Coconut	Thenai Maram	Arecaceae	Cocos nucifera	-	✓
4	Palm tree	Panai Maram	Arecaceae	Borassus flabellifer	✓	✓

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

5	Banana tree	Valai Maram	Musaceae	Musa acuminata	-	✓
6	Arappu maram	Aarappu	Fabaceae	Albizia amara	✓	✓
7	Moringa	Murungaka	Moringaceae	Moringa oleifera	-	✓
8	Manila tamarind	Madras Thorn	Fabaceae	Pithecellobium dulce	✓	✓
9	Tamarind tree	Puli	Fabaceae	Tamarindus indica	✓	✓
10	Teak tree	Thekku maram	Lamiaceae	Tectona grandis	✓	✓
11	Sapodila Tree	Chikoo tree	Sapotaceae	Manilkara Zapota	-	✓
12	Guava tree	Koyya Maram	Myrtaceae	Psidium guajava	-	✓
13	Peepal tree	Aarasa Maram	Moraceae	Ficus religiosa	✓	✓
14	Karuvelam	Seemai Karuvelam	Fabaceae	Probopis juliflora	✓	-
15	Indian Dates	Elanthai Maram	Rhamnaceae	Ziziphus mauritina.	✓	-
SHRUBS						
16	Common vetch	Garden vetch	Fabaceae	Vicia sativa	✓	✓
17	Spider flower	Tick weed	Cleomaceae	Cleome viscosa	✓	✓
18	Prickly pear	Chapathikalli	Cactaceae	Opuntia humifusa	✓	✓
19	Canthium	Kaaraichedi	Rubaceae	Canthium parviflorum	✓	-
20	Crown Flower	Eruku	Apocynaceae	Calotropis gigantea	✓	✓
21	Umbelanterna	Unni Chedi	Verbenaceae	Lantana camara	✓	✓
22	Wild water lemon	Stone flower	Passifloraceae	Passiflora foetida	✓	✓
23	Rose flower	Roja	Rosaceae	Rosa	-	✓

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

24	Tomato Plant	Thakkali	Solanaceae	Solanum lycopersicum	-	✓
25	Parthenium	Whitetop weed	Asteraceae	Parthenium hysterophorus	✓	✓
26	Castor	Amanakku	Euphorbiaceae	Ricinuc communis	✓	✓
HERBS						
27	Indian doab	Arugampul	Poaceae	Cynodon dactylon	✓	✓
28	Tridax daisy	Thatha chedi	Asteraceae	Tridax porcumbens	-	✓
29	Black nightshade	Blackberry nightshade	Solanaceae	Solanum nigum	✓	✓
30	Verbenas	Common Lantana	Verbenaceae	Lantana camara	✓	✓
31	Tanners cassis	Aavaram Poo	Fabaceae	Senna auriculata	✓	✓
32	Mountain grass	Poola Poo	Amaranthaceae	Aerva lanata	✓	✓
CLIMBERS						
33	Bitter guard	Pavakkai	Cucurbitaceae	Momordica charantia	-	✓
34	Veldt grape	Pirandai	Vitaceae	Cissus quadrangularis	✓	✓



Fig A. Mango tree - *Mangifera indica*



Fig B. Castor bean - *Ricinus communis*

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District



Fig C. Neem tree - *Azadirachta indica*



Fig D. Common vetch - *Vicia sativa*



Fig E. Seemai Karuvelam - *Prosopis juliflora*



Fig F. Poola poo - *Aerva lanata*



Fig G. Neem tree – *Azadirachta indica*



Fig H. Arugampul - *Cynodon dactylon*



Fig I. Aavaram poo – *Senna auriculata*



Fig J. Coconut tree – *Cocos nucifera*



Fig K. Palm tree – *Borassus flabellifer*



Fig L. Valai maram – *Musa acuminata*



Fig M. Santa Maria – *Parthenium Sps.*



Fig L. Indian dates – *Ziziphus mauritiana*

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District



Fig M. Prickly pear- Opuntia Sps.

Fig N. Arappu maram – Albizia amara

Fig No.3.24: Photos of Flora in Core and Buffer Zone

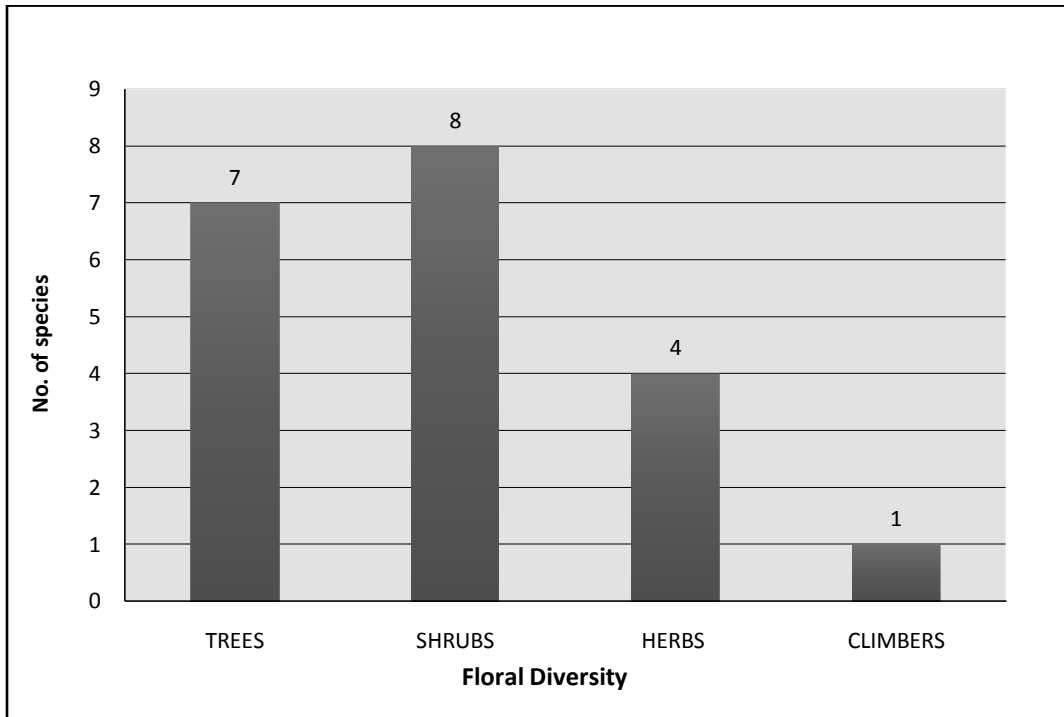


Fig No 3.25 Floral diversity in Core Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry

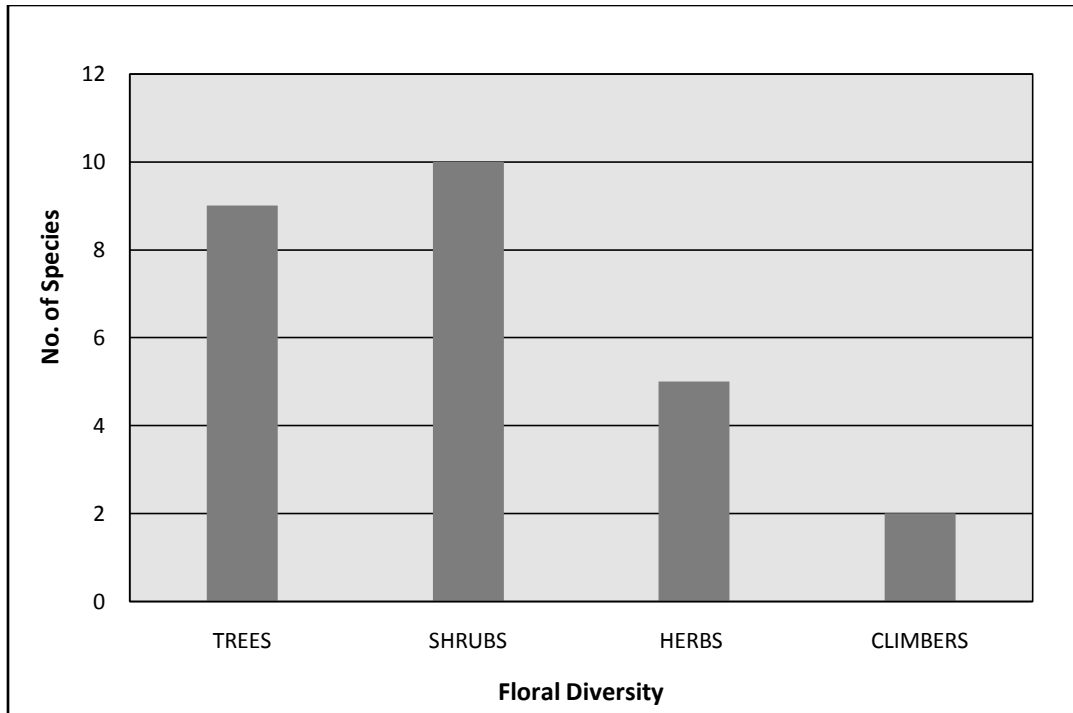


Fig No 3.26: Floral diversity in Buffer Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry

3.19.2. FAUNA

The fauna 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.

3.19.2.1. Fauna methodology

The study of fauna takes a substantial amount of time to understand the specific fauna 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

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

database (wiienvi.nic.in/Database/Schedule Species Database) and Zoological Survey of India (ZSI) (Table No 3.19).

Table No 3.19 Methodology applied during survey of fauna

Sl. 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	Ali S (1941); Grimmett R (2011); Collins 2015.

3.19.2.2 FAUNA IN CORE ZONE

Taxonomically a total of 20 species belonging to 19 families have been recorded from the core mining lease area. Based on habitat classification the majority of species were birds 5 and Invertebrates 5 followed by reptiles 4 and mammals 4 and Amphibian 2. Among the 20 species 2 species has common family Agamidae. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna with the scientific name were mentioned in Table No 3.20 and Fig 3.27 & Fig 3.28.

3.19.2.3 FAUNA IN BUFFER ZONE

Taxonomically a total of 24 species belonging to 23 families have been recorded from the buffer mining lease area. Based on habitat classification the species were mammals 6, invertebrates 6 followed by reptiles 5 and birds 5 and amphibians 2. Two reptiles have common family Agamidae. There were no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna with the scientific name were mentioned in Table No 3.20 and Fig No. 3.29.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Table No 3.20: Fauna diversity - Core and Buffer area of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry, Dindigul District.

Sl. No	Common name	Family name	Scientific name	Core Area	Buffer Area
Mammals					
1	Cow	Bovidae	Bus indicus	--	✓
2	Dog	Canidae	Canis lipus familiarizes	✓	✓
3	Squirrel	Sciuridae	Funambulus palamarum	✓	✓
4	Rat	Muridae	Rattus rattus	✓	✓
5	Goat	Bovidae	Capra aegagrus hircus	--	✓
6	Bat	Pteropodidae	Pteropus medius	✓	✓
Birds					
7	House Crow	Corvidae	Corvus Sps	✓	✓
8	Eagle	Accipitridae	Milvus migrans	✓	✓
9	Parrot	Psittacidae	Psittaciformes	✓	✓
10	Common myna	Sturnidae	Acridotheres tristis	✓	✓
11	Common cuckoo	Cuculidae	Cuculus canorus	✓	✓
Reptiles					
12	Garden Lizard	Agamidae	Calotes verticolor	✓	✓
13	Fan throated Lizard	Agamidae	Sitana ponticeriana	✓	✓
14	Green Lizard	Chamaeleonidae	Chamaeleon zeylanicus	✓	✓
15	Wall Lizard	Gekkonidae	Hemidactylus sps.	--	✓
16	Indian rat snake	Colubridae	Ptyas mucosa	✓	✓
Amphibians					
17	Common Frog	Ranidae	Rana hexadactyla	✓	✓
18	Frog (small)	Microhylidae	Cacopus sps.	✓	✓
Invertebrates					
19	Cockroach	Blattidae	Periplaneta Americana	--	✓
20	Honey Bee	Apidae	Apis mellificia	✓	✓
21	Indian Scorpion	Scorpionidae	Scorpio swammerdami	✓	✓
22	Grass Hopper	Acrididae	Caelifera	✓	✓

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

23	The Garden Spider	Araneidae	Araneus	✓	✓
24	Dragon flies	Aeshnidae	Anax junius	✓	✓



Fig A. Cow – *Bos indicus*.



Fig B. House Crow- *Corvus Sps*



Fig C. Garden Lizard - *Calotes verticolor*



Fig D. Hen – *Gallus gallus domesticus*

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District



Fig E. Goat - *Capra aegagrus hircus*

Fig F. Common Dog – *Canis lupus familiaris*

Fig No.3.27: Photos of Faunas in Core and Buffer Zone

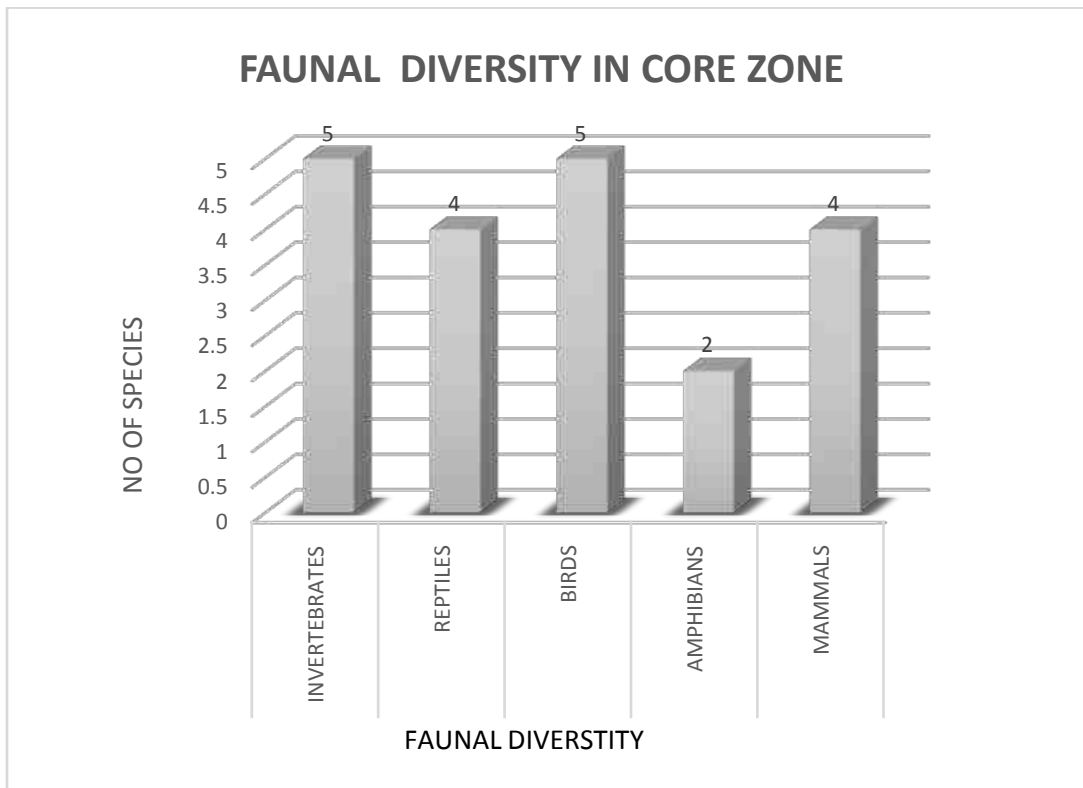


Fig No 3.28: Faunal diversity in Core Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry

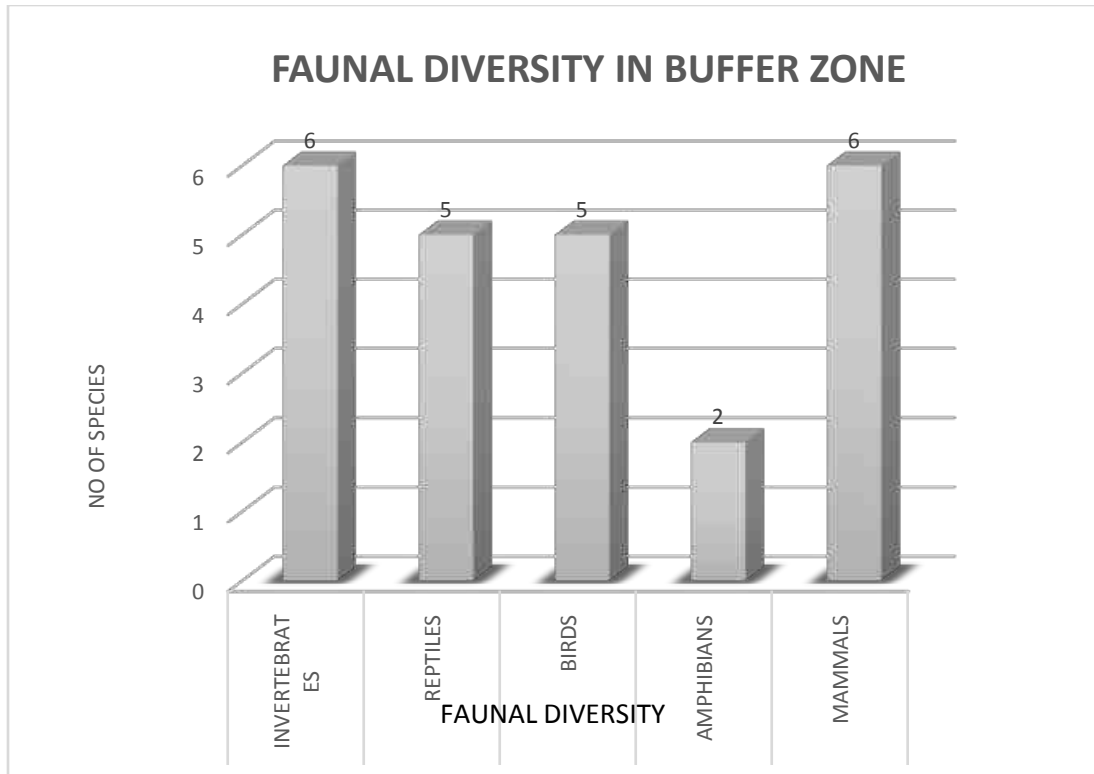


Fig No 3.29: Faunal diversity in Buffer Zone of Thiru.M.K.Kungumarajh, Rough Stone and Gravel Quarry

3.20 SOCIO-ECONOMIC ENVIRONMENT

3.20.1 Introduction

The major developmental activities in industrial sector are required for economic development as well as creation of employment opportunities (direct and indirect) and to meet the basic/modern needs of the society, which ultimately results in overall improvement of the quality of life through upliftment of social, economic, health, education, and nutritional status in the project region, state as well as the country. In this manner all developmental projects have direct as well as indirect relationships with socioeconomic aspects, which also include public acceptability for new developmental projects. Thus the study of socioeconomic component incorporating various facets related to prevailing social and cultural conditions and economic status of the quarry project region is an important part of EIA study. The study of these parameters helps in identification, prediction and evaluation of the likely impacts on the socioeconomics and parameters of human interest due to the project.

3.20.2 Proponent Details

The report deals with the Socio-Economic Impact Assessment of the Rough Stone & Gravel quarry Project promoted by Thiru. M.K.Kungumarajh residing at, No.32, M.G.R. Nagar, Chinna Andan Kovil Street, Karur District, Tamil Nadu.

The objectives of the socio-economic impact assessment are as follows:

- a) To study the socio-economic status of the people living in the study area of the quarry project.
- b) To assess the impact on socio-economic environment due to the quarry project.
- c) To study the socio economic environment like noise, water due to impact of the quarry project.

3.20.3 Baseline Information

The baseline information is collected in order to define the socio-economic profile of the study area. The process related database thus generated includes:

- Demographic structure
- Infrastructure base in the area
- Economic structure
- Health status
- Cultural attributes
- Public awareness and their concern about the project

3.20.4 Methodology

The methodology adopted for the socio economic impact assessment is as follows:

- a) The details of the activities and population structure have been obtained from Census 2001 and 2011 and analyzed.
- b) Based on the above data, impacts due to quarry operation on the community have been assessed and recommendations for further improvement have been made.

3.20.5 Collection of Data from Secondary Sources:

Data from secondary sources were collected on following aspects:

- Demographic profile of the area
- Social profile of the area
- Economic profile of the area, and
- Land use pattern

Table 3.21 Type of Information and Sources

Information	Source
Demography	District Census Handbook, Govt. of India
Land use	District Census Handbook, Govt. of India
Social Profile of the area	Google Earth image, Topographic Maps (SOI)
Economic profile of the area	Census of Tamil Nadu
District profile	District Census Handbook, Tamil Nadu

3.20.6 Population Characteristics- Thirukooranam Village

In Gujiliamparai Taluk, Thirukooranam village had a total household 597 in 2001 which is almost same household 602 in according to census 2011. Village had a total person of 2210 in 2011 census previous census 1988 persons in 2001. There were about 1095 men (49%) according to 2011 census and 1009 men (50%) in 2001 census marking an increase about 86 men over the previous census. During 2001 there were about 979 women (49%), which is increased to 1115 (50 %) in 2011 census.

Thirukooranam village had a literate accounted for 1047 persons (52%) in 2001 and increased to 1320 persons (59%) in 2011. There were about 63percent males in 2001 and 68 percent in 2011. There were about 403 (41%) females an increased to 566 (50%) classes as literates in 2011.

Sex composition is the most important demographic characteristics that affect the incidence of birth and death. The average sex ratio in Gujiliamparai taluk,

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Thirukoornam village was 970 during 2001 census which is an increase to 10518 in the year of 2011. The highest sex ratio may be either due to the fertility of female is high in the village and migrants for educational purpose and employment opportunities and due to infant birth of female is very high. The population characteristics of Thirukoornam Village (2001-2011) are shown in Table 3.22 and Fig. 3.30.

Table 3.22 Population Characteristics- Thirukoornam Village, Gujiliamparai Taluk, Dindigul District (2001-2011)

Sno	Characteristics	2001	%	2011	%
1	Total Household	597		602	
2	Total Population	1988		2210	
3	Male Population	1009	50.75	1095	49.55
4	Female Population	979	49.25	1115	50.45
5	Total Literacy	1047	52.67	1320	59.73
6	Male Literacy	644	63.83	754	68.86
7	Female Literacy	403	41.16	566	50.76
8	Sex Ratio		970.3		1018

Source: Census 2001 & 2011, Dindigul District, Tamilnadu

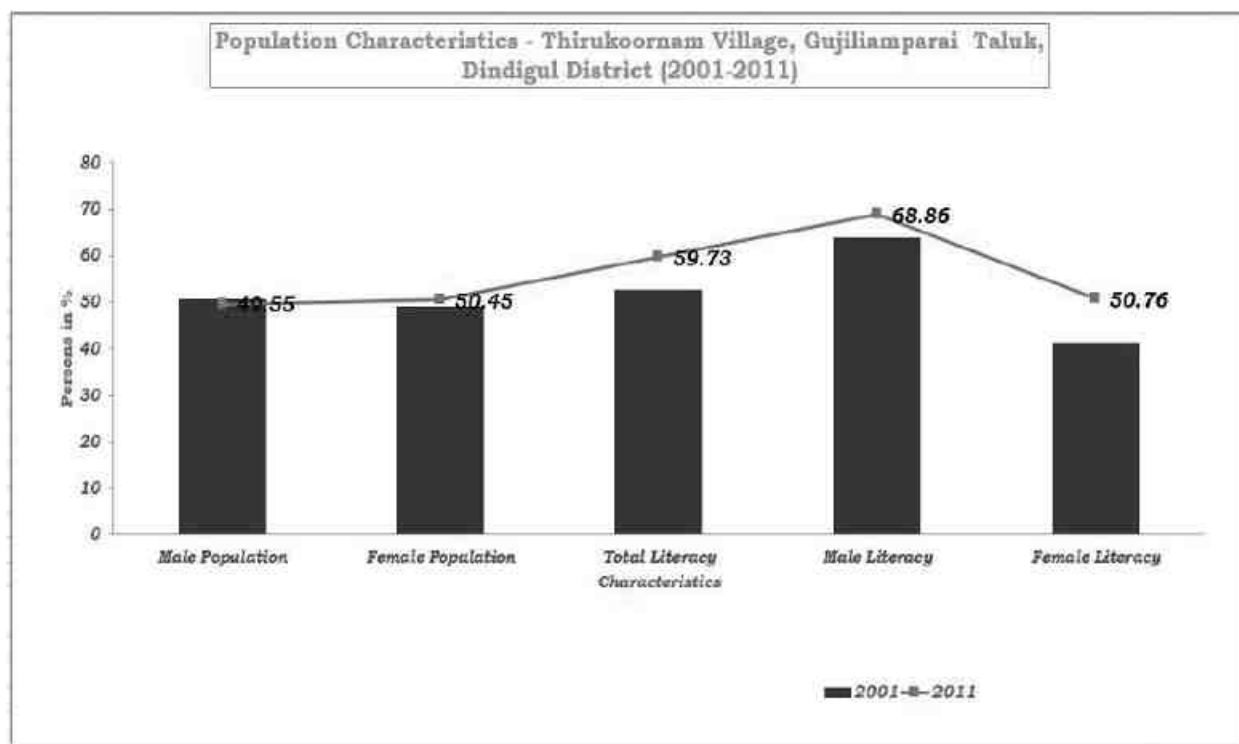


Fig No 3.30 Population Characteristics of Thirukoornam Village (2001-2011)

3.20.7 Occupational Characteristics - Thirukooranam Village

The term workers denote the population engaged in primary, secondary and tertiary activities classified in the census reports of Indian government. During the year 2001, Thirukooranam village had 1473 total workers accounting for 74 percent of the total population of the Village. During 2011, there were about 1346 (60%) according to the census. There were about 760 men workers (75 %) during 2001 which is decreased to 738 persons (67%) according to census 2011. There were about 713 (72%) female workers according to 2001 which is decreased to 608 (54 %) during 2011 marking decreases of 105 women over the previous census.

Thirukooranam village had total main workers of 1284 (64 %) persons during 2001 census which is decreased to 1120 (50 %) persons during 2011. There were about 536 (54%) women in 2001 and 507 (45%) women according to the census 2011 marking decreases of 29 women over the previous census.

Study on occupation characteristics of population should analyze the workforce engaged in different type of occupation. Cultivators are the major category of occupation representing the workforce owning land. Thirukooranam village had total cultivators 489 cultivators. The proportion of cultivators to total workers is calculated as a percent for the two census years 2001 and 2011 for the taluk of Gujiliamparai in Thirukooranam village. There were about 415 (54 %) men in 2001 which is decreased to 224 (30 %) according to census 2011. Thirukooranam village had female cultivators 74 (10 % of the female workers) cultivators during 2001 census which is increased to 121 (19 %) during according to census 2011.

The distribution of agricultural laborers in the study area for the two census periods has revealed that the study area has experienced a decline in the proportion of workers classed as agricultural laborers between 2001 and 2011. Gujiliamparai Taluk in Thirukooranam village had agricultural labourers 619 agricultural labourers during census 2001. There were about 203 (26 % of male workers) men in 2001 which is increase to 218 (29 % of male workers) according to census years 2011. Thirukooranam village had female agricultural laborer of 416(58 % of female workers persons during 2001 which is decreased to 193 (31 % of female workers) census 2011. 27% of female agricultural laborer has been decreased.

This group includes the employment of workers in manufacturing activities. Agro based industries, located in the study area engages a sizeable amount of workers. The

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

distribution of HHI in the study area is calculated as percent to the total workers. The village had 14 HHI during 2001 whereas 2011, it has been increased 44 HHI. Due to unemployment, the HHI has been increased.

The tertiary workers include the labour force engaged in service sector such as education, medical, judicial, finance, administration, recreation, trade and commerce and transport. In Thirukooranam village had tertiary workers accounted for about 11 percent of the workers during 2001 census and it is increased to 23 % according to census 2011. There were about male tertiary workers of 121 (16% of the male workers which is increases to 164 (22% of the male workers) according to census 2011. There were about 41 women tertiary workers (6 % of the female workers) during 2001 census which is increased to (22 % of the female workers) according to census 2011.

The study area has experienced a change in the occupational structure in the form of a decline in the proportion of cultivators, agricultural laborers and an increase in the proportion of tertiary workers.

Thirukooranam village had non workers population of 864 (39 % of the total population) in census 2011 and 515(26%) in census 2001. It is found that NWP has been increased during 2011. There were about male non workers of 249 (24 % of the male population) during the census 2001 which is increased to 357 (32 % of the male population) according to census 2011. As there was no source of employment, many of the village people were unemployed.

The occupational characteristics of Thirukooranam village population are given in Table 3.23 & Fig. 3.31.

Table 3.23 Occupational Characteristics of Population - Thirukooranam Village (2001-2011)

Sno	Characteristics	2001	%	2011	%
1	Total Population	1988		2210	
2	Male Population	1009	50.75	1095	49.55
3	Female Population	979	49.25	1115	50.45
4	Total Workers	1473	74.09	1346	60.90
5	Male Workers	760	75.32	738	67.40
6	Female Workers	713	72.83	608	54.53
7	Total Main workers	1284	64.59	1120	50.68
8	Male Main workers	748	74.13	613	55.98

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

9	Female Main Workers	536	54.75	507	45.47
10	Total Cultivators	489	33.20	345	25.63
11	Male Cultivators	415	54.61	224	30.35
12	Female Cultivators	74	10.38	121	19.90
13	Total Main Agricultural Labourers	619	42.02	411	30.53
14	Male Agri.Labourers	203	26.71	218	29.54
15	Female Agri.Labourers	416	58.35	193	31.74
16	Total Main HHI	14	0.95	44	3.27
17	Male HHI	9	1.18	7	0.95
18	Female HHI	5	0.70	37	6.09
19	Total Main Other Tertiary workers	162	11.00	320	23.77
20	Male OT	121	15.92	164	22.22
21	Female OT	41	5.75	156	25.66
22	Total Nonworkers	515	25.91	864	39.10
23	Male Nonworkers	249	24.68	357	32.60
24	Female Non workers	266	27.17	507	45.47

Source: Census 2001 & 2011, Dindigul District, Tamilnadu

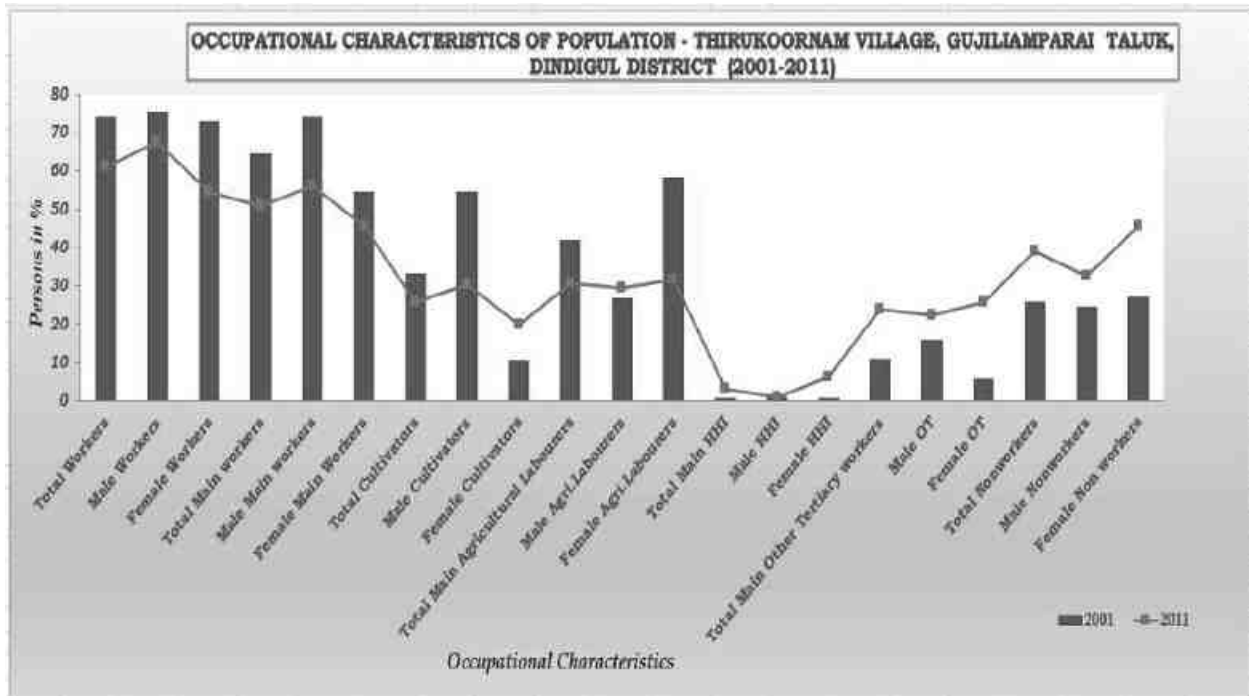


Fig No 3.31 Occupational Characteristics of Population - Thirukoornam Village (2001-2011)

3.20.8 Infrastructure Improvements

There can be significant infrastructure improvements with the construction of a quarry. Most mining operations of any size are served by roads, water supplies, sanitation systems, and electricity. If these are restricted to use by the company, and designed solely for company objectives, they may be of little relevance to anyone else. With some advanced planning and willingness to consult with the community, these can bring lasting benefits at little or no added cost. The development of infrastructure may facilitate development of other forms of economic activities such as business centre and tourism.

Table 3.24 Details of Infrastructure of the Village in core and Buffer Zone

S.No.	Description	Place	Distance (Kms)
1	Post office	Chinnakariyampatti	7km -N
2	Town	Aravakurichi	9km-NW
3	Police Station	Aravakurichi	9km-NW
4	Panchayat Union	9km-NW	9km-NW
5	Fire station	Aravakurichi	6km-NW
6	Govt. Hospital	Aravakurichi	9km-NW
7	School	Thirukooranam	2km-N
8	DSP Office	Aravakurichi	9km-NW
9	Railway Station	Palaiyam	20km-E
10	Airport	Trichy	82km-E
11	Seaport	Kochin	204km-SE

a) Road

The area is accessible to a distance of Village metal road is available to reach the quarry about 64m East.

b) Water Bodies

There is no major river found within 300m radius from the site. Water table is located at depth of 30m bgl.

1. Godavanan River – 435m – E
2. Kodavanan Check dam – 450m – E
3. Alamarathupatti lake – 1.3km – NE

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

4. Small odai – 1km – NE
5. Amaravathi river – 8.2km – NW
6. Nanganji River – 5.1km – W

c) Education

As with health, access to educational services and facilities can improve dramatically for communities close to or around large mines, particularly for mines in remote areas of developing countries. The mining company is often involved in the provision of educational facilities – either directly or indirectly through the redistribution of revenues by the state. Other developments of educational opportunities are through scholarships.

d) Place of worship

There is no place of worship like Temple, Mosque Church, etc., around 500m radius from mine lease area.

3.20.9 Corporate Social Responsibility (CSR)

The lessee will arrange medical camps, conducting Road and Safety Awareness program to the village people and road maintenance work under CSR activity. The villages in the buffer zone depend upon agriculture and mining. Mining will be done with the vision of positive impacts on socio-economics of people living in nearby villages. All the provisions as per the Mines Act 1952 shall be strictly adhered during temporary discontinuation.

3.20.9.1 Socio-economic Developmental Activities

- Drinking water and drainage facilities are provided to the local villages nearby the quarry
- Helped in construction of school buildings and Primary health centre
- Formed an Educational Committee for the improvement of the villages
- Provided sports materials
- Arranged medical camps to improve the village people
- Vocational Employment training program given to local villagers
- Provided employment to the local village persons of around 34 nos. in the quarry
- Road facilities are provided to the villages.

3.21 Primary survey

Primary survey conducted 10 villages total population is 30456. This village has approximately 1 percent of total population of the village area. This calculation is total

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

sample size has 250 around 10km radius core and buffer zone from mine lease boundary.

3.21.1 Primary survey methodology

The study was carried out with a participatory approach by involving the stakeholders, particularly the project beneficiaries and probable affected persons through a series of consultative process. The population groups that were consulted include beneficiary group of people in the project influence area, particularly the shopkeepers, farmers, Gram Panchayat members, village elders etc. Proportionate and purposive sampling methods were used for selecting respondents for household survey. Male and female respondents, both were selected for household survey. Structured questioners were used for survey.

3.21.2 Data structures

The data collected with the help of questionnaire survey for list of villages of Gujiliamparai Taluk were suitably converted into uni-variate, bi-variate and multivariate tables. The selection of these blocks were meaningfully done in order to get complete details of the surveyed population, their living environment, socio economic and socio-cultural and healthcare practices so as to conceptualize the findings with the help of interrelationships between Occupation and income status. the surveyed population were examined and interpreted with reference to socioeconomic living area, family structure and Educational, Sanitation etc.,

Table No. 3.25 List of Villages and Population around 10km Radius

S.no	Village Name	Total population as per 2011 census
1	Thirukooranam	2210 –N-1.19km
2	Vellodu	3147 –E-6.89km
3	Velampatti	1436- S-6.85km
4	Pallapatti	4807- NW-7.45km
5	Thethupatti	1784-NW-4.06km
6	rajapuram	4985-NW-9.30km
7	Andipatti	5506-SW-6.51km
8	Ammapatti	2394-SE-7.25km
9	Alamarathupatti	3717 –NE-1.14km
10	Pudur	470 –SE-6.42km
	Total	30456

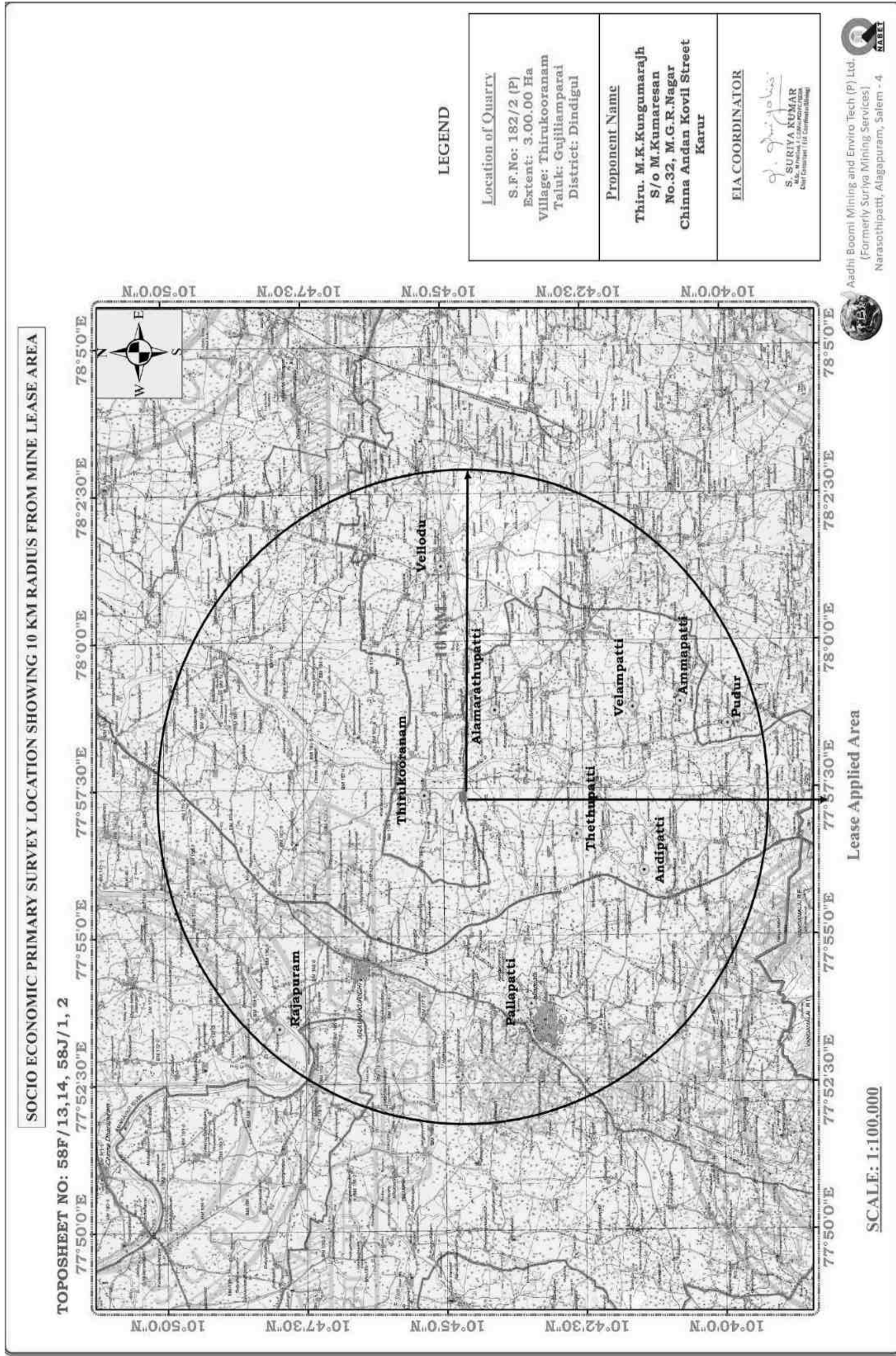


Fig No 3.32 Socioeconomic Survey Location

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3.22 Infrastructure Facilities:

The socio-economic wellbeing of the area and its people is represented by the infrastructure and the social assets available in the area. The study area constituted of various infrastructures related to education, health care, communication, transportation, drinking waters etc.

3.26 Health and Medical Infrastructure

S.No	Health Institution	Distance (0 -10 km)
1	No. of Medical Clinic	1.Aravakurichi-5.86km-NW 2.Puthur-6.41km-SE 3. Easanatham-7km-SE 4. Pallapatti-7.52km-SW
2	No. of Ayurvedic Hospital	0
3	No. of Allopathic Dispensaries	0
4	No.of Primary healthcare centre	1.Vellodu-7.21km-E
5	No.of Primary healthcare sub centre	0
6	No.of Primary healthcare sub centre paramedical total staff	0
7	No of community health workers	0
8	No.of Government Hospitals	1.Aravakurichi-5.86km-NW 2.Easanatham-7km-SE 3.Pallapatti-7.52km-SW

Source: Village Directory, 2011, Dindigul District, Tamilnadu

The above table shows that health care facilities were available in the area to fulfill the health need of the peoples mostly in the form of primary health sub centers. The health care facilities include both infrastructures and man powers. Within the radius of 10 km there is no hospital allopathic and Ayurvedic hospital. 1 primary health center has available in this village.

3.22.1 Post and Courier services

Post and courier services were available in the area to fulfill need of the peoples mostly in the village post office found in their 10km radius. So, post like ordinary post courier services are normal.

Table No 3.27 Post and Courier Services

S.No	Type Institution	0 -10 km
1	Post office	8
2	Courier	2

Source: Village Directory, 2011, Dindigul District, Tamilnadu

3.22.2 Transport facilities

Table No 3.28 Transport facilities

S.No	Type of Transport	Distance (0 -10 km)
1	Public bus service	5
2	Private bus service	8
3	Railway	1

The above table shows that Transport facility has improved the village. Transport facilities were available in the area; within the radius 10 km as far as no other mode transport utilize the people.

3.22.3 Drinking Water facilities

Table No 3.29 Drinking Water facilities

S.No	Type of Water source	Distance (0 -10 km)
1	Hand pump	5
2	Tube well/bore well	20
3	Lake/Pond	1
4	River/canal status	6

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Drinking water is available in all the villages of the study area. The various sources of drinking water are taps, wells, tanks, hand pumps and rivers. Various drinking water sources were available within the study area. Tube wells and river, pond were the major water sources in the area.

3.23 Socio- economic Primary survey methodology

**Fig No 3.33 PRIMARY SURVEY PHOTOGRAPHS OF VILLAGE WISE-
GUJILIAMPARAI TALUK, DINDIGUL DISTRICT**



The study was carried out with a participatory approach by involving the stakeholders, particularly the project beneficiaries and probable affected persons through a series of consultative process. The population groups that were consulted

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

include beneficiary group of people in the project influence area, particularly the shopkeepers, farmers, Gram Panchayat members, village elders etc. Proportionate and purposive sampling methods were used for selecting respondents for household survey. Male and Female respondents, both were selected for household survey. Structured questioners were used for survey.

By enquiring village people around mine lease boundary, we came to know that they need Employment opportunity, Road Facility, Public toilet, primary healthcare centre and sub centre, 24hours medical facilities, drainage pattern etc. Other people are getting Income through their 100days employment opportunity like garments, Agriculture Laborers for the local people get its own business like, Tailor, workshop, Maligai shop, household industries etc. We found that most of the villagers have normal condition. People need road facility and Hospital facilities by this project. There is no objection regarding mine operation. There is no evidence for negative impact in this village. School, colleges, is available in this area. Only positive aspects are related to mining area.

CHAPTER – 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Open cast mining is carried out by using excavators and dumpers combination. Scientific mining with proper benches with width and slope will be enabled as per MMR, 1961. Jackhammers with compressors will be deployed for drilling. Manual labors will be engaged for jack hammer drilling, sorting of waste and excavator will be used for loading the rough stone and gravel into trucks. Primary Blasting will be carried out Nonel blasting techniques with minimum vibration or detonating card with electric detonator initiation system. Sizing of materials shall be done by rock breakers or muffle blasting or pop shooting to the required size for better loading into trucks.

All these operations can disturb the environment in various ways, such as removal of mass, change of landscape, flora and fauna of the area, surface drainage, and change in air, water and soil quality. Therefore, it is essential to assess the impacts of mining on different environmental parameters before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. The likely impacts on various environmental aspects and mitigation measures are discussed below.

4.1 Air Environment

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

4.1.1. Anticipated Impact

The air borne particulate matter generated by handling, operations and transportation of Rough stone & Gravel are the main air pollutant. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal. Prediction of impacts on air environment has been carried out taking into consideration of proposed volume of 160296m³ of Rough stone(Five years) and 31958m³ of Gravel (Three years), on air environment and net increase in emissions on air environment.

4.1.2 Emissions Details

Drilling, Blasting, Loading, unloading and transportation of Rough stone & Gravel and wind erosion of the exposed area and movement of light vehicles will be the

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

main polluting source in the mining activities that releasing Particulate Matter (PM10) affecting Ambient Air of the area. Emission during Blasting, Loading and unloading was calculated as the area sources. Transportation of the Rough stone & Gravel by 2 nos. of trucks operated on the haul road was calculated as the line sources. It was assumed that truck will carry 10 T of Rough stone & Gravel. Details of emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

4.1.2.1 Drilling

Drilling is the process of making holes in Rough stone to carry out smooth blasting. The drilling is most representative for point source. The rate of emission from the drilling process will be very high when compared to loading, unloading, transporting and blasting. So wet drilling will be proposed for the Rough stone & Gravel quarry which completely suppresses the dust emitted during drilling process. Also dust extractor will be used over the wet drilling for the effective emission control system.

4.1.2.2. Loading of Rough stone

Chakraborty et al. (2002) was used to calculate emission of particulate matter released into the atmosphere during loading of Mineral.

$$E = [(100 - m) (m)^{-1}]^{0.1} [(s) (100 - S)^{-1}]^{0.3} h^{0.2} [(u) (0.2 + 1.05u)^{-1}] [(xl) (15.4 + 0.87xl)^{-1}]$$

Table 4.1: Source Parameters (Loading of Rough stone)

S.No	Description	Symbol	Quantity
1	moisture content (%)	m	90%
2	silt content (%)	s	0.1(approx)
3	wind speed (m s ⁻¹)	u	2.94
4	drop height (m)	h	1m above the tipper body
5	size of loader (m ³)	l	1.20
6	frequency of loading(no.h ⁻¹)	x	12 times
7	Quarry area (m ²)	a	16460
9	Controlled emission rate (g s ⁻¹)	CE	0.041

Totally 2 tippers and 1 hydraulic excavator will be proposed for proposed Rough stone & Gravel quarry. The maximum rate of production per hour is estimated as 14 m³. The loading capacity of excavator is 1.20 m³.

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Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

$x = \text{frequency of loading (no. h}^{-1}) = 14/1.20 = 12 \text{ times.}$

4.1.2.3 Loading of Overburden (Gravel)

Chakraborty et al. (2002) was used to calculate emission of particulate matter released into the atmosphere during loading of Gravel.

$$E = [0.018\{(100-m) (m)^{-1}\}^{1.4}\{s (100-s)^{-1}\}^{1.4}(uhxl)^{0.1}]$$

Table 4.2: Source Parameters (Loading of Gravel)

S.No	Description	Symbol	Quantity
1	moisture content (%)	m	30
2	silt content (%)	s	12
3	wind speed (m s ⁻¹)	u	2.94
4	drop height (m)	h	1m above the tipper body
5	size of loader (m ³)	l	1.20
6	frequency of loading(no.h ⁻¹)	x	5 times (maximum)
7	Quarry area (m ²)	a	16460
9	Controlled emission rate (g s ⁻¹)	CE	0.0023

The maximum rate of production of gravel per hour is estimated as 5 m³. The loading capacity of excavator is 1.20 m³.

$x = \text{frequency of loading (no. h}^{-1}) = 5/1.20 = 5 \text{ times}$

Emission of PM₁₀ during Roughs stone & gravel loading was calculated and found to be 0.041 g/s and 0.0023 g/s respectively based on moisture content 90% & 30% respectively and average wind speed was 2.94 m/s as observed with site data.

4.1.2.4 Haul Road

Chaulya (2006) was used to calculate emission of particulate matter released into the atmosphere during transportation of Rough stone & Gravel by truck operated per hour on haul road.

$$E = [\{ \{ (100-m) (m)^{-1} \}^{0.35} \{ (us) (100-s)^{-1} \}^{0.7} \{ 0.5 + 0.1(f + 0.42v) \} 10^{-3}]$$

Table 4.3: Source Parameters (During Vehicle Movement on Haul Road)

S.No	Description	Symbol	Quantity
1	Moisture content (%)	m	70
2	silt content (%)	s	12

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3	wind speed (ms^{-1})	u	2.94
4	frequency of transporting (no. h^{-1})	f	10 times (maximum)
5	average vehicle speed(ms^{-1})	v	4.1
6	haul road area (m^2)	a	110
7	Controlled emission rate (g s^{-1})	CE	0.0005

Emission of PM₁₀ due to transportation of Rough Stone & Gravel on haul road was 0.0005 g/s based on assumption that silt content spread on road surface was 12% and average wind speed of 2.94 m/s as observed with site data. Based on the above consideration there was low emission of PM₁₀ during transportation of Rough Stone & Gravel.

4.1.2.5 Blasting

In another scenario when controlled blasting is carried out at the mine site and all the other activities are brought to halt. Significant amount of PM₁₀ is released during blasting at mining site for very short-term.

$$E = E_f \times Q$$

Table 4.4: Source Parameters (During Blasting)

S.No	Description	Symbol	Quantity
1	Uncontrolled Particulate matter emissions rate in pounds per year	UE	54
2	Emission factor in unit of pounds of particulate per ton shifted by blasting	E_f	TSP $E_f = 0.0001$ pounds/ton PM ₁₀ $E_f = 0.0008$ pounds/ton PM _{2.5} $E_f = 0.0008$ pounds/ton
3	Amount of material of all types shifted by blasting during the year in tons	Q	80148

(Reference: Mojave Desert Air Quality Management District, 1403 Park Avenue, Victoria, CA 92392 -2310).

Loading and unloading of Rough Stone & Gravel, overburden, movement of trucks on haul roads and open pit source were considered as combined action. So the emission during loading, unloading and transportation were taken combined and US EPA based Dispersion AERMOD model was used for prediction of impact with 1-h meteorological data of the study period for the assessment of incremental GLC. Then blasting was considered as separate action and US EPA based Dispersion AERMOD model was used for prediction of impact separately.

4.1.2.6 Summary of calculated Emission Rates

Table 4.5: Emissions Rates of PM₁₀

Source type	Controlled Emission Rate (g/s/m ²)
Rough stone loading	2.5 x 10 ⁻⁶
Overburden Loading	1.4 x 10 ⁻⁷
Haul Road	4.5 x 10 ⁻⁶
Blasting	1.7 x 10 ⁻⁷

Table 4.6: Emissions Rates of SO₂

Source type	Average Emission rate for HDDV as per EPA	Emission rate (Proposed Project)
Tippers	0.012 g/mile	7.5 x 10 ⁻⁸ g/s/m ²
Excavators	0.012 g/mile	4.2 x 10 ⁻⁷ g/s/m ²
Total Emission Rate		4.9 x 10 ⁻⁷ g/s/m ²

Table 4.7: Emissions Rates of NO₂

Source type	Average Emission rate for HDDV as per EPA	Emission rate (Proposed Project)
Tippers	0.725 g/mile	4.5 x 10 ⁻⁶ g/s/m ²
Excavators	0.725 g/mile	2.3 x 10 ⁻⁵ g/s/m ²
Total Emission Rate		2.8 x 10 ⁻⁵ g/s/m ²

4.1.3 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise 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 modeling 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 mining activities.

4.1.3.1 Model Input data

The air pollution modeling carried out represents the normal operating scenarios. As the proposed activity is mining the major source of pollution is particulate matter and gaseous emission. The following data has required as input data for dispersion pattern.

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- 1) Baseline data of PM₁₀, PM_{2.5}, SO_x and NO₂ is needed along with meteorological data. Meteorological data preprocessor (AERMET) needs meteorological data which calculates atmospheric turbulence characteristics, mixing heights, surface heat flux for finding the atmospheric dispersion. Site specific data recorded during Summer season (1st March to 31st May 2022) at project site for executing modeling studies.
- 2) The emission rates of PM₁₀, PM_{2.5}, SO_x and NO₂ from the various sources was taken.
- 3) Location of the project.

4.1.3.2 Model Results

The Air Quality Impact Prediction has been done by using AERMOD of USEPA". The main sources of air pollution with regard to the proposed project for the purpose of estimation of increase in PM₁₀, SO_x and NO₂ are identified due to –

1. Scenario 1 – PM₁₀

- (i) Loading/unloading of Rough stone & Gravel and overburden
- (ii) Transportation of Rough stone & Gravel, overburden by trucks on the Haul roads from mining benches.

2. Scenario 2 - PM₁₀

- (i) Due to blasting

3. Scenario 3 – SO_x and NO₂

- i. From Operation of Excavator and movement of transporting vehicle

Scenario1:

Table 4.8: Total predicted GLC of PM₁₀ in core and buffer zone due to combined action of loading, unloading and Transportation of Rough stone & Gravel by trucks on the haul road, of the mining lease area.

Location	Location Code	Background value in µg/m ³	Incremental GLC in µg/m ³	Total Predicted GLC in µg/m ³
Mine site	AQ1 - Centre	48	20.07	68.07
Receptor 01	AQ2 – 98m - NE	48	2.39	50.39
National Ambient Air Quality Standards (NAAQS)				100

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Scenario 2:

Table 4.9: Total predicted GLC of PM₁₀ in core and buffer zone due to blasting activity in the mining lease area.

Location	Location Code	Background value in µg/m³	Incremental GLC in µg/m³	Total Predicted GLC in µg/m³
Mine site	AQ1 - Centre	48	6.18	54.18
Receptor 01	AQ2 – 98m - NE	48	3	51
Receptor 02	AQ3 – 910m - SW	48	0.46	48.46
Receptor 03	AQ4 – 1.1km - NE	48	0.09	48.09
National Ambient Air Quality Standards (NAAQS)				100

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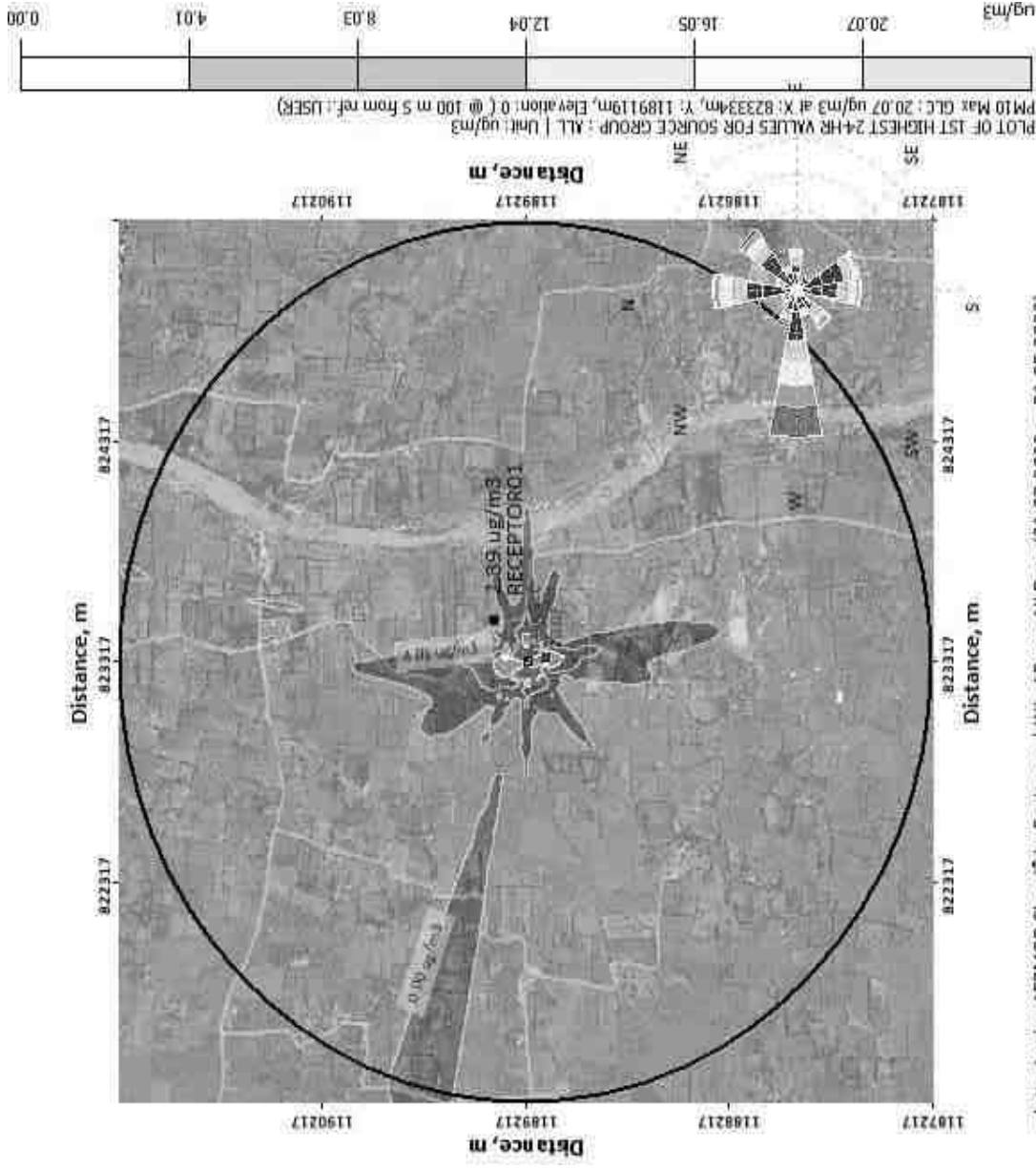
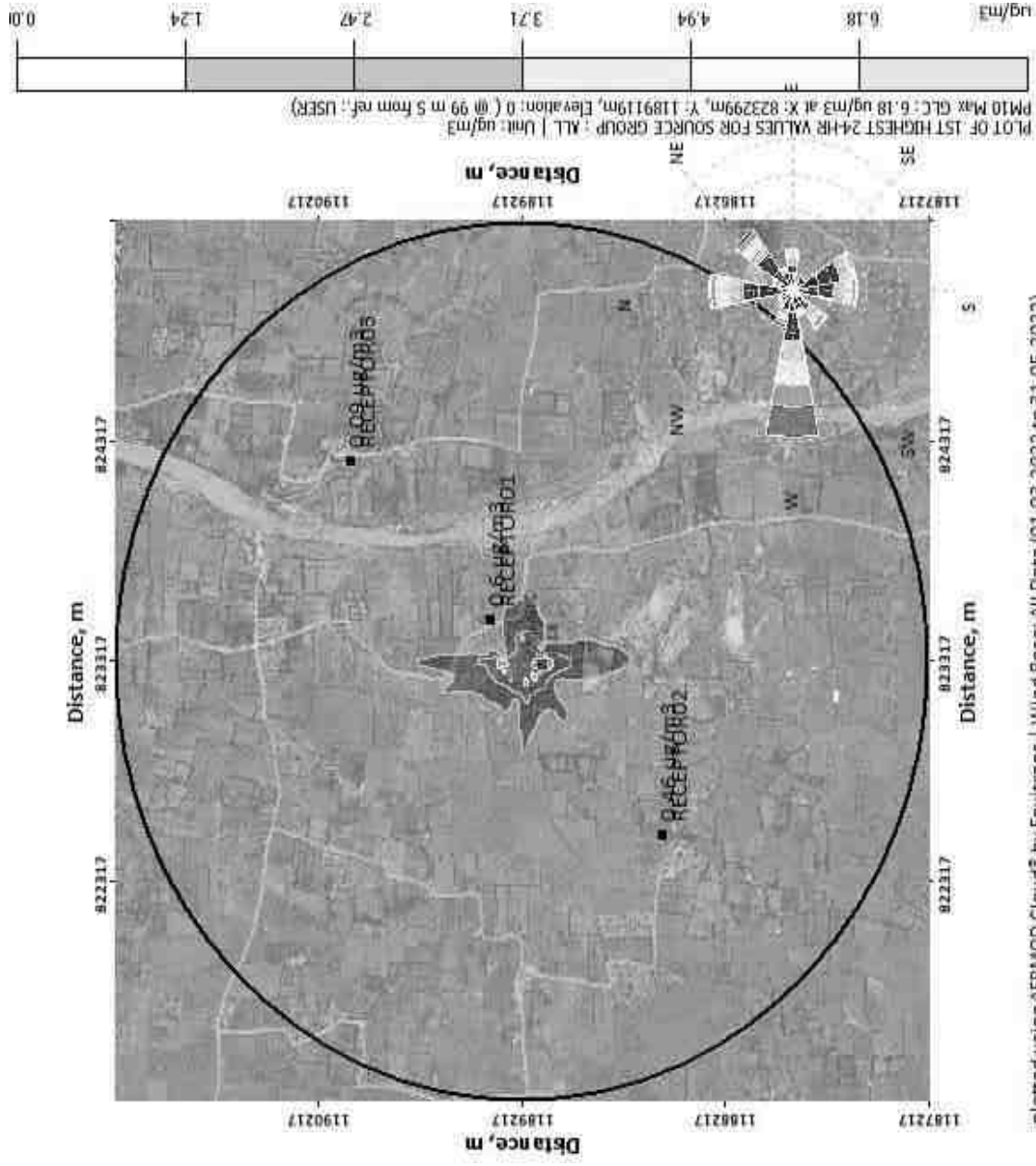


Fig 4.1: Isopleths of PM10 is 20.07 µg/m3(Core) occurred at the project site during i) loading and unloading and ii) transportation of Rough stone and Gravel over the haul road

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plotted using AERMOD Cloud® by Envirotrans | Wind Rose: All Data (01-03-2022 to 31-05-2022)

Fig 4.2: Isopleths of PM10 is 6.18 $\mu\text{g}/\text{m}^3$ occurred near the project site during blasting in the mining area

Scenario 3:

Table 4.10: Impact of SO_x due to Operation of Excavator and Movement of Vehicle in the mining lease area

Location	Location Code	Background value in µg/m³	Incremental GLC in µg/m³	Total Predicted GLC in µg/m³
Mine site	AQ1 - Centre	9	1.95	10.95
Receptor 01	AQ2 – 98m - NE	9	0.35	9.35
Receptor 02	AQ3 – 910m - SW	7	0.16	7.16
Receptor 03	AQ4 – 1.1km - NE	9	0.02	9.02
National Ambient Air Quality Standards (NAAQS)				80

Table 4.11: Impact of NO_x due to Operation of Excavator and Movement of Vehicle in the mining lease area

Location	Location Code	Background value in µg/m³	Incremental GLC in µg/m³	Total Predicted GLC in µg/m³
Mine site	AQ1 - Centre	14	3.31	17.31
Receptor 01	AQ2 – 98m - NE	14	0.55	14.55
Receptor 02	AQ3 – 910m - SW	14	0.23	14.23
National Ambient Air Quality Standards (NAAQS)				80

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

Total predicted 24-h maximum GLC of PM₁₀ at project site for scenario 1 i.e. loading-unloading, transportation and scenario 2 i.e. Blasting was 68.07µg/m³ and 54.18µg/m³ respectively after superposition of base-line value 48µg/m³ over the incremental GLC 20.07µg/m³ and 6.18µg/m³ respectively due to combined impact of loading, unloading, open pit and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO_x and NO_x for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³. Therefore the total predicted GLC of SO_x and NO_x will be 10.95µg/m³ and 17.31µg/m³ respectively.

Maximum Impact of PM₁₀, SO_x and NO_x was observed close to the source within the lease area due to moderate wind speeds.

4.1.4 Combined Impact on Air Environment due to proposed quarry and adjacent quarry within 500m radius.

There are two existing quarries namely Thiru.D.Sivajeeeganesan and Thiru.R.K.Panneerselvam located within the 500m radius of Proposed Thiru.M.K.Kungumaraj Rough stone and Gravel Quarry. The predicted incremental GLC of PM₁₀, PM_{2.5}, SO_x and NO_x due to the proposed mining activity is given in below table.

Table 4.12: Incremental GLC of PM₁₀, PM_{2.5}, SO_x and NO_x due to the proposed mining activity

S.No	Air Pollutants	Incremental GLC due to proposed quarry (Controlled) µg/m ³
1.	PM ₁₀	20.07
2	SO _x	1.95
3.	NO _x	3.31

Assume that emission rate from the various mining activity in adjacent 2 quarries are same as the proposed quarry. So the incremental GLC will also be same as proposed quarry. Therefore the when the proposed quarry and two adjacent quarries are working together, the incremental GLC and total predicted GLC are given below table.

Table No.4.13 Total predicted GLC of PM₁₀, PM_{2.5}, SO_x and NO_x due to the combined activity in the cluster

S.No	Air Pollutants	Baseline Value	Incremental GLC due to proposed quarry and two quarries µg/m ³	Total Predicted GLC due to proposed quarry and two adjacent quarry µg/m ³
1.	PM ₁₀	48	60.21	108.21
2.	SO _x	9	5.85	14.85
3.	NO _x	15	9.93	24.93

From the above table it is found that, when the three quarries are working together the Total predicted GLC of SO_x and NO_x (Controlled) due to mining activities was found within the NAAQS in the cluster area. PM₁₀ is slightly beyond the limits which shall be controlled by installation of more number of sprinklers in the lease area.

4.1.5. Air Quality Index

An air quality index is defined as an overall scheme that transforms the weighed values of individual air pollution related parameters (for example, pollutant concentrations) into a single number or set of numbers (Ott, 1978). Air quality standards are the basic foundation that provides a legal framework for air pollution control. The basis of development of standards is to provide a rational for protecting public health from adverse effects of air pollutants, to eliminate or reduce exposure to hazardous air pollutants, and to guide national/ local authorities for pollution control decisions.

The objective of an AQI is to quickly disseminate air quality information (almost in real-time) that entails the system to account for pollutants which have short-term impacts. To present status of the air quality and its effects on human health, the following description categories have been adopted for IND-AQI.

AQI breakpoints for eight pollutant parameters considered for AQI and these are summarized below in Table with color scheme to represent the AQI bands.

Table 4.14: AQI and its associated Health Impacts

AQI	Associated Health Impacts
Good	Minimal Impact
Satisfactory	May cause minor breathing discomfort to sensitive people
Moderate	May cause breathing discomfort to the people with lung disease

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

	such as asthma and discomfort to people with heart disease, children and older adults
Poor	May cause breathing discomfort to the people on prolonged exposure and discomfort to people with heart disease with short exposure
Very Poor	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases
Severe	May cause respiratory effects even on healthy people and serious health impacts on people with lung/heart diseases. The health impacts may be experienced even during light physical activity

**Table 4.15: Proposed Breakpoints for AQI Scale 0-500
(Units: µg/m³ unless mentioned otherwise)**

AQI Category (Range)	PM ₁₀ 24-hr	PM _{2.5} 24-hr	NO ₂ 24-hr	O ₃ 8-hr	CO 8-hr (mg/m ³)	SO ₂ 24-hr	NH ₃ 24-hr	Pb 24-hr
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200	0-0.5
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400	0.5-1.0
Moderately polluted (101-200)	101-250	61-90	81-180	101-168	2.1- 10	81-380	401-800	1.1-2.0
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200	2.1-3.0
Very poor (301-400)	351-430	121-250	281-400	209-748*	17-34	801-1600	1200-1800	3.1-3.5
Severe (401-500)	430+	250+	400+	748+*	34+	1600+	1800+	3.5+

*One hourly monitoring (for mathematical calculation only)

4.1.5.1. Interpretation of Air quality using IND-AQI:

Table 4.16: Computation of AQI with Baseline data

Air pollutants	Total Predicted GLC due to proposed quarry µg/m ³	AQI	Associated Health Impacts
PM ₁₀	68.07	Satisfactory (51-100)	May cause minor breathing discomfort to sensitive people
SO _x	10.95	Good (0-50)	Minimal Impact
NO ₂	17.31	Good (0-50)	Minimal Impact

The above table shows the AQI quality due to total predicted GLC of quarry in core area. PM₁₀ is between 51-100 and 31-60 of AQI which is satisfactory and may cause minor breathing discomfort to sensitive people. SO₂ and NO₂ are between 0-40 of

AQI which is good and may cause Minimal Impact. It is found that the value of PM₁₀ high which will be controlled by installing more number of sprinklers to combat the increase and to maintain the parameters within the limits of NAAQS.

4.1.6. Mitigation Measures

The pollutants from nearby ongoing mining activities, residential and commercial activities are the primary sources of air pollution. However, in the study area adequate control measures will be implemented in future at the time of mining operation. Mitigation measures suggested for air pollution controls are based on the baseline ambient air quality of the area. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that air quality is monitored on a regular basis to check compliance of standards as prescribed by regulatory authorities. However, to further minimize the pollutant concentration especially PM₁₀, the following control measure should be adopted by the project proponent.

- ❖ Regular water sprinkling on haul roads, blasted heaps, service roads and overburden dumps at regular intervals will help in reducing considerable dust pollution
- ❖ 0.5 KLD will be used for dust suppression.
- ❖ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator.
- ❖ Conventional low explosives are being used.
- ❖ The scale of blasting is however very less considering the rate of production.
- ❖ Covering of material when transport through trucks/dumper
- ❖ The drilling and blasting are being carried out as per the proposals laid down in the approved plan.
- ❖ Proposed to follow up muffle blasting so as to prevent fly rock fragments
- ❖ Avoiding blasting during high windy periods and temperature inversion periods
- ❖ Delay blasting under unfavorable wind and atmospheric conditions
- ❖ Use of appropriate explosives for blasting and avoiding overcharging of blast holes
- ❖ The vehicles and machinery will be kept in well maintained condition so that emissions will minimize
- ❖ Provision of green belt all along the periphery of the lease area for control of dust

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

- ❖ Information on wind direction and meteorology will be considered while planning, so that pollutants, which cannot be fully suppressed by engineering technique, will be prevented from reaching the residential areas
- ❖ Cabins for shovel and dumpers and dust masks to workmen will be provided
- ❖ The dust respirators should be provided to all workers working in dusty environment
- ❖ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act
- ❖ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.

As discussed above under each activity, there will be increase in terms of dust load and gaseous emissions. However, it can be stated that these incremental contributions will remain within the prescribed limits/norms. Further, the mitigation measures will further bring down these concentrations making the mining activities more eco-friendly.

4.2 Carbon emission and carbon sinks due to proposed mining activity

4.2.1 Carbon emissions

There are both natural and human sources of carbon dioxide emissions. Natural sources include decomposition, ocean release and respiration. Human sources come from industrial activities such as cement production, deforestation as well as the burning of fossil fuels like coal, oil and natural gas.

4.2.1.1 Carbon emission due to natural activity in project site and carbon sinks

a) Carbon from decomposition

As the proposed project site is dry barren land with few shrubs which implies there is no much cutting of trees. So the process of decomposition will not take place which emits carbon dioxide into the atmosphere.

b) Carbon from ocean release

The project site is located 116km away from the Arabian Sea. Hence the carbon release by ocean to the project site is not possible

c) Carbon from respiration

The number of people employed in the proposed mining activity will be 20 persons. As per the study, human exhales about 1kg of carbon dioxide on an average day and

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

a tree can absorb 0.07kg of CO₂ in the atmosphere per day. Based on the working hours in the project, 20 people can exhale 6.6kg of CO₂ per day which may contribute to increase in level of ambient carbon dioxide. This will lead to green house effect in the earth atmosphere.

Remediation

The project proponent proposed to plant 95 numbers of one year taller tree sapling along the safety zone of mining lease area to overcome the emission of carbon by workers in the quarry.

4.2.1.2 Carbon emission due to human activity in project site and carbon sinks

a) Carbon from Vehicles

The proposed method of mining is semi mechanized which involves activity of excavator and tippers. The burning of fossil fuels used for the tippers and excavators releases carbon monoxide, carbon dioxide and nitrogen oxide into the atmosphere. When those gases are emitted into the atmosphere it affects the amount of greenhouse gases, which are linked to climate change and global warming. In average based on the production per day, two tippers can travel 21 miles within the lease area for transporting the rough stone. Plants not only absorb carbon dioxide but also absorb other gases and remove the impurities from it.

Table 4.17: Emission of carbon monoxide from vehicle

Source type	Average Emission rate of CO for HDDV as per EPA	Emission rate of CO
Tippers	2.311 g/mile	0.05 kg/day
Excavators	2.311 g/mile	0.23 kg day
Total Emission Rate		0.28 kg/day

Remediation

The project proponent proposed to plant 55 numbers of one year taller tree sapling along the safety zone of mining lease area to overcome the emission of carbon gases and other gases by vehicles in the quarry. Moreover, they will plant trees along the village road and government schools under CER and CSR schemes. BS –VI model of tippers are proposed to use in the quarry for the controlled emission of gases.

4.3 Soil Carbon stock

Soil carbon sequestration is a process in which CO₂ is removed from the atmosphere and stored in the soil carbon pool. This process is primarily mediated by plants through photosynthesis, with carbon stored in the form of SOC. Carbon is the main component of soil organic matter and helps give soil its water-retention capacity, its structure, and its fertility. The dense carbon stocks below and above the soil are mostly seen in dense forest where more process of photosynthesis takes place and tons of leaves, branches gets decomposed. The agricultural activity in field can degrade and deplete the SOC levels during the process of tillage in paddy, sugarcane turmeric crop field.

The land use analyst shows that there is Rengamala R.F and Thoppasamymalai R.F located at the distance of 10.20km and 20.90km respectively. As it is mining project which is carried out within lease area it will not affect any soil carbon stock in the reserved forest.

4.4 Noise Environment

Noise survey has been conducted in the study area to assess the background noise levels in different zones. In order to assess the baseline noise levels, impact of noise assessment around the mine site due to mining machineries on its workers and on the nearby settlements and movements of vehicles during transportation have been carried out exclusively and objectively in the core and buffer zone covering 10km radius in 5 locations. Following sources of noise in the proposed open cast Rough stone & Gravel quarry project are being observed:

- Drilling;
- Blasting;
- Vehicular Movement.

The drilling operation is being carried out by Jack hammer operated by compressor mounted with tractor. The noise levels in the working environment are being and will be maintained within the standards prescribed by Occupational Safety and Health Administration (OSHA). These standards were established with the emphasis on reducing the hearing loss. The permissible limits, as laid down by CPCB, are presented in below Table 4.18.

Noise generated from blasting is always instantaneous. The noise produced by blasting is for extremely short duration of around 0.5 seconds, though with a high intensity. Blasting time is generally fixed at lunch interval or after the working shift taking. Noise of blast is site specific and depends on type, quantity of explosives,

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

dimensions of drill holes, degree of compaction of explosive in the hole and rock. Blasting, in addition to easing the hard strata, generates ground vibrations and instantaneous noise. The noise levels in many situations will be above Threshold Limit Value. Exposure to noise levels, above Threshold Limit Value may have detrimental effect on the workers' health. The adverse effects of high noise levels on exposed workers may result in Annoyance, Fatigue, Temporary shift of threshold limit of hearing, Permanent loss of hearing and Hypertension and high blood cholesterol, etc.

Noise pollution poses a major health risk to the mine workers. When noise in the form of waves impinges the eardrum, it begins to vibrate, stimulating other delicate tissues and organs in the ear. If the magnitude of noise exceeds the tolerance limits, it is manifested in the form of discomfort leading to annoyance and in extreme cases to loss of hearing. Detrimental effects of noise pollution are not only related to sound pressure level and frequency, but also on the total duration of exposure and the age of the person.

Table 4.18: Permissible Exposures in Cases of Continuous Noise (CPCB)

Sound Level (dB A)	Continuous Duration (Hours)
85	8
88	4
91	2
94	1
97	0.5
100	0.25

Table 4.19: Noise Exposure Levels & Its Effects

Noise Levels dB(A)	Exposure Time	Effects
85	Continuous	Safe
85-90	Continuous	Annoyance and Irritation
90-100	Short term	Temporary shift in hearing threshold, generally with complete recovery
Above 100	Continuous	Permanent loss of hearing
100-110	Several years	Permanent deafness
110-120	Few months	Permanent deafness
120	Short term	Extreme discomfort
140	Short term	Discomfort with actual pain
150 and above	Single exposure	Mechanical damage to the ear

Source: Hand Book of EIA, Rao & Wooten

4.4.1 Anticipated Impacts due to Noise in Core Zone

During the operation phase of mining, movement of HEMM also add some noise level whose impact is being minimized by continuous maintenance of vehicle. The likely generations of noise levels due to operation of HEMM are given in Table 4.20.

Table 4.20: Expected Noise Levels

Equipment's	Expected Noise Levels dB(A)
Mining	
Drilling	90-100
Shovel	75-80
Tipper	75-80
Dozers	85-90
Crusher	85-95

The mine site where heavy earth moving machinery will operate, noise level will be within the stipulated 90 dB (A) norm of DGMS. The protection measures for the operators of this equipment will reduce the impact/exposure.

Predicted noise levels due to mining operations using Mathematical Equations

$L_2 = L_1 - 20 \log_{10} (R_2/R_1)$ Where L_1 dB (A) = Noise level at a distance R_1 (m)

L_2 dB (A) = Noise level at a distance R_2 (m) &

$L = 10 \log_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$

Where L_1 , L_2 and L_n are noise level dB (A)

Table 4.21: Predicted Noise levels in Core Zone and buffer zone

Location Code	Distance, km	Source Noise Level, dB(A)	L(Day) dB(A)	L(Night) dB(A)	Noise level at Receptor from Mining sources, dB(A)	Resultant noise level, dB(A) day time	Resultant noise level, dB(A) Night time
Core Zone	--	100	46.0	36.4	100	100	36.4
Pillar -1	0.1	100	48.2	37.2	70	70	37.2
Pillar -2	0.1	100	45.7	35.0	70	70	35.0
Pillar -3	0.1	100	46.5	35.8	70	70	35.8
Pillar - 4	0.1	100	47.6	36.8	70	70	36.8
Pungambadi – N	4.2	100	42.2	33.4	37.5	43.5	33.4
Seethapatti - NW	1.7	100	40.4	31.0	45.3	46.5	31.0
Thethupati – SW	4.3	100	45.3	35.1	37.3	45.9	35.1
Thirukooranam – N	1.3	100	45.6	35.3	47.7	49.7	35.3
Thulukambarai- E	2.5	100	47.6	36.4	42.0	48.6	36.4

Green colour- Baseline Value, Red Colour – Noise level due to mining,
Blue colour- Baseline + Noise level due to mining

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

Table 4.22: Predicted Noise levels in Core Zone and buffer zone due to combined action of three quarries in the cluster area

Location Code	Distance, km (from Proposed activity 1)	Distance, km (from Adjacent Quarry 2)	Distance, km (from Adjacent Quarry 3)	Source Noise Level, dB(A)	L (Day) dB(A)	Noise level at Receptor from Quarry 1 dB(A)	Noise level at Receptor from Quarry 2, dB(A)	Noise level at Receptor from Quarry 3, dB(A)	Resultant Noise level, dB(A) Day time
Core Zone	--	--	--	100	46.0	100	100	100	100
LB Pillar (N)	0.1	0.1	0.1	100	48.2	70	70	70	70.01
LB Pillar (S)	0.1	0.1	0.1	100	45.7	70	70	70	70.01
LB Pillar (E)	0.1	0.1	0.1	100	46.5	70	70	70	70.01
LB Pillar (W)	0.1	0.1	0.1	100	47.6	70	70	70	70.01
Pungambadi – N	4.2	4.3	4.5	100	42.2	37.5	37.3	36.9	45.1
Seethapatti - NW	1.7	1.6	1.5	100	40.4	45.3	45.9	46.5	51.0
Thethupati – SW	4.3	4.4	4.2	100	45.3	37.3	37.1	37.5	46.9
Thirukooranam – N	1.3	1.2	1.4	100	45.6	47.7	48.4	47.0	53.3
Thulukambarai- E	2.5	2.3	2.4	100	47.6	42.0	42.7	42.4	50.4

Green colour- Baseline Value, Red Colour – Noise level due to mining,

Blue colour- Baseline + Noise level due to mining

Although the noise level due to the operation of various mining machineries is 100dB(A), the noise level at different receptors is lower due to the distance involved and other topographical features adding to the noise attenuation. The calculated values at the receptors and resultant noise level are based on the mathematical formula as mentioned above. From the above table, it can be seen that the ambient noise levels at all the locations will remain within permissible limits even when the project will be in operation phase after getting EC.

4.4.2 Mitigation measures for Control of Noise

The following noise mitigation measures are proposed for control of Noise.

- ❖ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas.
- ❖ Limiting time exposure of workers to excessive noise.
- ❖ Proper and regular maintenance of vehicles, machinery and other equipments.
- ❖ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments.
- ❖ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles.
- ❖ Carrying out blasting only during day time and not on cloudy days.
- ❖ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.
- ❖ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
- ❖ Provision of Quiet areas, where employees can get relief from workplace noise.
- ❖ The development of green belts around the periphery of the mine to attenuate noise.
- ❖ Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

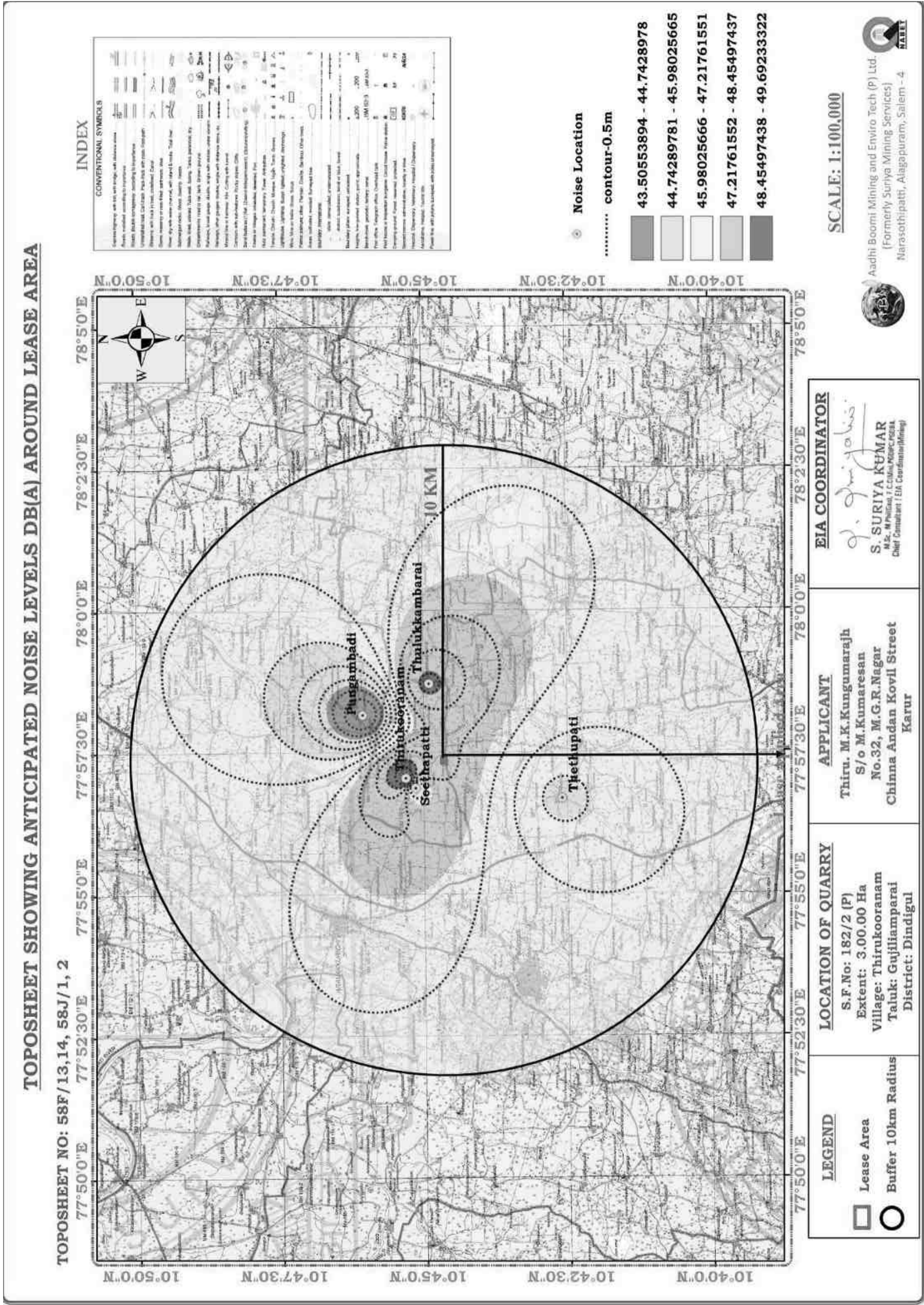


Fig 4.5: Noise dispersion in Buffer zone due to proposed mining activity

4.5 Ground Vibrations

Ground vibration due to mining activities in the area are anticipated due to operation of mining machines like excavators, wheel loaders, drilling and blasting, transportation vehicles, etc. However, the major source of ground vibration from this mine is blasting. Another impact due to blasting activities is fly rocks. These may fall on the houses or agriculture fields nearby the mining lease area and may cause injury to persons or damage to the structures. Nearest habitation from the mine lease area is located in northeast side and nearest village is located on southwest side. The study area does not involve any mining activity so anticipated impact has been assessed using the empirical equation. The empirical equation used for assessment of peak particle velocity (PPV) is:

$$V = 417.8 \{D / (Q^{0.5})\}^{-1.265}$$

Where

V= Peak particle velocity in mm/s

D= Distance between location of blast and gauge point in m

Q=Quantity of explosive per blasting in kg.

The standards for safe limit of PPV are established by Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. Permissible standards of Ground vibration due to blasting as per guidelines of Director General of Mines Safety (DGMS), Dhanbad are given in Table 4.24.

Table 4.23: Estimated Peak Particle velocities for different Explosive Charges

Nearest Habitation	Quantity of Explosive/Blast, Kg	PPV, mm/s
98m -E	38	22.98
98m -E	15	7.0
98m -E	10	5.4
98m -E	9	5.0
98m-E	8	4.7
905m -SW	38	0.75
905m -SW	100	1.4

Note: The empirical formula does not take into account the delay factor in blasting due to use of Delay Detonators.

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

$$\text{ROM for five years} = 160296 \text{ m}^3$$

$$\begin{aligned} \text{ROM for a year} &= 160296/5 = 32059 \text{ m}^3 \\ &= 32059 \times 2.5 = 80148 \text{ MT.} \end{aligned}$$

$$\text{Per day ROM} = 261 \text{ MT}$$

$$\text{Explosives requirement} = 351/7 = 38 \text{ kg/day}$$

Table 4.24: Permissible Peak Particle Velocities (mm/s)

S. No	Type of Structure	Dominant excitation Frequency		
		< 8 Hz	8 – 25 Hz	> 25 Hz
A) Buildings/structures not belonging to the owner				
1	Domestic houses/structures (Kuchcha brick and cement)	5	10	15
2	Industrial Buildings (RCC and framed structures)	10	20	25
3	Objects of historical importance and sensitive structure	2	5	10
B) Buildings belonging to the owner with limited life span				
1	Domestic houses/structures (Kuchcha brick and cement)	10	15	25
2	Industrial buildings (RCC & framed structures)	15	25	50

Source: DGMS Circular No. 7 dated 29/08/1997

From the above results (Table 4.23), it can be seen that the charge per blast of 38kg is above the Peak Particle Velocity of 5mm/s. So the proponent will be advised to use five delays to keep the ground vibration within 5mm/s. However, as per statutory requirement additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

4.5.1 Mitigation measures for Control of Vibration

Blasting is the major source of vibration and fly rocks. The following mitigation measures are proposed for control of vibration and fly rocks.

- ❖ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios.
- ❖ Milli second detonators shall be used preferably 25–50ms per delay to control vibrations.
- ❖ Inclined holes shall minimize back brake and intensive shocks.
- ❖ In case of development work if any, cushion blasting and Deck loading system shall be adopted to minimize throw of fragments and ground vibration.
- ❖ Air blast due to usage of Detonating Cord with 10gm/m shall be reduced to 5gms/m to minimize air reverberation.

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

- ❖ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone.
- ❖ No deep hole blasting shall be practiced.
- ❖ Heavy machineries with high ground pressure shall not be used in the mines.
- ❖ Proper warning signals should be used.
- ❖ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring.

Though all mitigation measures are pointed out, as such no adverse effects on human life, wild life and other biotic system.

4.6 Water Environment

Mining operations can affect groundwater quality in several ways. The most obvious occurs in mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water.

Whereas Impacts on surface water include the build-up of sediments or other toxic products, short and long-term reductions in pH levels (particularly for lakes and reservoirs), destruction or degradation of aquatic habitat, and contamination of drinking water supplies and other human health issues. The water balance for the project is presented in Fig 4.7.

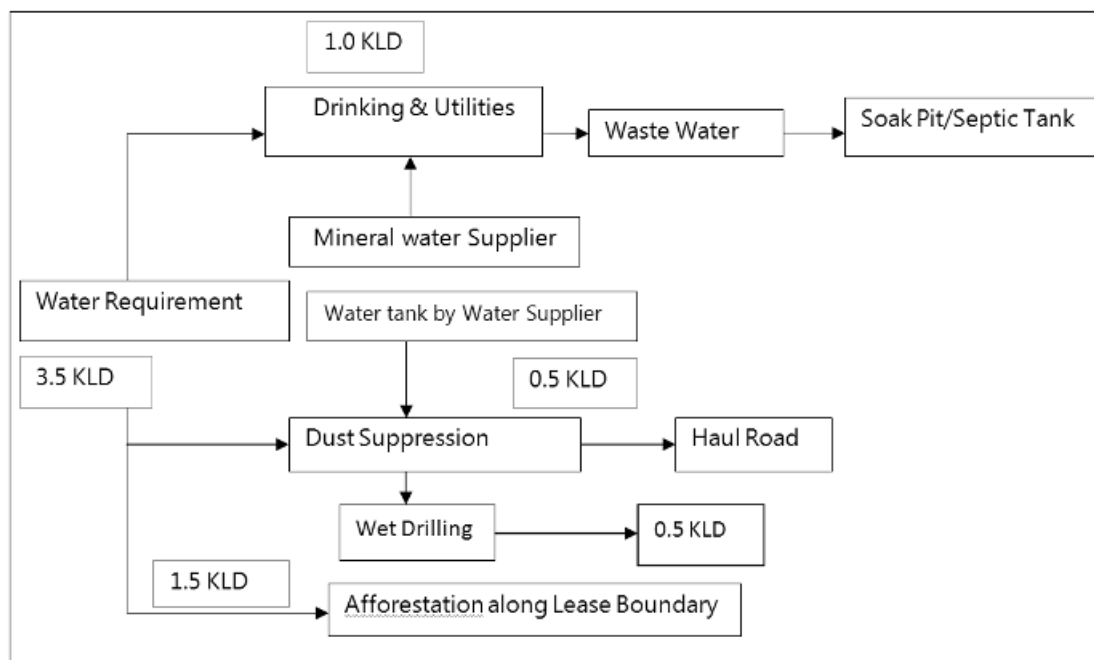


Fig. 4.7 Water Balance

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Drinking & Utilities = 1.0 KLD

Wastewater = (1.0 KLD * 75%) = 0.75 KLD

Water required For Dust Suppression, Green Belt, wet drilling = 2.5 KLD

Total Water Requirement = 3.5 KLD

There are no probable sources of liquid effluents in this project. The 0.75 KLD of domestic effluent/ wastewater generated from office will be discharged into soak pit via septic tank.

4.6.1. Anticipated Impact on Surface Water body due to proposed project

There is no nalla or water body location within the leasehold area. There are one lake, one small odai, one check dam and three rivers located within the five km radius of the proposed project site. The details of river body are given below.

1. Godavananar River – 435m – E
2. Kodavananar Check dam – 450m – E
3. Alamarathupatti lake – 1.3km – NE
4. Small odai – 1km – NE
5. Amaravathi river – 8.2km – NW
6. Nanganji River – 5.1km - W

It is noted that that Godavananar River and Kodavananar check dam is situated within one 1km radius which may sensitive to proposed mining activities. Based on the drainage map given in the Fig.No.4.8 it is found that there is no stream order connects the lease area to the nearest Kodavananar River. From the proposed mining project, 5% of rejects will be generated which is planned to dump within the mining lease area. Even though the streams order not connecting with the nearest river, there will be chance of siltation of river bed during raining season due to mining activity. To over such siltation in the river the following mitigation measure will be followed.

4.6.1.1 Mitigation Measures:

- i. The garland drainage will be provided around the dump(Top Soil and rejects) to prevent the escape of runoff from the dump.
- ii. The repair works of the machineries are strictly prohibited within the lease area to prevent the spillage of grease, oil etc.

4.6.2 Anticipated Impact on Ground water due to proposed project

The water table in this region is about 30 m bgl. The proposed depth of mining is 14m bgl for five years and the ultimate depth of mining is 20m bgl. Thus, the mining

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activity will not intersect ground water table. No chemical having toxic elements will be used for carrying out mining activity. Also Rough stone does not contain any kind of toxic element which can contaminate the water. So the rain water or water used for drilling purposes which infiltrates into the ground in the lease area does not affect the quality of ground water. The schematic representation of depth of mining and water table is given in Figure 4.9. The lease area is deposited with rough stone and safety distance of 7.5m is planned to left on north, east and west side of the lease area and safety distance of 10m is planned to left on the southern side. The minerals locked under the safety zone will act as barrier to prevent the seepage of aquifer into the quarry pit if any.



Fig. 4.8 Drainage pattern and water bodies within the 1km radius around the project site

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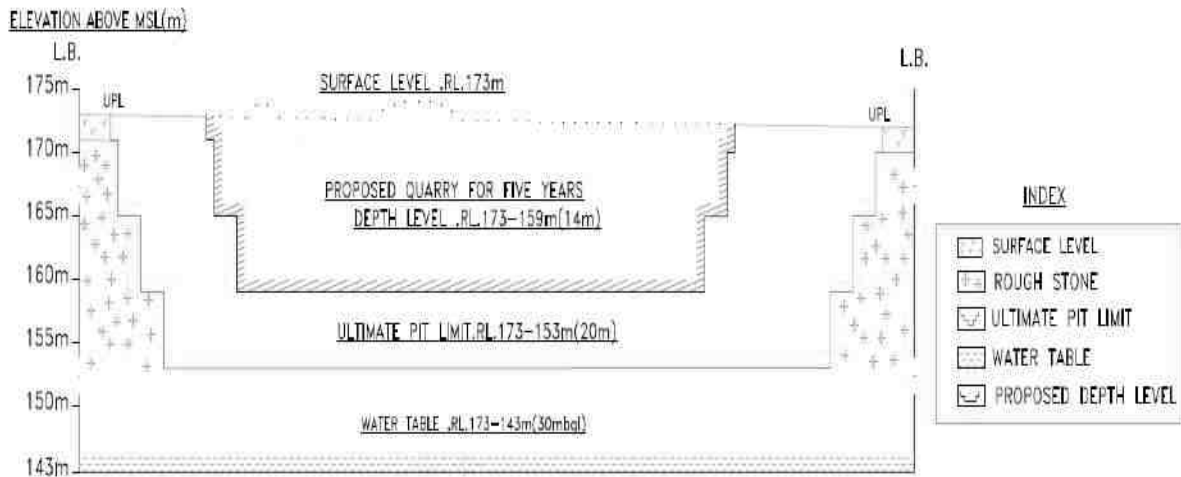


Fig.4.9 Schematic representation of depth of mining and water level

4.6.3 Management of rain water in the pit during Monsoon Season

During monsoon season, the rain water gets stored in the quarried out pit. For the working purpose, rain water will be pumped and allowed to store in the surface setting tank constructed outside the lease area to remove suspended solids if any. After the sedimentation process, the water from the settling tank will be used for dust suppression, and green belt development within the lease area.

4.6.4 Water Quality Index

Water Quality Index value has been calculated for the observed values and compared with drinking water specification as per IS 10500:2012 and results were discussed. The WQI has been calculated by using the standards of drinking water quality recommended by the World Health Organization (WHO), Bureau of Indian Standards (BIS) and Indian Council for Medical Research (ICMR). The weighted arithmetic index method (Brown et. al.,) has been used for the calculation of WQI of the water body.

Water Quality Index = $\frac{\sum q_n W_n}{\sum W_n}$

Further quality rating or sub-index (q_n) was calculated using the following expression.

$q_n = 100 * [V_n - V_{io}] / [S_n - V_{io}]$ Where,

q_n = Quality rating for the nth water quality parameter.

V_n = Estimated value of the nth parameter at a given sampling station.

S_n = Standard permissible value of the nth parameter.

V_{io} = Ideal value of nth parameter in a pure water.

Ideal value in most cases $V_{io} = 0$ except in certain parameters like PH and dissolved oxygen. V_{io} for PH = 7 and V_{io} for DO = 14.6

W_n = Unit weight for the nth parameter.

The overall Water Quality Index (W.Q.I.) was calculated by aggregating the quality rating with the unit weight linearly.

Table 4.25: Water Quality Index (W.Q.I.) and Status of water quality (Chatterji and Raziuddin 2002)

Water Quality Index Level	Water Quality Status
0 – 25	Excellent water quality
26 - 50	Good water quality
51 - 75	Poor water quality
76 - 100	Very Poor water quality
>100	Unfit for Drinking

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Table 4.26: Analyses of water quality using Water Quality Index

Parameters	As Per IS 10500:2012	Unit Weight (Wn)	Core Zone	Pungambadi	Thirukooranam	Thethupatti	Thulukamparai
Water Quality Index Level							
Water Quality Status							
pH value at 25°C	6.5 – 8.5	0.079	8.4	7.48	7.24	7.34	7.34
Turbidity, NTU	Max 1 NTU	0.0853	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)
Total Dissolved Solids, mg/L	Max 500 mg/L	0.135	2510	493	756	3710	3722
Total Hardness as CaCO ₃ , mg/L	Max 200 mg/L	0.059	1200	95	270	1676	1542
Chlorides as Cl, mg/L	Max 250 mg/L	0.132	954	668	753	1907	2003
Sulfates as SO ₄ , mg/L	Max 200, mg/L	0.097	63	13	20	107	107
Total Iron as Fe, mg/L	Max 0.3 mg/L	0.088	0.1	0.04	0.07	2	2
Total Coliform, MPN/100ml	Shall not be detectable	-	170	27	30	220	220
E.coli, MPN/100ml	Shall not be detectable	-	<2	<2	<2	<2	<2

Note: Water Quality is calculated only for Physical and Chemical Parameters

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

The water sample from all the locations including core zone except Pungambadi has high TDS and TH exceeds the permissible limit. Chlorides were found to be high in all the five locations. Total coliform was found in the range of 27 MPN index/100ml to 220MPN index/100ml at 95 percent confidence limit in all the water samples. E.coli was found <2 in all the water samples. Based on the Water Quality Index calculated, water qualities from all location were poor to unfit for drinking. For excellent quality, the water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate. Boiling of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

Total Coliform: The most basic test for bacterial contamination of a water supply is the test for **total coliform bacteria**. Total coliform counts give a general indication of the sanitary condition of a water supply. It includes bacteria that are found in the soil, in water that has been influenced by surface water, and in human or animal waste.

Effects: Drinking water that is contaminated with **coliform** bacteria does not always cause illness. If disease-causing bacteria are present, the most common symptoms are gastrointestinal upset and general flu-like symptoms such as fever, abdominal cramps, and diarrhea.

Solution: To kill the microorganisms (Total Coliform) boiling the water is very easy and effective step.

Escherichia coli (E.coli): It is the major species in the fecal coliform group. E. coli is considered to be the species of coliform bacteria that is the best indicator of fecal pollution and the possible presence of pathogens.

Effects: It Causes intestinal infection include diarrhea, abdominal pain, and fever. More severe cases can lead to bloody diarrhea, dehydration, or even kidney failure.

Solution: E.coli contaminated water can be treated by using chlorine, ultra-violet light, or ozone, all of which act to kill or inactivate E. coli. Chlorine is a cheap and effective disinfectant. It is available in local market.

4.6.5 Impact on Hydrogeology

i. RESISTIVITY SURVEY ANALYSIS

Electrical Resistivity survey by Schlumberger configuration was conducted to interpret various geological formation and possibility of water spring touch at various depths by Inverse slope method. At a depth of 30-31 there is an indication of seepage of ground water which may yield < 1/2" of water. Water aquifer is interpreted at 30-31m and which may yield >2" by "V" Notch test.

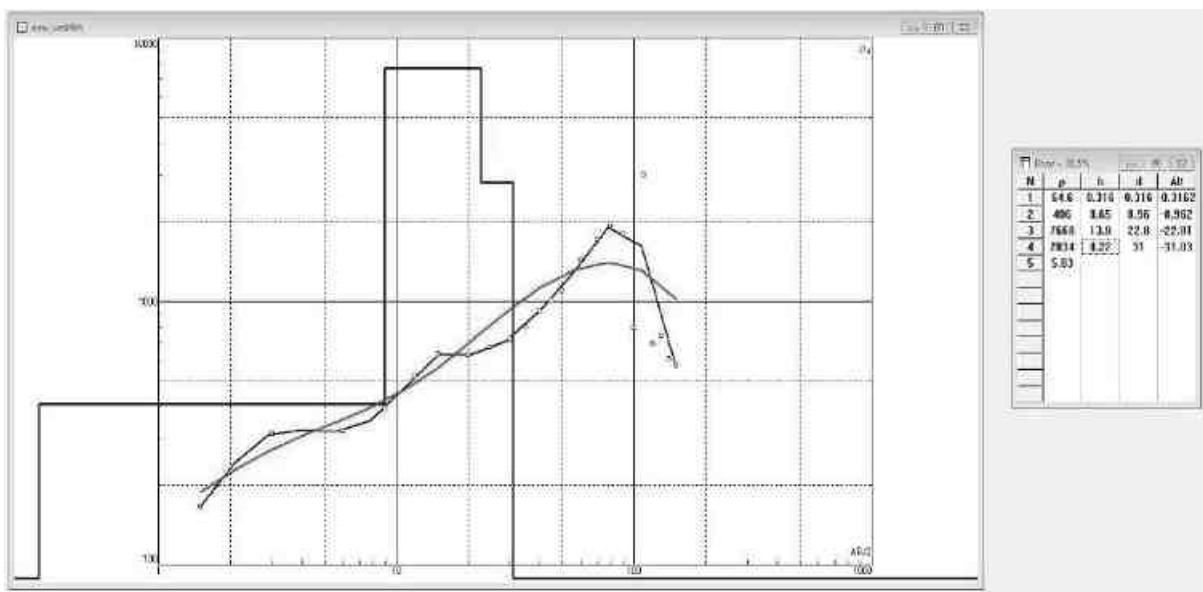
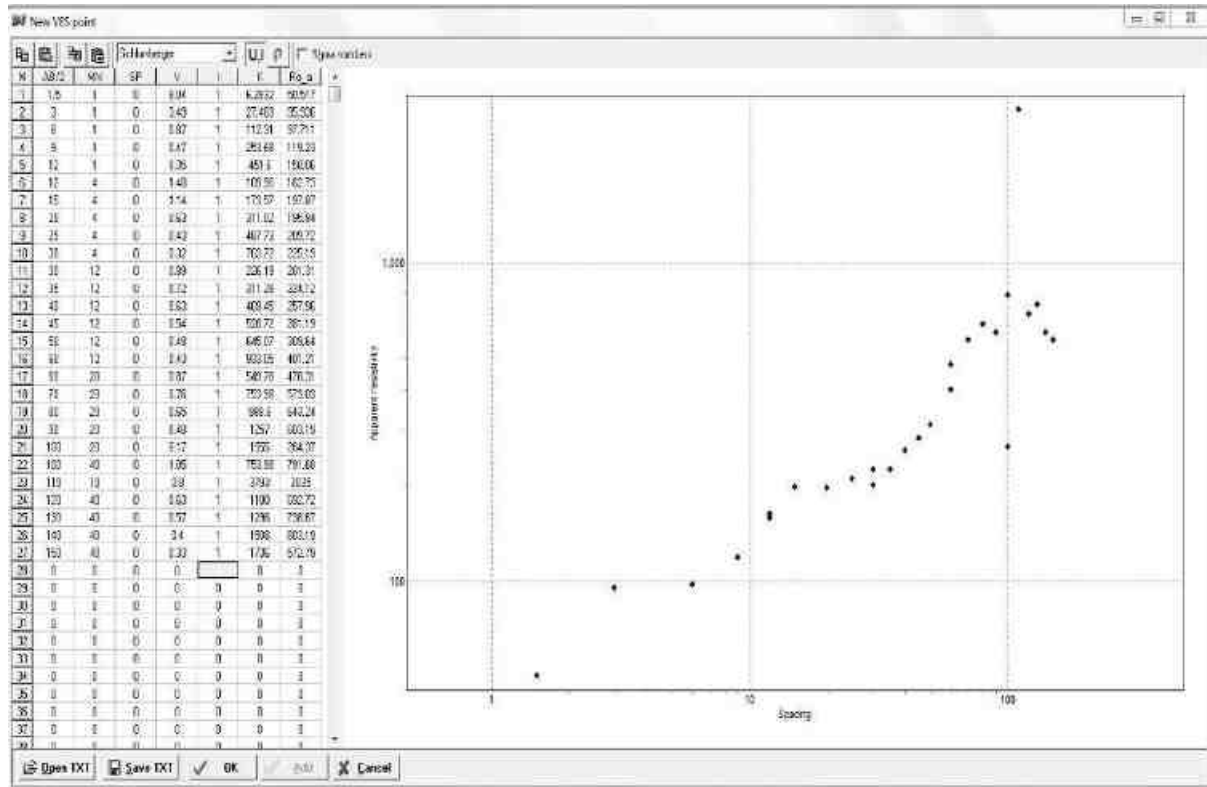


Fig No. 4.10. Image showing Resistivity curve, depth data

The various geological formations and water touch as interpreted is given below,

Table 4.27: Resistivity Survey

Layer	Depth (m)	Nature of formation	Resistivity Value
h1	0-4	Top Soil & weathered Formation	Very Low (64'Ω)
h2	4-30	Massive Charnockite formation	Medium Value(7668'Ω)
h3	30-31	Fractured Formation (Water level fluctuations)	Low Value (406'Ω)
h4	>31	Massive Formation	High Value(2834'Ω)

From the results of Resistivity Survey, it is understood that the study area is composed of Rough stone & Gravel deposit, with little geological disturbances by folding. It is blue with grey in color. Mild Seepage of Ground water is reported at 30-31m bgl.

4.6.6 Rainwater Harvesting Potential in Core Zone at the end of project

- 1) Total Pit Area = 16460m²
- 2) Annual rainfall of the area = 0.831m
- 3) Total rainwater available to store in pit area = 13678 m³
- 4) Total volume of Quarried Pit = 329200 m³

4.7 Soil Environment

4.7.1 Impact on Soil Environment

The limited quantity of top soil generated will be dumped along 7.5m inner boundary of the lease area. The top soil will be used to develop greenbelt within the lease area. Part of top soil will be spread over the non active dumps along the slope and edges to plant tree saplings to form vegetal cover over the dumps. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected. The 31958m³ of gravel generated upto the depth of 2m will be sold to the local needy customers.

4.7.2 Mitigation measures for Soil Conservation

- ❖ Garland drains will be provided around the dumps to arrest any soil carried away by the rain water. This will protect the adjacent agricultural land and surface water body from the deposition of soil.
- ❖ Toe drains with low height retaining wall will be provided all along the toe of dumps to arrest any soil from the dump slopes being carried away by the rain water

- ❖ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises.

4.8 Waste Dump Management

4.8.1 Anticipated Impact

The proposed rate of production of Rough stone for five years is about 152281m³ at the rate of 95% recovery up to permissible depth. The 5% reject of 8015m³ shall be dumped as per earmarked site in the approved mining plan.

4.8.2 Mitigation measures

The mineral rejects and waste shall be dumped systematically with proper repose angle and stabilization as given below,

- ❖ The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation.
- ❖ Gradation of dump shall be done automatically as coarser materials go to the bottom and finer at the top and therefore drain of rain water flow freely to the bottom without endangering the stability of dump,
- ❖ More over the dump height shall be less than 6m with natural repose angle and hence dump will be more stable.
- ❖ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse,

4.9 Municipal solid waste management

The human waste shall be treated by temporarily built septic tank and soak pit within the mine lease area. The municipal solid waste generated by workers will be properly segregated into biodegradable and non-biodegradable and disposed through garbage collector of Coimbatore Corporation.

4.10 Ecology and Biodiversity

4.10.1 Impact on Ecology and Biodiversity

The details and list of flora, fauna, reserved forest and cropping pattern within the 10km radius of study area is given in chapter 3. The impact on ecology and biodiversity due to the proposed mining activity has to be studied in detail to prepare the management plan to safeguard the flora, fauna, forest products and aquatic living organism etc.

A detailed anticipated impact of Ecology and Biodiversity due to mining activity is described in Table 4.28 & 4.29.

Table 4.28: Ecological Impact Assessments and Its Mitigations -Part 1

Sl. No	Issues	Assessment	Mitigations
1	Proximity to national park/ wildlife sanctuary / reserve forest / mangroves / coastline/estuary/sea	No forests are situated within 10km radius. The proposed project does not attract Forest Conservation Act, 1980. There is no wild life sanctuaries found around 10km radius. Quarry area is 154km (SE) away from the Bay of Bengal. Hence the area does not attract Wildlife Protection Act, 1972 and C.R.Z. Notification, 1991.	-
2	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. The fauna in the buffer zone may be affected by noise generated due to mining activity.	The noise due to the mining activity will be controlled developing green belt all along the lease boundary, regular maintenance of tippers, excavators, transporting the empty tipper within the speed the 20 km/hr.
3	Located near an area populated by rare or endangered species	No endangered, critically endangered, vulnerable species sighted in core mining lease area and also in buffer zone.	Nil
4	Proposed project restricts access to waterholes for wildlife	No waterholes are in core zone. No Wild life sanctuary within 10km radius.	Nil

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5	Proposed mining project impact surface water quality that also provide water to wildlife	'NO' scheduled or threatened wildlife animal sighted regularly in core area.	Nil
6	Proposed mining project increase siltation that would affect nearby Biodiversity area.	Yes, the runoff from the dump which carries the solid materials may get silt in the adjacent agricultural land and affect the cropping pattern. Also it may get silt in the adjacent river bed and reduce its water carrying capacity	Garland drainage will be excavated around the dump to arrest the runoff from dump. The drainage will be desilted after every precipitation.
7	Risk of fall/slip or cause death to wild animals due to project activities	'NO'. No Wild life sanctuary within 10km radius.	Nil
8	The project release effluents into a water body that also supplies water to a wildlife	As the proposed project is mining activity there will be no possibilities of release of effluents. Also no Wild life sanctuary within 10km radius.	Nil
9	Mining project effect the forest based livelihood/ any specific forest production which local livelihood depended	Rengamalai R.F and Thoppasamimalai R.F are located beyond 10km. Hence the proposed mining activity will not affect the nearest forest.	-
10	Project likely to affect migration routes	No migration route observed during monitoring period.	Nil
11	Project likely to affect flora of an area, which have medicinal value	No flora having medicinal value found within the lease area	The flora such as neem having medicinal value found in the study area of buffer zone. Those floras will not be affected by the proposed mining activity at it will be carried out only within the lease area.
12	Forestland is to be diverted, has carbon high sequestration	'NO'. There is no forest land within the lease area.	Nil
13	The project likely to affect wetlands, fish breeding grounds, marine ecology	'NO'. No wetland, fish breeding grounds, marine ecology present in core mining area.	Nil

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

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

Table 4.29: Ecological Impact Assessments – Part 2

Ecological Criteria	Identified Impacts	Ecological significance of Impact	Magnitude	Duration /Timing/ Frequency	Reversibility	Mitigation	Cumulative Impact
Zone of Influence	Project site Habitat due to Site Clearance.	The proposed mining lease is located in Thirukooranam Village. Since it is a fresh area, some shrubs will be cleared before the commencement of the project. The fauna which depends on the shrubs for habitat will be disturbed. No clearance of vegetation in the buffer zone	Low Impact	-	Irreversible in quarry area	During the clearance, it will find the alternate habitat in the buffer zone. During the operation of quarry, the proponent will develop the green belt along the lease boundary. This afforestation will provide the habitat for the migrated fauna.	No Cumulative Impact
Zone of Influence	Ecological Impact Surrounding habitat due to fugitive emission	The fugitive emission due to the mining activities such as drilling, blasting, loading and transportation on the haul road will be deposited on the flora and crop field in the buffer zone which affects growth and its productivity.	Temporary Impact	During mining period	Reversible	Before loading the rough stone & gravel will be moisturized to minimize the emission. The sprinkling of water over the haul road will be done. Then completely wet drilling will be take place. The transportation vehicles will be maintained and serviced Properly.	No Cumulative Impact
Accessibility	Ecological Impact due to road construction	No Road construction is required to assess the project site. The existing village road Road connects the project site to the existing MDR road.	No Impact		-	-	No Impact

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

<p>Zone of Influence</p>	<p>Ecological Impact on Surrounding/ Eco sensitive habitat due to waste water generated from the project activity.</p>	<p>Since the proposed project is an mining activity no waste water generation is expected. Human waste and municipal solid waste will be generated due to the workers.</p>	<p align="center">-</p>	<p align="center">-</p>	<p>Human waste will be properly treated by septic tank and soak pit in the lease area and dispose periodically. The municipal solid waste generated by workers will be properly segregated into biodegradable and non-biodegradable and disposed through garbage collector of Coimbatore Corporation.</p>	<p>No Impact</p>
<p>Zone of Influence</p>	<p>Ecological Impact on Surrounding / Eco sensitive habitat due to Noise generated from the project activity.</p>	<p>During drilling or blasting, transportation of rough stone & gravel, noise will be generated and it may slightly affect the movement of fauna around the lease area.</p>	<p>Only during drilling, blasting operation and transportation period. (5 years)</p>	<p align="center">No</p>	<p>Avenue trees will be planted along the lease area to minimize the noise level. Milli second detonators shall be used preferably 25–50ms per delay to control vibrations. Regular maintenance of vehicles and driving the empty tipper within 20km/hr speed also control the noise generations.</p>	<p>No Impact</p>

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Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

Zone of Influence	Ecological Impact On Surrounding/ Eco sensitive habitat due to Transportation	There is no eco sensitive habitat found around the lease area. The fugitive emission from drilling, blasting, vehicle movement will form layer in leaves thus reducing the gaseous exchange process. This ultimately affects the growth of plants. The animals like dog, cattle may get accident due to truck movement.	Temporary impact	During Operation Phase	No	The truck driver will be advised to drive the vehicle within 20km/hr inside the lease area and 40km/hr outside the lease area. Before loading the rough stone & gravel will be moisturized to minimize the emission. The sprinkling of water over the haul road will be done. Then completely wet drilling will be take place.	No Impact
Zone of Influence	Ecological Impact on Natural ecosystem, the soil micro flora and fauna and soil seed banks.	There are no forests and wild life sanctuary within 10km radius of the project site. The Godavanan river is located at the distance of 450m in east direction. During raining season the runoff from the lease may affect the habitants in the river and reduce river carrying capacity	Temporary Impact	Nil	--	The garland drainage will be around the quarry pit and dump to prevent the escape of runoff from the lease area to the river. The maintenance of vehicle will be strictly prohibited in the lease area to prevent the spillages of oil, grease.	No Impact
Zone of Influence	Fish habitats and the Food web/food chain in the water body and Reservoir	The Godavanan river is located at the distance of 450m from the lease area in east direction.	No Impact	Nil	--	The garland drainage will be around the quarry pit and dump. The maintenance of vehicle will be strictly prohibited in the lease area	No Impact

Table 4.30: Afforestation Plan of the Proposed Rough Stone & Gravel Quarry for the next five years

Year	Place	Type of Trees	Number	Area to be covered Sq.m	Spacing	Rate of survival
I	Lease Boundary & Dump	Pungai, Vagai, Vanni	50	300	5m X 5m	80%
II	Lease Boundary & Dump	Karungali, Puvarasu,	50	300	5m X 5m	80%
III	Lease Boundary & Dump	Pungai, Vagai, Vanni	50	300	5m X 5m	80%
IV	Lease Boundary & Dump	Karungali, Puvarasu	50	300	5m X 5m	80%
V	Lease Boundary & Dump	Pungai, Vagai, Vanni	50	300	5m X 5m	80%

Nearly 6430 Sq.m area is proposed to use under afforestation by planting 50 nos of Neem sampling etc., every year in the spacing interval of (5m x 5m) with an anticipated survival rate of 80%.

4.11 Socio Economic

4.11.1 Anticipated Impact

Employment generation (Direct and Indirect) due to the project has generated direct and indirect employment for more than 20persons. Preference will be given to the local population for employment in all categories including semi-skilled and unskilled. The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations.

It is obvious to assume that the activities of the mining operations will improve the socio-economic levels in the study area. The anticipated impact of this project on various aspects is described in the following sections

- Impact on human settlement: Overall, due to employment generation and economic progress, there will be positive changes in the socio-economic condition of the people residing in the vicinity of the project site. The local

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT.

Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

population will have preference to get an employment. No resettlement occurred due to mining activity. Built up land has been increased marginally.

- Impact on Population Growth: Population rate grows annually and demand of primary needs and employment will increase due to population growth. It will provide some direct and indirect employment to the people in and around the villages.
- Impact on Vegetation: No decline in agricultural land. It has been increased over a period of time by utilizing the water stored in the working pits. No deforestation will be happened.

Therefore due to mining, per capita income of local people will be improved. The local people have been provided with either direct employments or indirect employment such as business, contract works and development work like roads, etc. and other welfare amenities such as Sanitary facilities, Solar Lighting to Govt school, Health Care to the villages in buffer zone, Maintenance of village road or Providing funds to local body or Prime minister's fund on Socio economic Development and relief measures. The job/ business opportunities will improve the economic condition of the persons. They are in a position to utilize this money for purchase of tractors, trucks, etc. which may be put into use for business purposes. Many **positive impacts** can be resulted from a long-term mine unit. In this context, provision of job opportunities, business, transport and communication, laborer etc are the major ones. Thus, this unit is highly favorable to poor and landless people.

4.11.2 Mitigation Measures

- Good maintenance practices will be adopted for plant machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Drilling, blasting etc at specified location will be followed with proper schedule.
- Appropriate air pollution control measure will be taken so as 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 has been provided which meet 'BIS' (Bureau of Indian Standards).

Thus, no significant impact on health and safety will be occurred due to this project.

4.12 Land Environment

4.12.1 Anticipated Impact on Land Use / Land Cover

Rough stone & gravel Quarry project will result in disturbance of the land use pattern of the mine lease area. The impact on the topography in the form of changed landscape is unavoidable during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs. So reclamation of mined out land will be given due importance as a step for sound land resource management. No release of toxic elements into the ground. No adverse impact is anticipated on land use of buffer zone associated due to the mining activity, as all the activities will be confined within the project site. The mining operations will impact the land usage and land aesthetics of mine lease area.

The land use analyses show that the area is of predominantly Agriculture followed by buffer zones of the study area, which clearly indicates that the development of agriculture land increases over a period of time. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing agricultural activity around the mining lease area. It will improve the livelihood of village people. The evaporation rate of the water in the pit is given detail in the report.

4.12.2 Mitigation measures

- ❖ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil.
- ❖ Provision of Garland drainage around the dumps
- ❖ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land
- ❖ Appropriate measures will be taken for Green belt development.
- ❖ The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.

4.13 Occupational Health Risks

4.13.1 Anticipated Impact

Occupational health and safety hazards occur during the operational phase of mining.

Excessive dust, Noise and vibration are the chief health hazards. Exposure to fine particulates is associated with work in most of the dust generating stages of mining.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT.

Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

Workers with long term exposure to fine particulate dust are at risk of pneumoconiosis, emphysema, bronchitis, silicosis and fibrosis.

Health and Safety Measures to control dust inhalation; precautions would be adopted to prevent dust generation at site and dispersing in the environment. Long-term exposure to silica dust may cause silicosis. Occupational Safety hazards related to blasting activities may result in accidental explosions, if not properly mitigated.

Physical injuries during project operation are related to near slips and falls: contact with falling/ moving objects and lifting/ over-exertion. Other injuries may be due to contact with or capture in, moving machinery like dump trucks, loaders etc.

4.13.2 Anticipated occupational and safety hazards

- ❖ Health Impact due to Physical activity, Extremes of age, poor physical condition, fatigue, Cardiovascular disease, Skin disorders
- ❖ Noise
- ❖ Burns and shocks due to electricity
- ❖ Respiratory hazards due to Dust exposure
- ❖ Physical hazards
- ❖ Explosives
- ❖ Fire

4.13.3 Anticipated health impacts on people in nearby villages

The mining activity not only causes health hazards to quarry workers but also affect the health of nearby village people. The fugitive emission during heavy wind period travel along the predominant wind direction and people in village located along predominant wind direction gets affected. The chances of changing water quality in villages due to mining activities lead to causes various diseases in the nearby village people.

4.13.4 Mitigation measures

For the safety of workers at site, the following mitigation measures are proposed

- ❖ Excavators, dumpers, drills other automated equipments will be enclosed
- ❖ Use of personal breathing protection will be made compulsory
- ❖ Spraying with water on all working faces & haul roads, by water-sprinkler
- ❖ Regular health monitoring of workers once in 6months for silicosis
- ❖ Random health check up village people around the lease area for identify diseases if any due to mining activity

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT.

Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District

- ❖ No employee will be exposed to a noise level greater than 75 dB(A) for a duration of more than 8 hours per day without hearing protection
- ❖ Ear muffs provided will be capable of reducing sound levels at the ear to at least 75 dB(A).
- ❖ During mining operations, all the statutory provisions of the Indian Electricity Rules 1956, and Indian Standards for installation and maintenance of electrical equipment etc. will be observed.
- ❖ Care will be taken to evacuate the mining area completely at the time of blasting operations.
- ❖ A blasting SIREN will be used at the time of blasting for audio signal
- ❖ Before Blasting and after blasting, red and green flags will be displayed as visual signals.
- ❖ Warning notice boards indicating the time of blasting and NOT TO TRESSPASS are displayed prominently.
- ❖ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955
- ❖ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A).
- ❖ Insurance will be taken in the name of the labourers working in the mines.

4.14 Agricultural Environment

4.14.1 General

The general impacts on agricultural lands will be dust pollution, as volume of dust is discharged into the air during the process of quarrying. Dust gets deposited on the leaves of plants, flowers and soil. This affects the photosynthetic and fruiting ability of the crops.

Silt from the excavation, screening process and reject during monsoon season gets washed and chokes the agricultural fields, rendering them useless for the growth of crops. Due to blasting, fly rocks may fall on agricultural fields making it difficult for the farmer to cultivate.

There is a need for dust control on haul road movements. Vehicles emit fugitive gases during transportation of materials. Those gases enter the plants through the stomata pores; it destructs chlorophyll and affects photosynthesis leading to stunted growth or death of crops.

The pumping of water from the ground for the mining activity will reduce the availability of water for the agricultural purposes.

4.14.2 Anticipated Impacts of Proposed project on Agriculture, Horticulture and livestock

The land use analyst sighted that the agricultural land are surrounded around the project site. Field crops such as maize, groundnuts are cultivated and the plantation crops such as coconut trees are planted within 2km radius of the project site. The field crop paddy are cultivated along the Amaravathi River which is located more 8k away from project site. Other than coconut plantation, maize, groundnuts mostly shrubs are identified within 1km.

As the villages are located around the project site, the people in the villages are farming animals like goat, cow, and sheep for their livelihood. The above mentioned impact may be observed on the nearest agricultural farm during the quarrying activity. So the following mitigation measures will be suggested to protect the nearest farm. The requirement of water for the proposed project will be getting from water vendors. The ground water from the 2km radius of the project site will not be extracted for the proposed mining activity and the proposed mining activity is 10m above ground water table. So the proposed mining activity does affect the ground water resource.

4.14.3 Mitigation Measures

- Spraying of water on the haul roads will be done to suppress the dust in the source itself. Interval of sprinkling depends on the environmental factors such as temperature, rainfall and humidity of the proposed site.
- The trees having tolerance to different air pollutants will be planted along the boundary to prevent the escape of dust to the surroundings.
- Provision of Garland drainage will be provided around the lease area to prevent the leach of silt into the farm.
- Regular check and proper maintenance of Vehicles will be carried out to minimize the emission of pollutants.
- Adequate Blast shield or blast mats will be provided wherever necessary for fly rock protection during blasting, thus to prevent the accident on the nearest farms.
- During monsoon season the dust deposited on the surface of plant body is washed out naturally.
- Making two bore holes which have direct conduit with the water table in the lease area will help ground water recharge during monsoon seasons. It helps the agricultural activity in the buffer area of project site

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT.

Proponent: Thiru M.K.Kungumarajh, Rough stone & Gravel Quarry, Dindigul District



Fig No 4.11 Agricultural land within 1km radius of project site

4.15 Post COVID Health Management Plan

- The vaccinated persons only will be given employment.
- The labors and other skilled, semi skilled employees will be given a new mask daily.
- The body temperature of the labors will be checked using the temperature monitoring gun while getting into the quarry and getting out from the quarry.
- The labors will be advised to maintain the social distance of at least 10m and also advised to sanitize the hand.
- The general awareness program will be conducted about the handling of COVID-19 in two weeks once.
- The board referring the “Wear mask” and “Maintain social distance” will be placed in two sides of entrance of the quarry in local language.



Fig 4.12 Maintain social distance of 2m in work place



Fig 4.13 Sanitizing Hand Frequently



Fig 4.14 Wear Mask at the work place

CHAPTER – 5: ANALYSIS OF ALTERNATIVES
(TECHNOLOGY AND SITE)

Consideration of alternatives to a project proposal is a requirement of the 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 environment friendly and cost effective options. Analysis of alternatives should be similar to the content of the approved mining plan.

The selection of the site is based on the following considerations which are feasible in terms of location, deposit characteristics, availability of reserves, percentage recovery, road facilities, labor availability, requirement of health and safety and environmental concerns, production scheduling, scope of mechanization/automation, land reclamation, and operating and capital cost estimates.

Mineral deposits are site specific, and therefore, selection of a quarry site has limited alternatives. The geological formations found in the district are "Gneissic rock contains of Quartz and feldspar identified by grayish white in colour, pearly luster on cleavage faces with high strength, high density, low porosity etc. the proportion of quartz shall be more than ortho feldspar and thereby chemical resistance resist weathering and uniformly grained materials of sand and grits are useful for making aggregates. The Gneissic rock body running NW 40° direction and dipping 60° towards north, the reddish topsoil covers up to a depth of 1m. At places, quartzo feldspathic and mafic layers are segregated giving rise to banded structures. Biotite and hornblende gneisses are common. The quarry site is dependent on the geology and rough stone mineral deposition of the area. This project is mineral and site specific, hence no alternative site or technology is considered for this project.

CHAPTER – 6: ENVIRONMENTAL MONITORING PROGRAMME

Environmental Monitoring program is mandatory to check the impact of the mining activity in the core and buffer zone. Hence regular monitoring of various environmental parameters helps in maintaining sound operating practices of the mining in line with mining and environmental regulations. 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.

6.1 Measurement methodologies

The following instruments will be used for environment monitoring for various environmental parameters.

Table No: 6.1 Instruments used for Monitoring

S. No	Instruments	Purpose of Monitoring
1	Respirable Dust Sampler	Air Pollution
2	Fine Particulate Sampler	Air Pollution
3	Sound level meter	Noise level
4	Digital Seismograph	Vibration monitoring
5	Water level indicator	Water level
6	Geophysical Instruments (DDR3)	Water table
7	Camera, Binocular & Lens	Flora, Fauna
8	GPS & DGPS	For fixing the coordinates of sampling location
9.	Electronic Total station	Reduced level & topography monitoring

In addition to the above, Primary data on land use, socio economics will be collected by visiting the field and secondary data will be collected from Government Department and other sources.

6.2 Monitoring Schedule and Frequency

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB). Monitoring program will be followed till the mining operation ceases as per the schedule below.

Table 6.2: Monitoring Schedule

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – PM _{2.5} , PM ₁₀ , SO ₂ and NO _x	6 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind direction).	8 hours	Six months once	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in the vicinity.	–	Six months once	Physico–chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Six months once	Water level monitoring devices may be used.
5	Noise	Mine Boundary, high noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter
6	Vibration	At the nearest habitation (in case	–	During blasting	Digital Seismograph

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

		of reporting)		operation	
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Six months once	Physical and Chemical characteristics

6.3 Data Analysis

Data analysis will be done by MoEFCC/NABL approved laboratory as per CPCB guidelines & compliance reports shall be submitted to concerned authority (specified in Environment Clearance Letter issued by SEIAA, Tamil Nadu and Consent issued by TNPCB, Dindigul) on regular basis.

6.4 Emergency procedures

The mines manager monitors the emergencies that may occur in opencast mining operations and prepares an emergency plan to deal with emergency situations during the operation of the mine. Preparation of a preventive maintenance schedule program based on recommendations given and maintenance schedules for all equipments and instruments as per recommendations of the manufacturers user manuals.

6.5 Detailed Budget

Detailed budgetary provisions for monitoring program are detailed in the following Table No 6.3.

Table No 6.3 Environment monitoring budget

S. No	Environmental Monitoring Program	No. of samples per year	Cost per sample	Cost
1	Ambient Air Quality monitoring	10	Rs 4500	Rs 45,000
2	Water quality	2	Rs 5000	Rs 10,000
3	Soil quality	2	Rs 2500	Rs 5,000
4	Noise monitoring	10	Rs 1000	Rs 10,000
5	Hydro geology	5	Rs 2000	Rs 10,000
	Total			Rs 80,000

CHAPTER – 7: ADDITIONAL STUDIES

7.1. Public Consultation

The present draft EIA report is for Public Consultation only. The proceedings of the Public Consultation will be included in the Final EIA report.

7.2 Risk assessment and Disaster Management Plan

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The mining operation is carried out under the management control and direction of a qualified mines manager. The DGMS have been issuing a number of standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any.

To overcome such risks, help/aid would be sought from emergency services providers like Police station, fire station, Hospital, Ambulance services in the vicinity of the mine site. Their telephone numbers and communication facilities are to be provided and displayed on the board at the mine office as well as mine site. Responsibility of coordinating rescue activities is entrusted to quarry-in-charge at the quarry site in addition to quarry-in-charge is also looking after statutory obligatory under Mines Act,1952. Name and Address of Contact Person coordinating in case of Eventuality is stated below:

Name and Address of the Proponent	Thiru.M.K.Kungumarajh S/o. Thiru. M.Kumaresan, No. 32, M.G.R. Nagar, Chinna Andan Kovil Street, Karur District, Tamil Nadu. Pincode-639 301, Mobil No: 9489682473
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However, the following natural/industrial hazards may occur during normal operations.

- i. Operational Phase,
- ii. Inundation of mine pit due to flood/excessive rains,
- iii. Accident due to transport & other equipments, Safety and Environmental aspects.

Table 7.1 Risk Assessment and Disaster Management Plan

S. No	Hazards	Mitigation measures
1	Surface Fire	<ul style="list-style-type: none"> ➤ Fire Extinguishers ➤ Sand Buckets
2	Explosives/Blasting	<ul style="list-style-type: none"> ➤ The applicant is directly purchasing explosives from an authorized dealer and they are blasting with help of certified blaster. Agreement is made with License holder in Form-22 for store, use and sale of explosives. ➤ Shot holes blasting using compressor and Jack Hammers combination are adopted to release the mineral.
3	Flooding of Rain water	<ul style="list-style-type: none"> ➤ Escape Routes will be provided to prevent inundation of storm water ➤ Garland drains will be provided at the toe of dump
4	Radioactive hazard	➤ Not Anticipated
5	Failure of Mine Benches and Pit Slope	<ul style="list-style-type: none"> ➤ Ultimate or over all pit slope shall be 45° and each bench height shall be 6m height equal to the boom height of excavator and vertical. ➤ During working normally 3-6m will be maintained as per the plan.
6	Failure of Waste Dumps	<ul style="list-style-type: none"> ➤ Stabilization of dump with top soil and tree plantation shall make the dump more stable. ➤ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse.
7	Dust	<ul style="list-style-type: none"> ➤ Periodical wetting of land by spraying solutions. ➤ Regular water sprinkling on haulage roads ➤ Provision of Dust mask to workers ➤ Green Belt shall be carried out within the mine premises by planting trees, to improve the aesthetics of the area and also to reduce the pollution outside the activity area
8	Noise	<ul style="list-style-type: none"> ➤ Rotation of workers to minimize exposure time of noise ➤ The equipments and machineries shall be

		<p style="text-align: center;">maintained properly</p> <ul style="list-style-type: none"> ➤ Provision of earmuffs to workers
9	Transportation	<ul style="list-style-type: none"> ➤ Convex mirrors should be kept at all corners ➤ All vehicles should be fitted with reverse horn with one spotter at every tipping point ➤ Loading according to the vehicle capacity ➤ Regular checking of brakes to avoid failures ➤ Periodical maintenance of vehicles
10	General measures	<ul style="list-style-type: none"> ➤ No entry for any unauthorized persons ➤ S1 type fencing as per DGMS circulars ➤ Quarrying as per Approved Plans only ➤ Provision of Personal Protective Equipments ➤ In case of any closure of mine the compensation under Industrial Dispute Act will be paid as per law

7.2.1 Care and Maintenance during temporary discontinuance

Watch and ward are provided permanently in the Mine premises to monitor the Mine openings to prevent inadvertent entry. Top soil bund is made partly and Stone fencing is proposed all around lease boundary to safe guard the mine and the adjacent livings. Temporary discontinuance will be minimal as there is good demand for this material in construction work.

7.2.2 Economic repercussions of closure of mine and manpower retrenchments

7.2.2.1 Number of local residents employed in the mine, status of continuation of family occupation and scope of joining occupation back

There are 20 person employed in the quarry. Most of labors are Agriculturist. In case of closure of mine, they may continue their own work.

7.2.2.2 Compensation given or to be given to the employees connecting with sustenance of himself and their family members

In case of any closure of mine the compensation under Industrial Dispute Act will be paid as per law. All workers shall get retrenchment benefits as per labour laws under enforcement.

7.2.2.3 Satellite occupations connected to the mining industry – number of persons engaged therein – continuance of such business after mine closes

The quarrying activity shall lead to development of several ancillary units and business, which are explained below:

- i. Other than mine employment, workshops, spare parts, hotels, tea shop and related several self-employment opportunities.
- ii. Several shops and service providers shall grow in the public adjacent to mines.
- iii. Schools and city development shall also be possible owing to the fact of economic growth in the village.

7.2.2.4 Continued engagement of employees in the rehabilitate status of mining lease area and any other remnant activities.

In the event of closure of mine, the mine worker shall get alternate work or business like agriculture etc. No serious repercussions envisaged in the event of cessation of mining activity, as they will be provided employment in other mines belong to the company.

7.2.2.5 Envisaged repercussions on the expectation of the society around due to closure of mine

Persons on roll at the time of closure will get benefit as per State Govt. guidelines as applicable at the time of retrenchment

7.2.3 Time Scheduling for abandonment

The following works are scheduled before abandoning the mine,

- i. Parapet wall of 2m height will be constructed around the pit,
- ii. Planting and monitoring of Afforestation program.

There is no proposal for closure of mine for the next 10 years. The parapet and plantations will be done during operation of mine. In case of any abandonment the following time is required,

Activities	Days for schedule
Time schedule for fencing	6 months
Time schedule for reclamation of mined out area	1 year

7.3 Social Impact Assessment, R&R Action Plans

The Rough Stone and Gravel quarry project of Thiru.M.K.Kungumarajh S/o. Thiru. M.Kumaresan does not involve any kind of displacement of the population since the mining will be concentrated only in the mining area only. Not much disturbance in respect of fauna, flora and human settlement of the villages. The impact of mining activity on the population will be insignificant. Hence, Rehabilitation of settlements is not anticipated under this project as it will not be required. Thus R&R Action Plans not proposed.

The project proponent will help in uplifting the poor section of the society as part of CSR activity by undertaking social welfare programs. The Project proponent contributes 2.5% of profit towards CSR activities. This project will have a positive impact on the socio economic as it will provide considerable employment to the families in the nearby villages. Improved health care facilities are expected to come-up in the area for catering to the health needs of the miners. The impact of mining on the civic amenities will be substantial after the commencement of mining activities. The local people who are currently depending on forest and agriculture will have new avenue from the mine.

7.4 Detail study of Rainwater harvesting after the completion of project.

I. Total Pit Area	= 16460m ²
II. Annual rainfall of the area	= 0.694 m
III. Total rainwater available to store in pit area	= 11423m ³
IV. Total volume of quarried pit	= 329200 m ³

Since the rainwater directly getting stored in the quarried pit, the runoff will not take place. The Quarried Pit will be act as **Artificial Ground Water Recharge Pond**. After the rainwater getting stored in quarried pit, the water slowly infiltrates into the ground and reaches the ground water table. This will greatly increase the ground water table around the lease area.

By electrical resistivity survey it is found that there is massive rock formation at 20m bgl. So the infiltration rate of rain water is very less. If the rain water stored in pit for long period the evaporation loss will take place.

Meyer's Formula (1915) is used to find the loss of water in pit due to natural evaporation process.

Meyer's Formula (1915)

$$E_L = K_M (e_w - e_a) (1 + u_9/16)$$

Where

- E_L = Evaporation Rate (mm/day)
- e_w = the saturation vapor pressure at the water temperature in mm of mercury
- e_a = the actual vapor pressure in the air in mm of mercury
- u_9 = monthly mean wind velocity in km/h at about 9 m above ground
- K_M = coefficient accounting for various other factors with a value of 0.36 for large deep and 0.50 for small shallow waters.

Here,

e_w = 31.83 mm of Hg (considered average temperature in Dindigul district during May month of 2022)

e_a = 0.59 x 31.83 = 18.7 mm of Hg.

u_1 = 15.12 km/hr

u_9 = 20.69 km/hr

Substitute the above parameters in Meyer's equation,

$$E_L = 0.36 (31.83 - 18.7) (1 + 20.69/16)$$

$$E_L = \mathbf{6.14 \text{ mm/day}}$$

$$\mathbf{\text{Evaporated Volume per day} = 16460 \times 0.00614 = 101\text{m}^3/\text{day} \text{ or } 101 \text{ KLD}}$$

The total quantity of rain water to be stored in quarried pit is 11423m³. The evaporation rate of water per day is 101m³ based on the maximum temperature in Dindigul district. It takes nearly 5 months for the complete evaporation of water. Before that the stored water will be used to irrigate the crop around the quarry area.

Other benefits are that the water will be used for the domestic purposes after the water properly treated by Sedimentation-Filtration processes. A higher quantity of about 20 liters **per capita per** day should be assured to take care of basic hygiene needs and basic food hygiene.

Thereby the Proposed quarry benefits the daily needs of water to so many families around the quarry area for every year. This is very important **positive impact** of the proposed Rough stone and gravel quarry of Thiru. M. K. Kungumarajh.

7.5 Plastic/Microplastic waste Management Plan

This is proposed Rough stone and gravel quarry. So the project does not need any plastic related material for quarry operations. The plastic materials will be used by the employee and labours in the form of carry bags, water bottles, etc. To avoid such situations the employees and labours will be strictly instructed to avoid the plastic materials in the lease area. Moreover they will be advised to use cloth bags, jute bags and bring the food by Steel tiffin box.

Water will be provided by the project proponent for both drinking and domestic purposes. So the dustbins will not be needed in the quarry. To manage the unavoidable situations, Dustbins will be placed in the quarry for both decompose and non-decompose waste separately of Municipal solid waste. The collected waste will be disposed periodically as instructed by TNPCB. The board with the instruction "**Avoid plastics**" is placed in the two sides of quarry and awareness program will be conducted to the labours monthly once.

Microplastics are small pieces of plastics less than 5mm. As usage of plastics is totally devoid in the quarry premise, the chance of Microplastic pollution is negligible inside the lease area.



CHAPTER – 8: PROJECT BENEFITS

Mining activity will help in improving the socio-economic benefits in areas like employment, communication and infrastructure development etc.

8.1 Physical Infrastructure

The Rough Stone and Gravel project located in Thirukooranam Village of Dindigul District has well established roads, communications and other facilities. The impact on the civic amenities will be substantial after increasing the mining capacity.

The following physical infrastructure facilities will further improve due to mine.

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

Under plantation program, it is suggested to develop green belt further all along the boundary of mining lease area. The species to be grown in the areas will be dust tolerant and fast growing species so that a permanent green belt is created. Apart from the green belts and aesthetic plantation for eliminating fugitive emission and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community.

8.2. Social Infrastructure

The mining activity will create rural employment. It has been observed that local people mainly depend upon agricultural, where the income is irregular and low. The mining activity in the region will have positive impact on the social economic condition of the area by way of providing employment to the local in-habitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture by improving the life style of the people. 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. Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village. District Mineral Fund @30% of the Royalty shall be given to the Dept. of Geology and Mining, Dindigul District. The State Government

will also benefit directly from the mine, through increased revenue from royalties, excise duty and etc...

8.3 Employment Potential

The proponent employed about 20 persons for carrying out the mining operations of which 1 are skilled, 4 semi-skilled, 11 unskilled worker personnel. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of Rough stone to destinations, sanitation, supply of goods and services to the mine and other community services, etc... The local population will have preference to get an employment. The economic status of the local people will be enhanced due to mining project.

8.4 Other tangible benefits

8.4.1 Corporate Social Responsibility

Corporate Social Responsibility (CSR) refers to voluntary actions undertaken by the project proponent either to improve the living conditions (economic, social, environmental) of local communities or to reduce the negative impacts of mining activity. By definition, voluntary actions are those that go beyond legal obligations, contracts, and license agreements.

CSR programs usually invest in infrastructure (potable water, electricity, schools, roads, hospitals, hospital equipment, drainage repairs, etc.), building social capital (providing high-school and university education, providing information on HIV prevention, workshops on gender issues, information on family planning, improving hygiene, etc.), and building human capital (training local people to be employed by the mining enterprise or to provide outsourced services, promote and provide skills on micro business, aquaculture, crop cultivation, animal rearing, textile production, etc.)

8.4.2 CSR activities

The following activities which may be included by companies in their Corporate Social Responsibility Policies are notified as CSR activities under Schedule VII ((See section 135) of the Companies Act 2013:

- i. Eradicating extreme hunger and poverty;
- ii. Promotion of education;

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

- iii. Promoting gender equality and empowering women;
- iv. Reducing child mortality and improving maternal health;
- v. Combating human immunodeficiency virus, acquired immune deficiency Syndrome, malaria and other diseases;
- vi. Ensuring environmental sustainability;
- vii. Employment enhancing vocational skills;
- viii. Social business projects;
- ix. Contribution to the Prime Minister's National Relief Fund or any other fund set up by the Central Government or the State Governments for socio-economic development and relief and funds for the welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women; and
- x. Such other matters as may be prescribed.

The Board of every company referred to in sub-section (1), shall ensure that the company spends, in every financial year, at least 2% of the average net profits of the company made during the three immediately preceding financial years, in pursuance of its Corporate Social Responsibility Policy. Provided that the company shall give preference to local area and areas around it, where it operates for spending the amount earmarked for Corporate Social Responsibility activities. Provided further that if the company fails to spend such amount, the Board shall report under clause (d) of sub-section (3) of section 134, specify the reasons for not spending the amount.

Explanation: For the purposes of this section "average net profit" shall be calculated in accordance with the provisions of section 198.

8.4.2.1 CSR Cost Estimation

CSR activities will be taken up in the nearby villages 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.

i)	Sale value	=	Rs 160 per MT
ii)	Production cost	=	Rs 130 per MT
iii)	Profit	=	Rs 30 per MT
iv)	Production	=	76,140 MT/year
v)	Hence, Total Profit	=	76,140 x 30/MT
		=	Rs. 22, 84, 200/-
vi)	CSR @ 2.5 % Profit	=	Rs. 22,84,200x 2.5%
		=	Rs 57,105/Year

(As per the Companies Act, 2013 and CSR Rules, 2014)

Total CSR amount = Rs 2, 85, 525 for plan period

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Under this programme, the project proponents will take-up following activities for social and economical development of villages through local panchayat.

- ✚ Employment to eligible persons during operational phase of the mine
- ✚ Conducting Medical Camps
- ✚ Infrastructure Development like repair of roads, renovation of ponds, rainwater harvesting schemes, etc...
- ✚ Financial grant to the existing educational institutions for development of physical infrastructures
- ✚ Training for Self Employment
- ✚ Plantation in villages and all along roads.
- ✚ Providing solar lamps to nearby schools and villages by going eco-friendly.

8. 4.3 Corporate Environment Responsibility (CER)

CER Activity	Project Cost (Rs. In Lakhs)	CER Cost @ 2% of Project Cost (Rs. In Lakhs)
1. Developing Library Facilities to Government high School in Thirukooranam village	19	0.38
Total Cost Allocation	19	0.38 Say in 1.0 Lakhs

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

9.0 PROJECT COST

After making exhaustive study, it is considered that the mining project may be implemented.

Project cost for the proposed Rough stone and Gravel Quarry namely "Rough Stone and Gravel Quarry of Thiru. M. K. Kungumarajh" over an area of 3.00.0 Ha falling in Village Thirukooranam, District Dindigul is Rs. 19,00,000/- and EMP Cost is Rs. 5,80,000/-

- This project provides direct employment to 20 people and indirect employment to nearly 40 people. In a family 5 persons, totally 200 persons will get benefit because of the project.
- Surrounding people will get benefit as they get aggregate (Rough Stone) for construction purposes with less transportation cost.
- The Management will ensure good production and in turn there will be good revenue to the Government of Tamil Nadu and Government of India through taxes. The industry is an asset to the nation.
- At the end of the project the pit will act as rain water harvesting tank which is useful for agricultural purpose. Thereby it will increase the survival of people around the quarry.

CHAPTER - 10: ENVIRONMENTAL MANAGEMENT PLAN

The **Environment Management Plan (EMP)** is required to ensure sustainable development in the study area. Hence it needs to be a comprehensive plan for which the industry, Government, Regulating agencies likes Pollution Control Board working in the region and more importantly the population of the area need to extend their co-operation and contribution.

It has been evaluated that the project area will not be affected significantly due to mining activity. Mitigation measures at the source level and an overall Management Plan at the site level are elicited so as to improve the surrounding environment.

Table 10.1 Environmental Management Plan		
S.No	Parameters	Mitigation measures
1	Air Environment	<p style="text-align: center;">Mining Activity</p> <ul style="list-style-type: none"> ○ Dust extractor or wet drilling to be followed to control dust at source of emission ○ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator <p style="text-align: center;">Blasting</p> <ul style="list-style-type: none"> ○ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution <p style="text-align: center;">Loading</p> <ul style="list-style-type: none"> ○ Water sprinkling be done before loading by making it moist <p style="text-align: center;">Transportation</p> <ul style="list-style-type: none"> ○ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ○ Overloading will be prevented ○ Trucks/Dumpers covered by tarpaulin covers <p style="text-align: center;">DG Sets</p> <ul style="list-style-type: none"> ○ DG sets will be used only during power failure ○ Adequate stack height for DG sets will be provided as per CPCB norms <p style="text-align: center;">General measures</p> <ul style="list-style-type: none"> ○ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ○ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, goggles as per the MMR, 1961 amendments and circulars of DGMS. ○ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

2	Water Environment	Surface water	<p>occupational health assessment of employees should be carried out as per the Factories Act</p> <ul style="list-style-type: none"> o Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air. o Wastewater discharge from mine if any will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	<ul style="list-style-type: none"> o The mining activity will not intersect the ground water table o De silting will be carried out before and immediately after the monsoon season
		Storm water	<ul style="list-style-type: none"> o Pit will be used for Storage of rainwater o Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. o The proponent will collect and judiciously utilize the rainwater as part of rain water harvesting
		General measures	<ul style="list-style-type: none"> o Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling Blasting	<ul style="list-style-type: none"> o Limiting time exposure of workers to excessive noise o Carrying out blasting only during day time and not on cloudy days o Noise levels will be controlled by using optimum explosive

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

		charge, proper delay detonators and proper stemming to prevent blow out of holes. <ul style="list-style-type: none">o Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
	Transportation	<ul style="list-style-type: none">o Proper and regular maintenance of vehicles, machinery and other equipments.o The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments.o Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles.o Adequate silencers will be provided in all the diesel engines of vehicles.o Minimum use of horns and speed limit of 10 km/hr in the village area.o It will be ensured that all transportation vehicles carry a valid PUC Certificates
	General measures	<ul style="list-style-type: none">o Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areaso Provision of Quiet areas, where employees can get relief from workplace noise.o The development of green belts around the periphery of the mine to attenuate noise.o Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

4	Vibration	Blasting	<ul style="list-style-type: none"> o No deep hole blasting envisaged. o Small dia shot holes are used for breaking boulders. o Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. o If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone o In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none"> o Humus top soil shall be preserved for reuse in afforestation and agriculture o Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises o Garland drains will be provided around the mine and dumps to arrest any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none"> o The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

			<p>some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation.</p> <ul style="list-style-type: none"> o Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse o Dump should be terraced for every 5m height and stabilized
7	Plantation	Mine lease boundary and waste dump	<ul style="list-style-type: none"> o Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise o Stabilization of Dump with plantation o It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. o The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		<ul style="list-style-type: none"> o The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. o Provision of Garland drainage around the dumps o Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land o Appropriate measures will be taken for Green belt development. o The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

9	Socio Economic	<p>irrigating the nearby agricultural lands.</p> <ul style="list-style-type: none"> o Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems. o Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines. o Drilling, blasting etc at specified location will be followed with proper schedule. o Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. o An emergency preparedness plan will be prepared in advance, to deal with fire fighting, evacuation and local communication. o For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). o As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socio economic development
10	Occupational Health	<ul style="list-style-type: none"> o First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 o Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A).

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

	<ul style="list-style-type: none">○ Insurance will be taken in the name of the labourers working in the mines○ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...
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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

10.1 Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA

In order to maintain the environmental quality within the standards, regular monitoring network to maintain environmental quality will be implemented.

Table 10.2 EMP Budget for Plan period

S. No	Description	Budget
1.	Safety Kits & Personal protective equipment	Rs 50,000
2.	Environmental Monitoring - Air, Water, Noise (Four seasons)	Rs 1,50,000
3.	Sign Boards	Rs 50,000
4.	Green Belt Development	Rs 50,000
5.	Water Sprinkling & Tyre Washing	Rs 50,000
6.	Convex mirrors at all turning points	Rs. 50,000
7.	Workers' Health Checkup i. Pre operation phase ii. Post operation phase (Yearly once)	Rs. 1,80,000
	Total	Rs. 5.80 lakhs

Table 10.3 Budget Allocation for Mine Closure Plan as per ToR

S. No	Description	Budget
1.	Garland Drainage around Mines	Rs 1,00,000
2.	Earth Bund with Fencing around mines	Rs 50,000
3.	Making Pit for pond after the activity of mines	Rs 50,000
	Total	Rs 2.0 lakhs

CHAPTER – 11: SUMMARY AND CONCLUSIONS

INTRODUCTION

Thiru. M. K. Kungumarajh Rough stone and Gravel quarry over an extent of 3.00.0 Hectares is located in S.F.No: 182/2 (P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu. The area is marked in the survey of India Toposheet No.58F/14. The area lies between northern latitude of 10°44'36.82" to 10°44'41.38" and eastern longitude of 77°57'17.33"E to 77°57'25.31"E. The precise area communication letter has been given by Assistant Director, Dept of Geology and Mining, Dindigul District vide Rc No. Roc.No.23/2022 (Mines), dated 18.03.2022 for Thiru. M. K. Kungumarajh.

The mining plan was approved by Assistant Director, Department of Geology and Mining, Dindigul vide letter Rc.No.23/2022 (Mines), dated 24.03.2022. The proposed rate of production of Rough Stone is about 152281m³ up to the depth of 20m bgl (depth for five years -14m). The ultimate depth of mining is 20m bgl.

As per the Environmental Impact Assessment (EIA) Notification dated 14th September 2006, the project falls under 1(a) Mining of minerals, Category – B1 in view of lease area >5 and <250 Ha. The proposed area comes under cluster classification, based on the Assistant Director, Dindigul letter vide Roc.No.23/2022, dated 01.04.2022. So this project has to obtain Terms of Reference for conducting EIA studies. There are two existing quarries namely Thiru.D.Sivajee ganesan with an extent of 3.41.0 Ha & Thiru.R.K.Pannerselvam with an extent of 1.58.32 Ha, one abandoned quarry namely Thiru.K.Palanisamy with an extent of 1.15.0 Ha and one present proposed quarry namely Thiru.M.K.Kungumarajh with an area of 3.00.0 Ha located within the 500m radius from the lease boundary of the proposed project. The total cluster area is 9.14.32 Ha.

As per MoEF&CC OM: F.No.L-11011/175/2018-IA-II (M), dated 12.12.2018, the EIA/EMP report has to be prepared for the cluster area based on ToR recommended by SEIAA. Therefore, the applicant applied for ToR through Parivesh website vide online proposal no. SIA/TN/MIN/74776/2022 Dated 04.04.2021. The ToR proposal was placed in 284th SEAC meeting, dt 10.06.2022 and 529th SEIAA meeting, dated 06.07.2022. Then ToR has been issued by the SEIAA vide Lr.No.SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022. The EIA report has been prepared based on the recommended Standard ToR and Specific ToR.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

11.1 SCOPE OF THE PROJECT

The EIA report for Environmental Clearance of Rough stone & Gravel quarry of **Thiru. M.K. Kungumarajh** has been prepared based on the recommended Standard ToR and Specific ToR issued by SEIAA vide letter no. SEIAA-TN/F.No.9160/SEAC/TOR-1185/2022 dated 06.07.2022.

11.2 PROJECT DESCRIPTION

Table No 11. 1 Project Details

Project Details				
Proponent	Thiru. M.K.Kungumarajh			
Total Mine Lease Area	3.00.0 Ha - Rough Stone & Gravel quarry (Patta Land)			
Survey No.	182/2 (P)			
Site Location	Thirukoornam Village, Gujliamparai Taluk, Dindigul District, TamilNadu.			
Geographical Co-ordinates	Latitude: 10°44'36.82"N to 10°44'41.38"N Longitude: 77°57'17.33"E to 77°57'25.31"E			
Toposheet No.	58F/14			
Elevation	Elevation of the area is 173m above MSL			
Accessibility				
Nearest Habitation	98m - NE			
Nearest Village	Kanchamaranpatti – 905m - SW			
Nearest Settlement	Name of Village	Direction	Distance from Mines (Approx.)	Population
	Thirukoornam	N	1.5 km	2210
	Vellodu	E	2.5 km	3147
	koombur	S	2.5 km	3584
	Pallapatti	N-W	7 km	4807
Nearest Town	Aravakurichi – 5.4km - NW			
Nearest Roadway	NH 44 – 3.5km – South west side –Salem - Dindigul SH 193 – 5.7km - West side – Aravakurichi - Dindigul MDR 37 – 2.2km – North side Aravakurichi – Attamed Village road – Adjacent to lease area - S			
Nearest Railway	Palayam Railway Station – E- 19km			

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

station	
Nearest Airport	Trichy International Airport–82km – E
Environmental Sensitiveness	
Interstate Boundary	There is no interstate boundary within 15km radius. Tamil Nadu – Kerala Interstate boundary is located 93 km away from lease area in South west direction.
Coastal Zone	Bay of Bengal is located 154 km away from lease area in SE direction.
Reserve Forest	There is no Reserve forest and wild life sanctuaries found within 10km radius. Rengamalai R.F – 10.20km – SW Thoppasamimalai R.F – 20.90km -SE The proposed project site does not attract Forest Conservation Act, 1980.
Wildlife sanctuary	Nil within 10km radius. The Proposed project site does not the Wildlife (Protection) Act, 1972.
Water bodies	<ol style="list-style-type: none"> 1. Godavananar River – 435m – E 2. Kodavanar Check dam – 450m – E 3. Alamarathupatti lake – 1.3km – NE 4. Small odai – 1km – NE 5. Amaravathi river – 8.2km – NW 6. Nanganji River – 5.1km - W
Defense Installations	Nil within 10km radius
Critically Polluted area	Nil within 10km radius
Quarries around 500m radius (AD Letter furnished)	Two existing quarries, one abandoned quarry and one present proposed quarry are located within the 500m radius from the lease boundary of the proposed project site. Total Cluster area : 9.1432 Ha AD Cluster Letter: Rc.No: 23/2022 (Mines), dated: 01.04.2022
Mining Details	
Particulars	Details
Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	419040m ³
Mineable reserves	322936m ³ of Rough Stone & 33360m ³ of Gravel
Production (95%)	Rough stone – 152281m ³ for five years or 30456m ³ per annum(Avg) Gravel – 31958m ³ for three years or 10652m ³ per annum
Top soil	Gravel – 33360m ³ - 2m

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

Ore: Waste ratio	1: 0.052			
Depth of Mining	14m bgl (for first five years) and 20m bgl (Ultimate Depth)			
Water Table	30 m bgl			
Road design	1: 10 inside the pit and ramp 1:16 for transport			
Overall Pit Slope	45°			
Period of Lease	10 Years (To be granted)			
Ultimate pit dimension	<i>Ultimate Pit Dimensions-PIT-I (m)</i>			
	Bench	Length(m)	Width(m)	Depth(m)
	I	203	113	2
	II	199	109	6
	III	187	97	6
	IV	175	85	6
	Total			20

11.3 Description of the environment

11.3.1 Base line environmental study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during March 1st 2022 – May 31st 2022 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

Table No 11.2 Baseline Data

Particulars	Details	Standards
Meteorology (March 1st 2022 – May 31st, 2022)		
Rainfall (Avg.)	45.2 mm	--
Temperature (Avg.)	22-38°C	--
Wind speed	2.2 m/s	--
Wind Direction	Predominantly from West to East	
Ambient Air Quality (NAAQS)		
PM ₁₀	39-52 µg/m ³	100 µg/m ³
PM _{2.5}	18-33 µg/m ³	60 µg/m ³
SO ₂	4-14 µg/m ³	80 µg/m ³

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

NO _x	6-18 µg /m ³	80 µg/m ³
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Core zone – 45.7-48.2 dB (A) Buffer zone – 40.4- 47.6 dB (A)	Industrial Area Day Time - 75 dB (A) Residential Area Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Core zone – 35.0 – 37.2 dB (A) Buffer zone – 31.0-36.4 dB(A)	Industrial Area Night Time – 70 dB(A) Residential Area Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.24-8.4	6.5 to 8.5
TDS	493-3722 mg/l	500 mg/l
Electrical conductivity at 25°C	882-5794 micromhos/cm	
Total Hardness as CaCO ₃	95-1676 mg/l	200 mg/l
Silica SiO ₂	-	-
Total suspended solids	2-20	IS:3025:P.16:1984:R.2012
Chlorides Cl	668-2003mg/l	250
Total iron Fe	0.01-2mg/l	0.3mg/l
Sulfates SO ₄	13-107mg/l	200 mg/l
Soil Quality		
pH	6.65-8.92	Neutral to slightly alkaline
Bulk density	1.00-1.27 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Depth of Mining	20m bgl	
Water Table	30m bgl	

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.4.1 Air Environment

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by adopting semi-mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.

AERMOD - Model was used for prediction of impact of PM₁₀ during conditions i) Loading/unloading and transportation of ore by trucks on Haul roads ii) Blasting by using area source model to predict GLC of PM₁₀ during these conditions. Total predicted 24-h maximum GLC of PM₁₀ at project site for scenario 1 i.e loading-unloading and transportation and scenario 2 i.e blasting was 68.07µg/m³ and 54.18 µg/m³ respectively occurred at the project site after superposition of base-line value 48 µg/m³ over the incremental 20.07 µg/m³ and 6.18 µg/m³ respectively due to combined impact of loading and unloading and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO_x and NO_x for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m³ µg/m³ and 3.31µg/m³. Therefore the total predicted GLC of SO_x and NO_x will be 10.95µg/m³ and 17.31µg/m³ respectively.

Maximum Impact of PM₁₀, SO_x and NO_x was observed close to the source within the lease area due to moderate wind speeds.

11.4.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, Blasting. Loading and during movement of vehicles.

The noise generated by the mining activity is dissipated within the core zone. This is because of distance involved and other topographical features adding to the noise attenuation. From the results, it can be seen that the ambient noise levels (day time and night time) at all the locations will remain within permissible limits prescribed by CPCB and 90dB (A) norms of DGMS. At present there is no mining activity carried out. However, the expected noise levels are not likely to have any effect. Precaution will be made to keep down the noise exposure level of 85 dB (A) to the operating personnel for 8 hrs duration. The charge per blast of 38kg is above the Peak Particle Velocity below 5mm/s. So the proponent will be advised to use five delays to keep

the ground vibration within 5mm/s. However, as per statutory requirement additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

11.4.3 Water Environment

Mining operations can affect groundwater quality in several ways. The most obvious occurs in the mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water. But this Rough stone mine is devoid of any such impacts.

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during mining process. The mining activity will not intersect ground water table and it is 30m below ground level. The water sample from all the locations including core zone except Pungambadi has high TDS and TH exceeds the permissible limit. Chlorides were found to be high in all the five locations. Total coliform was found in the range of 27 MPN index/100ml to 220MPN index/100ml at 95 percent confidence limit in all the water samples. E.coli was found <2 in all the water samples. Based on the Water Quality Index calculated, water qualities from all location were poor to unfit for drinking. For excellent quality, the water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate. Boiling, chlorination of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

11.4.4 Soil Environment

The limited quantity of top soil generated will be dumped along 7.5m inner boundary of the lease area. The top soil will be used to develop greenbelt within the lease area. Part of top soil will be spread over the non active dumps along the slope and edges to plant tree saplings to form vegetal cover over the dumps. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected. The 31958m³ of gravel generated upto the depth of 2m will be sold to the local needy customers.

11.4.5 Waste Dump

The proposed rate of production of Rough stone for five years is about 152281m³ at the rate of 95% recovery up to permissible depth. The 5% reject of 8015m³ shall be dumped as per earmarked site in the approved mining plan.

11.4.6 Biological Environment

There are no notified endangered species in the area, which may be affected due to the mining activities; therefore the biological environment will not have significant impact due to mining activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around mining lease area.

11.4.7 Land Environment

The Rough stone & gravel quarry will result in disturbance of the land use pattern of the mine lease area. The land degradation is unavoidable during mining activities like excavation, overburden dumping, soil extraction etc. So reclamation of mined out land and proper formation of benches will be given due importance. The land use analyses show that the area is of predominantly Agriculture followed by buffer zones of the study area, which clearly indicates that the development of agriculture land increases over a period of time. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing agricultural activity around the mining lease area. It is generally agreed that as the total volume of production from year to year may increases. Some fallow land also increases due to seasonal crop production, which shows a positive impact due to mining activity.

11.4.8 Socio Economic Environment

The mining activity will definitely increase the employment opportunity (directly as well as indirectly) in the project area. Some of these impacts would be beneficial. The expectation of the people of the area is concerned towards employment, education, and health facilities.

Table 11.3 Environmental Management Plan			
S.No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	<ul style="list-style-type: none"> ○ Dust extractor or wet drilling to be followed to control dust at source of emission ○ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	<ul style="list-style-type: none"> ○ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	<ul style="list-style-type: none"> ○ Water sprinkling be done before loading by making it moist
		Transportation	<ul style="list-style-type: none"> ○ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ○ Overloading will be prevented ○ Trucks/Dumpers covered by tarpaulin covers
		DG Sets	<ul style="list-style-type: none"> ○ DG sets will be used only during power failure ○ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	<ul style="list-style-type: none"> ○ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ○ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, goggles as per the MMR, 1961 amendments and circulars of DGMS. ○ Regular health check-up of workers and nearby villagers in the impacted area should be carried out and also regular

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

2	Water Environment	Surface water Ground water Storm water	<p>occupational health assessment of employees should be carried out as per the Factories Act</p> <ul style="list-style-type: none"> o Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air. o Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes. o The mining activity will not intersect the ground water table o Desilting will be carried out before and immediately after the monsoon season o Pit will be used for Storage of rainwater o Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. o The proponent will collect and judiciously utilize the rainwater as part of rain water harvesting
3	Noise Environment	General measures Drilling Blasting	<ul style="list-style-type: none"> o Regular monitoring and analyzing the quality of water o Limiting time exposure of workers to excessive noise o Carrying out blasting only during day time and not on cloudy days o Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

		<p>prevent blow out of holes.</p> <ul style="list-style-type: none"> o Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment o Proper and regular maintenance of vehicles, machinery and other equipments. o The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. o Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles. o Adequate silencers will be provided in all the diesel engines of vehicles. o Minimum use of horns and speed limit of 10 km/hr in the village area. o It will be ensured that all transportation vehicles carry a valid PUC Certificates
	Transportation	
	General measures	<ul style="list-style-type: none"> o Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas o Provision of Quiet areas, where employees can get relief from workplace noise. o The development of green belts around the periphery of the mine to attenuate noise. o Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting
		o Specific charge pattern has to be designed by proper trial

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

			<p>vibration studies with varying charge ratios.</p> <ul style="list-style-type: none"> o Milli second detonators shall be used preferably 25–50ms per delay to control vibrations o If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave’s movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone o In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	<ul style="list-style-type: none"> o Humus top soil shall be preserved for reuse in afforestation and agriculture o Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises o Garland drains will be provided around the mine and dumps to arrest any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none"> o The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

7	Plantation	Mine lease boundary and waste dump	<p>form vegetation</p> <ul style="list-style-type: none"> o Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse o Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise o Stabilization of Dump with plantation o It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. o The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		<ul style="list-style-type: none"> o The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. o Provision of Garland drainage around the dumps o Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land o Appropriate measures will be taken for Green belt development. o The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.
9	Socio Economic		<ul style="list-style-type: none"> o Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems. o Green belt will be developed in and around the project site as

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

			<p>per Central Pollution Control Board (CPCB) guidelines.</p> <ul style="list-style-type: none">○ Drilling, blasting etc at specified location will be followed with proper schedule.○ Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone.○ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication.○ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards).○ As a part of CSR activities community welfare measures will be taken by Proponent through local Panchayat
10	Occupational Health		<ul style="list-style-type: none">○ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955○ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A).○ Insurance will be taken in the name of the labourers working in the mines○ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc...

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

11.5 Analysis of Alternatives

The mining site is dependent on the geology and mineral deposition of the area. Hence, this project is mineral and site specific and no alternative site considered for this project.

11.6 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 No: 11.4 Post Project Environmental Monitoring Program

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – PM _{2.5} , PM ₁₀ , SO ₂ and NO _x	5 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind direction).	8 hours	Once in six months	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in the vicinity.	-	Once in six months	Phyiso-chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in six months	Water level monitoring devices may be used.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

5	Noise	Mine Boundary, high noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting operation	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	-	Once in six months	Physical and Chemical characteristics

11.7 Project Benefits

The proponent is very much conscious of their obligations to society at large. Under plantation program, it is suggested to develop green belt further all along the boundary of mining lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emission and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community.

The mining activity will create rural employment. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation to destinations, sanitation, supply of goods and services to the mine and other community services, etc...The local population will have preference to get an employment. Part of the royalty is given to local bodies by the State Govt. for the welfare and development of the village. The proponent help in socio economic development of the village by providing education facilities to children's, procuring sports equipments, welfare amenities like drinking water to school, road facilities to villages and employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

11.8 Conclusion

As discussed, it is safe to say that the project is not likely to cause significant impact on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operation

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

shall be carried out with ease & minimum risk of the workers. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Plantation will substantiate the impact due to the mining activity. Mining activity will help in improving the socio-economic benefits in areas like employment, communication and infrastructure development etc.

CHAPTER - 12: DISCLOSURE OF CONSULTANTS ENGAGED

AADHI BOOMI MINING AND ENVIRO TECH (P) LTD, a QCI/NABET Accredited EIA Consultant Organization having its Registered Office at Salem and Branch at Porur, Chennai were promoted by a team of professional Geologists\ Mining\ Environment\ Civil\ Mechanical\ Chemical Engineers\ Scientists. The company has vast experience in various disciplines including Exploration and mining of minerals and was incorporated in 2002 in the name of Suriya Mining Services providing expert advice and solutions for clients' requirement in the field of Mineral prospecting, Exploration, Mining, Geo-technical, Techno economic Feasibility reports\evaluation, Mineral Engineering, Environment Impact Assessment (EIA), Environment Management Plan (EMP), Environment Monitoring and related liaison jobs like Environment Clearance, Wild life and Forest clearance from DEIAA/SEIAA/NBWL/CRZ, MoEF& CC etc of all accredited sectors.

12.1 SCOPE

- EIA & EMP for all accredited sectors and Monitoring as per SPCB/CPCB/MoEF & CC
- Environment/ Wild life/ CRZ/ Forest Clearance
- Social Impact Analysis (SIA) and Eco-Biodiversity studies for Mine Closure Plan
- Remote Sensing & GIS including Satellite data processing, ASTER, DEM etc for application in Forest, Agriculture, Disaster, Mineral Exploration, Environment Modelling, Town planning etc
- Geological Surveying, Mapping, Exploration and Project Management
- Geophysical, Geochemical & Geotechnical studies to locate concealed deposit\ formation including structural studies
- Noise and Vibration studies as per DGMS\MoEF & CC to design controlled blasting where inhabitations are located within 300m
- Mine Design and costing, selection of Machineries and Project Evaluation
- Statutory Mine Plans & Sections, Mining Plan and other mandatory projects
- Design and development of Mineral Beneficiation Plant including mineral separation studies.

12.2 INFRASTRUCTURE

- Our Human resources are well expertise in all functional areas as per Ver. 3 of NABET\QCI. Our Hi Tech ISO certified Office and Lab are accredited by NABL and MoEFCC.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Proponent: Thiru M.K.Kungumarajh, Rough Stone and Gravel quarry, Dindigul District

- And have latest field Investigation devices like Respirable and Fine Dust Samplers, Digital Seismograph, DDR3 Resistivity Meter, Echo sounder, DGPS, Total Station, Water level monitoring meters, GPS 62S, Sound Level Meter etc.

12.3 DISCLOSURE OF CONSULTANT FOR EIA STUDY

Thiru. M. K. Kungumarajh, appointed **AADHI BOOMI MINING AND ENVIRO TECH PRIVATE LTD**, having its office at 3/216, K.S.V Nagar, Narasothipatti, Alagapuram, Salem – 636 004, Tamil Nadu, for preparation of EIA/EMP report for obtaining Environment Clearance from SEIAA/SEAC, Tamil Nadu.












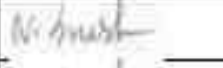
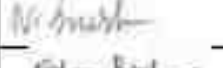
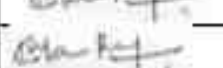



AADHI BOOMI MINING AND ENVIRO TECH PRIVATE LTD has MoU with **EKDANT ENVIRO SERVICES (P) LTD** laboratory at Chennai and has own Laboratory named **ABM ENVIRONMENTAL AND ANALYTICAL LABORATORY, accredited by NABL** for sampling and testing of air, water, noise and soil samples. Ekdant Enviro Services are recognized by the Ministry of Environment and Forests, Government of India under the relevant provision of Environment (Protection) Act 1986 and Accredited by NABL and NABET, Quality Council of India, New Delhi.

S. No.	Study	Consultants/LAB
1	Generation of Base Line Data	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem Ekdant Enviro Services (P) Ltd, Chennai
2	Remote Sensing and Land use/Land cover Studies	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem
3	Preparation of EIA and EMP Report	Aadhi Boomi Mining & Enviro Tech P Ltd, Salem

12.4 DECLARATION OF EXPERTS INVOLVED IN THE EIA REPORT PREPARATION

Names of the EIA coordinator, Functional Area Experts and other Team Members engaged and nature of consultancy rendered is provided in NABET Annexure –VII of EIA report. The multidisciplinary team comprises of Environmental Engineers, Geologists and Geographers who involved in preparation of Environmental Impact Assessment Report and Environment Management Plan for various functions like Air quality, Water quality, Noise levels, Soil Conservation, Hydro geology, Ecology and bio-diversity, Land use and Socio–Economics.

Table 12.1: Declaration of Experts

S.No	Name of the Expert	Category	Functional Areas	Signature
1.	Mr.S.Suriyakumar	A	EIA Co-ordinator	
		A	Solid and Hazardous Waste SHW* - HW* only	
		A	Risk Assessment and Hazard Management (RH)	
		A	Land Use (LU)	
		A	Soil Conservation (SC)	
2.	Dr. Sudharshan Ramakrishnan	A	Land Use (LU)	
		A	Socio Economics (SE)	
3.	Dr. Nithia Priya P.M	B	Air Pollution, Monitoring, Prevention and Control (AP)	
		B	Water Pollution Monitoring, Prevention and Control (WP)	
4.	Mr. M. Venkatesh Prabhu	B	Meteorology, Air Quality Modelling & Prediction (AQ)	
		B	Noise and Vibration (NV)	
5.	Mr. N. Suresh	B	Geology (GEO)	
		B	Hydrogeology (HG)	
6.	Mr. K. Manuraj	B	Geology (GEO)	
			Hydrogeology (HG)	
Team Member Involved in Report Preparation				
7.	Mrs. S. Santhi	-	Land Use (LU) under FAE - Dr. Sudharshan Ramakrishnan	
			Socio Economics (SE) - Dr. Sudharshan Ramakrishnan	

ANNEXURE I- COPY OF TERMS OF REFERENCE



THIRU.DEEPAK S.BILGI, I.F.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.9160/SEAC/ToR- 1185/2022 Dated :06.07.2022

To

Thiru M.K.Kungumarajh
S/o. Thiru. M.Kumaresan
No. 32, M.G.R. Nagar, Chinna Andan Kovil Street
Karur -639 301

Sir / Madam,

Sub: SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed Rough stone & Gravel quarry over an extent of 3.00.0 Ha in S.F.No. 182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu by Thiru M.K.Kungumarajh - 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/74776/2022, dated: 04.04.2022
 2. Your application seeking Terms of Reference submitted on: 08.04.2022
 3. Minutes of the 284th Meeting of SEAC held on 10.06.2022
 4. Minutes of the 529th Meeting of SEIAA held 06.07.2022.

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

The project proponent, Thiru M.K.kungumarajh has submitted application seeking ToR for B1 category project in Form-I, for the Proposed Rough stone & Gravel quarry over an extent of 3.00.0 Ha in S.F.No. 182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu and has furnished Pre-feasibility report.


MEMBER SECRETARY
SEIAA-TN

Discussion by SEAC and the Remarks:-

Proposed Rough stone & Gravel quarry over an extent of 3.00.0 Ha in S.F.No.182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu by Thiru M.K.kungumarajh for Terms of Reference (SIA/TN/MIN/74776/2022, dated 04.04.2022).


The proposal was placed in this 284th Meeting of SEAC held on 10.06.2022. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

The SEAC noted the following

1. The Project Proponent, Thiru M.K.kungumarajh has applied for Terms of Reference for the proposed Rough stone & Gravel quarry over an extent of 3.00.0 Ha in S.F.No. 182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan the lease period is 10 years. The mining plan is for the period of 5 years & production should not exceed 152281 cu.m. of Rough Stone and 31958 cu.m. of Gravel. The annual peak production 32120 cu.m. of Rough Stone(5th Year) and 12430 cu.m. of Gravel(3rd year). The ultimate depth - 20 m BGL.

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

1. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall prepare and submit an 'Action Plan' for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology and Mining during the time of appraisal for obtaining the EC.
2. The PP shall include the letter received from DFO concerned stating the proximity details of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., upto a radius of 25 km from the proposed site.
3. Details of odai(water course), viz nature of odai, origin, category etc.,


MEMBER SECRETARY
SEIAA-TN


4. The Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, as the depth of the working is extended beyond 30 m below ground level.
5. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
6. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
7. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
 - a. Quantity of minerals mined out.
 - b. Highest production achieved in any one year
 - c. Detail of approved depth of mining.
 - d. Actual depth of the mining achieved earlier.
 - e. Name of the person already mined in that leases area.
 - f. If EC and CTO already obtained, the copy of the same shall be submitted.
 - g. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
8. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
9. 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).
10. The PP shall carry out Drone video survey covering the cluster, Green belt , fencing etc.,
11. 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.
12. The Project Proponent shall provide the details of mineral reserves and mineable reserves,


MEMBER SECRETARY
SEIAA-TN


- 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.
13. 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.
 14. 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.
 15. 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.
 16. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of 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.
 17. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
 18. Issues relating to Mine Safety, including slope geometry in case of Granite quarrying, blasting parameters etc. should be detailed. The proposed safeguard measures in each case should also be provided.
 19. 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


MEMBER SECRETARY
SEIAA-TN

- submitted. Impact, if any, of change of land use should be given.
20. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
 21. Since non-saleable waste /OB / intermediate waste etc. is huge in the granite quarry, the Proponent shall provide the details pertaining to management of the above material with year wise utilization and average moving inventory be submitted.
 22. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
 23. 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.
 24. Impact on local transport infrastructure due to the Project should be indicated.
 25. 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.
 26. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
 27. Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.
 28. The Public hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.
 29. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.


MEMBER SECRETARY
SEIAA-TN

30. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
31. 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).
32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
33. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.
34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should


MEMBER SECRETARY
SEIAA-TN

- be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
42. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

Appendix -I
List of Native Trees Suggested for Planting

1. *Aeglemarmelos*-Vilvam
2. *Adenaantherapavonina*-Manjadi
3. *Albizialebbeck*-Vaagai
4. *Albiziaamara*-Usil
5. *Bauhinia purpurea* - Mantharai
6. *Bauhinia racemosa* - Aathi
7. *Bauhinia tomentosa*-Iruvathi
8. *Buchananiaaillaris*-Kattuma
9. *Borassusflabellifer*- Panai
10. *Buteamonosperma* - Murukkamaram
11. *Bobaxceiba*- Ilavu, Sevvilavu
12. *Calophylluminophyllum* - Punnai
13. *Cassia fistula*- Sarakondrai
14. *Cassia roxburghii*- Sengondrai
15. *Chloroxylonsweitenia* - Purasamaram
16. *Cochlospermumreligiosum*- Kongu, Manjalilavu
17. *Cordiadicotoma*- Mookuchalimaram
18. *Cretevaadansonii*-Mavalingum


MEMBER SECRETARY
SEIAA-TN


19. *Dilleniaindica*– Uva, Uzha
20. *Dilleniapentagyna*– SiruUva, Sitruzha
21. *Diospyrosebenum*- Karungali
22. *Diospyroschloroxylon*– Vaganai
23. *Ficusamplissima*– Kalltchi
24. *Hibiscus tiliaceous*–Aatrupoovarasu
25. *Hardwickiabinata*– Aacha
26. *Holopteliaintegrifolia*-Aayili
27. *Lanneacoromandelica* - Odhiam
28. *Lagerstroemia speciosa* - Poo Marudhu
29. *Lepisanthustetraphylla*- Neikottaimaram
30. *Limoniaacidissima* - Vila maram
31. *Litseaglutinosa*–Pisinpattai
32. *Madhucalongifolia* - Illuppai
33. *Manilkarahexandra*–UlakkaiPaalai
34. *Mimusopselengi* - Magizhamaram
35. *Mitragynaparvifolia* - Kadambu
36. *Morindapubescens*–Nuna
37. *Morindacitrifolia*– VellaiNuna
38. *Phoenix sylvestre*-Eachai
39. *Pongamiapinnata*–Pungam
40. *Premnamollissima*– Munnai
41. *Premnaserratifolia*– Narumunnai
42. *Premnatomentosa*-PurangaiNaari, PudangaNaari
43. *Prosopiscinerea* - Vannimaram
44. *Pterocarpusmarsupium* - Vengai
45. *Pterospermumcanescens*–Vennangu, Tada
46. *Pterospermumxylocarpum* - Polavu
47. *Puthranjivaroxburghii*–Puthranjivi
48. *Salvadorapersica*– Ugaamaram
49. *Sapindusemarginatus*- Manipungan, Soapukai
50. *Saracaasoca* - Asoca
51. *Streblusasper*- Pirayamaram
52. *Strychnosnuxvomica*–Yetti
53. *Strychnopotatorum* - TherthangKottai
54. *Syzygiumcumini* - Naval
55. *Terminaliabellerica*- Thandri
56. *Terminalia arjuna*- Venmarudhu
57. *Toona ciliate* – Sandhanavembu
58. *Thespesiapopulnea*- Puvarasu
59. *Walsuratrifoliata*–valsura


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60. Wrightiatinctoria- Vep**Discussion by SEIAA and the Remarks:-**

The proposal was placed in the 529th Authority meeting held on 06.07.2022. 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 for a mining period of 5 years subject to the ToR as recommended by SEAC & standard ToR in addition to the following ToR:

1. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
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 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.


MEMBER SECRETARY
SEIAA-TN


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


MEMBER SECRETARY
SEIAA-TN

20. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
21. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.
22. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.
23. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.
24. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
25. **No objection certificate from the Competent Authority for impact of mining on the River Kudakanaaru shall be furnished along with EC application.**

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


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SEIAA-TN

features of the study area (core and buffer zone).

- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be 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



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

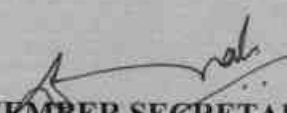

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SEIAA-TN

also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

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



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SEIAA-TN

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



MEMBER SECRETARY
SEIAA-TN

greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 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.


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SEIAA-TN

- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.
 - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
 - h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I 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


MEMBER SECRETARY
SEIAA-TN

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 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.



MEMBER SECRETARY
SEIAA-TN

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.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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


MEMBER SECRETARY
SEIAA-TN

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J-11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.
- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
 - The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
 - The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.


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Copy to:

1. The Additional Chief Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9


MEMBER SECRETARY
SEIAA-TN

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



ANNEXURE II- COPY OF PRECISE AREA COMMUNICATION LETTER

அனுப்புநர்

செ.பூர்ணவேல், எம்.எஸ்.சி.,
உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
திண்டுக்கல்

பெறுநர்

திரு.எம்.கே.குங்குமராஜ்,
த/பெ.எம்.குமரேசன்,
எண்.32, எம்.ஜி.ஆர்.நகர்,
சின்ன ஆண்டான் கோவில் தெரு,
கரூர் - 639 001

ந.க.எண்.23/2022 (கனிமம்), நாள்: .03.2022

பொருள்: கனிமங்களும் சுரங்கங்களும் - சிறுவகைக் கனிமம் - திண்டுக்கல் மாவட்டம் - திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் 3.00.0 ஹெக்டேர் பரப்பில் சாதாரண கல் மற்றும் கிராவல் குவாரி செய்ய அனுமதி கோரி திரு.எம்.கே.குங்குமராஜ் என்பவர் விண்ணப்பித்தது - புலத்தணிக்கை மேற்கொள்ளப்பட்டது - குத்தகை உரிமம் வழங்க உகந்த புலம் (Precise Area) என தீர்மானித்து ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீட்டு ஆணையம் சான்றிதழ் சமர்ப்பிக்க கோருதல் - தொடர்பாக.

- பார்வை:
1. திரு.எம்.கே.குங்குமராஜ், த/பெ.குமரேசன், எம்.ஜி.ஆர்.நகர், கரூர் என்பவரது மனு நாள்: 12.01.2022
 2. இவ்வலுவலக இதே எண்ணிட்ட கடிதம் நாள்: 12.01.2022 (பழனி வருவாய் கோட்டாட்சியருக்கு முகவரியிடப்பட்டது)
 3. பழனி வருவாய் கோட்டாட்சியர் கடித ந.க.எண். 731/2022/அ7 நாள்: 19.02.2022
 4. உதவி புவியியலாளர் (கனிமம்) திண்டுக்கல் புலத்தணிக்கை அறிக்கை நாள்: 08.03.2022
 5. அரசாணை எண்: 79, தொழில் (எம்.எம்.சி1) துறை, நாள்: 6.4.2015
 6. அரசாணை எம்.எஸ்.எண்.169, தொழில்(எம்.எம்.சி1) துறை நாள்: 04.08.2020
 7. அரசாணை எம்.எஸ்.எண்.208, தொழில்(எம்.எம்.சி1) துறை நாள்: 21.09.2020

பார்வை 1-ல் திரு.எம்.கே.குங்குமராஜ் என்பவர் 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதி எண்.19(1)ன்படி குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் பரப்பு 3.00.0 ஹெக்டேரில் சாதாரண கல் மற்றும் கிராவல்மண் வெட்டியெடுக்க குவாரி குத்தகை அனுமதி வழங்கக் கோரி கீழ்க்கண்ட ஆவணங்களை இணைத்து விண்ணப்பித்துள்ளார்.

1. விண்ணப்பக் கட்டணம் ரூ.1500/- செலுத்தியதற்கான சலான்.
2. விண்ணப்பித்துள்ள புலம் தவிர வேறு குவாரி ஏதுமில்லை என்பதற்கும், வருமானவரி செலுத்தும் அளவிற்கு வருமானம் ஈட்டும் வருவாய்ப் பிரிவை சேர்ந்தவர் அல்ல என்பதற்கும் கனிமக் கட்டணமாக செலுத்த வேண்டிய நிலுவை ஏதுமில்லை என்பதற்கும் சான்றொப்ப அலுவலர் மூலமாக எழுதி தரப்பட்ட உறுதிமொழி ஆவணம்.
3. சிட்டா நகல், அ" பதிவேடு நகல், புல வரைபட நகல், தொகுப்பு வரைபட நகல் மற்றும் அடங்கல் நகல்.

மேற்படி விண்ணப்பத்தின் மீது பழனி வருவாய் கோட்டாட்சியரிடம் பார்வை 2-ல் காணும் கடிதத்தில் பரிந்துரை அறிக்கை கோரப்பட்டதை தொடர்ந்து பார்வை 3-ல் காணும் கடிதத்தில் பழனி வருவாய் கோட்டாட்சியர் விண்ணப்பதாரருக்கு குத்தகை உரிமம் வழங்குவது குறித்து தனது பரிந்துரை அறிக்கையினை பின்வருமாறு சமர்ப்பித்துள்ளார்.

குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2-ல் மொத்தவில்தீரணம் 3.60.0 ஹெக்டேர் நிலமானது பட்டா எண்2796-ன்படி பழனிச்சாமி மகன் சக்திவேல் என்பவர் பெயரில் தனிப்பட்டவாக தாக்கலாகியுள்ளது என்றும், மேற்படி புலங்களில் குவாரிப்பணி மேற்கொள்ள 15.12.2021 முதல் 14.12.2036 வரையில் 15வருட காலத்திற்கு குத்தகை ஒப்பந்தப்பத்திரம் ஏற்படுத்தப்பட்டு கரூர் மாவட்டம், அரவக்குறிச்சி சார்பதிவகத்தில் ஆவண எண்.4711/2021, நாள்: 15.12.2021-ன்படி பதிவு செய்யப்பட்டுள்ளது என்றும், மேற்காணும் இடம் தற்போது தரிசாகவும், ஆங்காங்கே மண்பரப்பிலிருந்து 1 அடி உயரத்திற்கு பாறை திட்டக்கள் அமையப்பெற்றுள்ளது என்றும், மேலும், உரிமம் கோரியுள்ள புலத்தில் 15 வேம்பு மரங்கள், 12 வேலாமரங்கள், 4 ஆவிமரங்கள், 12 உசிலை மரங்கள் மற்றும் 1 பலா மரமும் அமைந்துள்ளது என்றும், கல்/கிராவல் குவாரி எடுத்து பயன்படுத்திக் கொள்ள அனுமதி வழங்க கோரும் புலத்தின் வழியே ஓடை, வாய்க்கால் ஏதும் செல்லவில்லை என்றும், உரிமம் கோரும் நிலத்தினைச் சுற்றி 300 மீட்டர் சுற்றளவிற்குள் குடியிருப்புகள், அங்கீகரிக்கப்பட்ட வீட்டுமனைகள், வழிபாட்டுதலங்கள் மற்றும் புராதான சின்னங்கள் ஏதுமில்லை என்றும், உரிமம் கோரியுள்ள நிலத்தைச் சுற்றிலும் 50மீட்டர் சுற்றளவிற்குள் உயர் மற்றும் தாழ்வழுத்த மின்கம்பிகள், தந்திக்கம்பிகள், சாலை ஆகியவை ஏதும் இல்லை என்றும், உரிமம் கோரியுள்ள புலத்திற்கு அருகில் புல எண்.179 மற்றும் புல எண்.184 ஆகிவற்றில் அரசுப் புறம்போக்கு வண்டிப்பாதை செல்கிறது என்றும், உரிமம் கோரியுள்ள நிலம் பஞ்சமர் நிலமோ, ஒப்படை வழங்கப்பட்ட நிலமோ இல்லை என்றும், மனுதாரருக்கு உரிமம் வழங்குவது தொடர்பாக கிராமத்தில் அ1 அறிவிக்கை பிரசுரம் செய்யப்பட்டதில் ஆட்சேபனை ஏதும் வரப்பெறவில்லை என்றும், அனுமதி கோரும் நிலத்தின் பேரில் வழக்கு ஏதும் நிலுவையில் இல்லை என்றும், எனவே, விண்ணப்பதாரர் திரு.எம்.கே.குங்குமராஜ் என்பவருக்கு குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் பரப்பு 3.00.0 ஹெக்டேரில் கனிம விதிகளின்படி கல் மற்றும் கிராவல் குவாரிப்பணி செய்ய அனுமதி வழங்கலாம் என பழனி வருவாய் கோட்டாட்சியர் தனது அறிக்கையில் தெரிவித்துள்ளார்.

மேற்படி புலங்களை உதவி புவியியலாளர்(கனிமம்) அவர்கள் இவ்வலுவலக களப்பணியாளர்களுடன் 08.03.2022 அன்று புலத்தணிக்கை செய்து பார்வை 4-ல் கண்டுள்ளபடி அறிக்கையினை பின்வருமாறு சமர்ப்பித்துள்ளார்.

அவ்வறிக்கையில் திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் 3.00.0 ஹெக்டேர் நிலம் பட்டா எண்.2796-ன்படி பழனிச்சாமி மகன் சக்திவேல் என்பவர் பெயரில் கிராமக் கணக்குகளில் தாக்கலாகியுள்ளது என்றும், மேற்படி புலங்களில் குவாரிப்பணி மேற்கொள்ள 15.12.2021 முதல் 14.12.2036 வரையில் 15வருட காலத்திற்கு குத்தகை ஒப்பந்தப்பத்திரம் ஏற்படுத்தப்பட்டு கரூர் மாவட்டம், அரவக்குறிச்சி

சார்பதிவகத்தில் ஆவண எண்.4711/2021, நாள்: 15.12.2021-ன்படி பதிவு செய்யப்பட்டுள்ளது என்றும், மேலும் விண்ணப்ப புலமானது சமதளமாக உள்ளதாகவும் மேற்படி புலத்தில் உள்ள பாறைகள் சார்னகைட் வகையைச் சார்ந்தது என்பதை அறிய முடிவதாகவும், இவை சாதாரண கற்கள், ஐல்லி, எம்.சாண்ட் (Blue Metals) ஆகியவை தயாரிக்க உகந்த பாறைகள் என்றும், மனு செய்துள்ள புலத்தில் பாறைப்படிவங்களின் தலப்போக்கு வடக்கு-தெற்கு திசையில் அமைந்துள்ளது என்றும், மேற்படி புலத்தில் 0-1 மீ வரை மண் படிந்துள்ளது என்றும், 1-2மீ சிதைவடைந்த பாறைகள் (Weathered Rock) மற்றும் 2 மீ கீழே சார்னகைட் வகையைச் சார்ந்த பாறைகள் மெல்லிய இணைப்புகளுடன் காணப்பட்டது என்றும், விண்ணப்ப புலங்களின் வடக்குப் பகுதியில் கரூர் மாவட்ட எல்லை மற்றும் புல எண்.179-ல் வண்டிப்பாதை அமைந்துள்ளது. விண்ணப்ப புலங்களைச் சுற்றி 300 மீட்டர் சுற்றளவில் குடியிருப்புகள், வீட்டுமனைகள், வழிபாட்டுதலங்கள், புராதான சின்னங்கள் ஏதும் இல்லை என்றும், 50மீட்டர் சுற்றளவில் உயரழுத்த/தாழ்வழுத்த மின்கம்பிகள், சாலை, வண்டிப்பாதை, ஓடை எதுவும் இல்லை. மேற்படி புலத்தின் நான்குமால் எல்லை விபரம் பின்வருமாறு:

வடக்கு: புல எண். 182/1பி - பட்டா நிலம்
தெற்கு: புல எண். 179 - வண்டிப்பாதை மற்றும் கரூர் மாவட்ட எல்லை
கிழக்கு: புல எண். 184 வண்டிப்பாதை
மேற்கு: புல எண். 180 - பட்டா நிலம்

எனவே, விண்ணப்ப புலமானது ஏற்கனவே குவாரி குத்தகை உரிமம் ஏதும் வழங்கப்படாத புதிய இனம் என்பதால் அரசாணை (எம்.எஸ்) எண்.208, தொழில்(எம்.எம்.சி1) துறை நாள்: 21.09.2020-ன்படி 10 ஆண்டுகளுக்கு திரு.எம்.கே.குங்குமராஜ் என்பவருக்கு திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் 3.00.0 ஹெக்டேர் பரப்பில் 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதிகள் விதி எண்.19(1) மற்றும் 20-ன்படி சாதாரணகற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு கீழ்கண்ட நிபந்தனைகளுக்குட்பட்டு குத்தகை உரிமம் வழங்கலாம் என பரிந்துரை செய்துள்ளார்.

நிபந்தனைகள்:

1. விண்ணப்ப புலங்களின் அருகில் உள்ள பட்டா மற்றும் புறம்போக்கு நிலங்களுக்கு முறையே 7.5 மீட்டர் மற்றும் 10 மீட்டர் பாதுகாப்பு இடைவெளி விடவேண்டும்.
2. விண்ணப்ப புலங்களின் தெற்கு மற்றும் கிழக்கு பகுதியில் புல எண்.179 மற்றும் 184-ல் செல்லும் வண்டிப்பாதைக்கு 10மீட்டர் பாதுகாப்பு இடைவெளி விடவேண்டும்.
3. பொதுமக்களுக்கும் அருகிலுள்ள நிலங்களுக்கும் எவ்வித பாதிப்பும் ஏற்படுத்தக் கூடாது.
4. குவாரிப்பணி தொடங்குவதற்கு முன்பாக குவாரியினை சுற்றி முள்கம்பிவேலி (Wire Fencing) அமைத்து குவாரிப்பணி தொடங்கவேண்டும்.
5. முறைப்படியும் விஞ்ஞானப்பூர்வமாகவும் குவாரிப்பணி செய்யவேண்டும்
6. பாறைகளை தகர்க்க கைத்துளைப்பான்களை கொண்டு பாறைகளை துளையிட்டு குறைவான வெடிபொருட்கள் பயன்படுத்த வேண்டும்.
7. சான்றிதழ் பெறப்பட்ட போர்மென், வெடிப்பாளர் மற்றும் சுரங்க மேலாளர் மூலம் முறையே குவாரிப்பணி செய்யப்பட வேண்டும்.
8. குவாரிப்பணி தொடங்குவதற்கு முன் சுரங்க பாதுகாப்பு இயக்குநர், சென்னை அவர்களுக்கு தகவல் தெரிவிக்கப்பட வேண்டும்.

இந்நேர்வில் பார்வை 5-ல் காணும் அரசாணையில் சிறுகனிமக் குவாரிகளுக்கு 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதிகள் விதி எண்: 41-ன்படி வரைவு சுரங்கத்திட்ட அறிக்கை மற்றும் 42-ன்கீழ் குத்தகை உரிமம் வழங்கும் முன் மேற்படி குத்தகை உரிமம் கோரிய புலத்தில் குவாரிப்பணி செய்வதால் சுற்றுப்புறச் சூழலுக்கு மாசுபடுத்தல் தொடர்பாக, மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீடு ஆணையத்தின் தடையின்மைச் சான்று பெற்று குவாரி குத்தகை உரிமம் வழங்க வேண்டும் என அறிவுறுத்தப்பட்டு நடைமுறையில் செயல்படுத்த தெளிவுரை வழங்கப்பட்டுள்ளது.

1) மேற்படி அரசாணையில் பத்தி 7 மற்றும் 8-ல் குறிப்பிட்டபடி மாவட்ட ஆட்சித்தலைவர் மூலம் குத்தகை வழங்க கருதப்பட்ட பரப்பிற்கு வரைவு சுரங்கத்திட்ட அறிக்கை சமர்ப்பிக்க அறிவுறுத்திய கடிதம் குத்தகைதாரரால் பெறப்பட்ட நாளிலிருந்து மூன்று மாதத்திற்குள் சுரங்கத் திட்ட அறிக்கை தயார் செய்து மூன்று பிரதிகள் மாவட்ட அளவில் உள்ள துணை இயக்குநர்/உதவி இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை அலுவலகத்தில் சமர்ப்பிக்கப்பட வேண்டும். குத்தகைதாரர் மூலம் பெறப்பட்ட வரைவு சுரங்கத்திட்ட அறிக்கையினை துணை இயக்குநர் / உதவி இயக்குநர் புவியியல் மற்றும் சுரங்கத்துறை பார்வை 5-ல் பத்தி 7(IV)-ல் குறிப்பிட்டபடி ஆய்வு செய்து ஒப்புதல் செய்து குத்தகைதாரருக்கு வழங்கவேண்டும்.

2) குத்தகைதாரர் ஏற்பளிக்கப்பட்ட வரைவு சுரங்கத்திட்ட அறிக்கை பெறப்பட்டவுடன் அத்துடன் கீழ்க்கண்ட ஆவணங்களை இணைத்து மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீடு ஆணைய அலுவலகத்திற்கு விண்ணப்பித்து தடையின்மைச் சான்று பெற்று சமர்ப்பிக்க வேண்டும்.

அ) படிவம்-I(Environment Impact Assessment Authority Notification 2006)

ஆ) An Environment impact Assessment Report

இ) An Approved Mining Plan, by the Competent Authority

3) ஏற்பளிக்கப்பட்ட சுரங்கத்திட்டம் மற்றும் மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீடு ஆணையத்தின் தடையில்லாச் சான்று பெற்ற பின்னர் அதனடிப்படையில் 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதி எண்.19(1) -ன்படி திண்டுக்கல் புவியியல் மற்றும் சுரங்கத்துறை உதவி இயக்குநரால் மனுதாரருக்கு குத்தகை உரிமம் வழங்குவது குறித்து இறுதி ஆணை பிறப்பிக்க முடிவு எடுக்கப்பட வேண்டும்.

பார்வை 6-ல் காணும் அரசாணையின்படி 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதிகள் விதி எண்.19(1)-ன்படி பட்டா நிலங்களில் உள்ள சிறுகனிமங்களை வெட்டியெடுத்துச் செல்ல குத்தகை உரிமம் வழங்கி ஆணையிடுவதற்கு சம்மந்தப்பட்ட உதவி இயக்குநர்/ துணை இயக்குநர் புவியியல் மற்றும் சுரங்கத்துறை அவர்களுக்கு அதிகாரம் வழங்கி ஆணையிடப்பட்டுள்ளது.

அ) எனவே, பழனி வருவாய் கோட்டாட்சியர் மற்றும் திண்டுக்கல் மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர் ஆகியோரின் பரிந்துரை அறிக்கையின்படி திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூரணம் கிராமம், புல எண்.182/2 (பகுதி) பரப்பு 3.00.0 ஹெக்டேரில் திரு.எம்.கே.குங்குமராஜ் என்பவருக்கு 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதி 19(1) மற்றும் 20-ன்படியும், பார்வை 7-ல் காணும் அரசாணை எம்.எஸ்.எண்.208, தொழில்(எம்.எம்.சி1) துறை நாள்: 21.09.2020-ன்படியும் பத்து ஆண்டுகளுக்கு உடைகல், ஜல்லி மற்றும் கிராவல் குவாரி செய்ய கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு குத்தகை உரிமம் வழங்க உகந்த புலம் (Precise Area Communication) என கருதப்படுகிறது.

நிபந்தனைகள்:-

1. விண்ணப்ப புலங்களின் அருகில் உள்ள பட்டா மற்றும் புறம்போக்கு நிலங்களுக்கு முறையே 7.5 மீட்டர் மற்றும் 10 மீட்டர் பாதுகாப்பு இடைவெளி விடவேண்டும்.
2. விண்ணப்ப புலங்களின் தெற்கு மற்றும் கிழக்கு பகுதியில் புல எண்.179 மற்றும் 184-ல் செல்லும் வண்டிப்பாதைக்கு 10 மீட்டர் பாதுகாப்பு இடைவெளி விடவேண்டும்.
3. பொதுமக்களுக்கும் அருகிலுள்ள நிலங்களுக்கும் எவ்வித பாதிப்பும் ஏற்படுத்தக் கூடாது.
4. குவாரிப்பணி தொடங்குவதற்கு முன்பாக குவாரியினை சுற்றி முள்கம்பிவேலி (Wire Fencing) அமைத்து குவாரிப்பணி தொடங்கவேண்டும்.
5. முறைப்படியும் விஞ்ஞானப்பூர்வமாகவும் குவாரிப்பணி செய்யவேண்டும்
6. பாறைகளை தகர்க்க கைத்துளைப்பான்களை கொண்டு பாறைகளை துளையிட்டு குறைவான வெடிபொருட்கள் பயன்படுத்த வேண்டும்.
7. சான்றிதழ் பெறப்பட்ட போர்மென், வெடிப்பாளர் மற்றும் சுரங்க மேலாளர் மூலம் முறையே குவாரிப்பணி செய்யப்பட வேண்டும்.
8. குவாரிப்பணி தொடங்குவதற்கு முன் சுரங்க பாதுகாப்பு இயக்குநர், சென்னை அவர்களுக்கு தகவல் தெரிவிக்கப்பட வேண்டும்.
9. 1959 ஆம் வருடத்திய தமிழ்நாடு சிறுகனிமச் சலுகை விதிகள் விதி எண். 36(1)-க்குட்பட்ட அனைத்து விதிகளும் பொருந்தும்.
10. மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீடு ஆணையத்தின் வழிமுறைகள் படி சுரங்கத்திட்டம் சமர்ப்பிக்கப்பட வேண்டும்.
11. மாநில அளவிலான சுற்றுப்புறச் சூழல் தாக்க மதிப்பீடு ஆணையத்திடமிருந்து தடையில்லா சான்று பெற்று சமர்ப்பிக்கப்பட வேண்டும்.

மேலும் மேற்குறிப்பிட்ட விண்ணப்ப புலத்திற்கு வரைவு சுரங்கத்திட்ட அறிக்கையை இக்கடிதம் கிடைக்கப்பெற்ற நாளிலிருந்து மூன்று மாத காலத்திற்குள் தவறாது தாக்கல் செய்யப்படவேண்டும் மற்றும் ஏற்பளிக்கப்பட்ட வரைவு திட்ட அறிக்கை கிடைக்கப்பெற்ற பின்னர் மாநில அளவிலான சுற்றுப்புறச் சூழல் செயல் விழைவு மதிப்பீடு தடையில்லாச் சான்று பெற்று உரிய காலத்திற்குள் சமர்ப்பிக்க குத்தகைதாரர் கேட்டுக் கொள்ளப்படுகிறார். தவறும்பட்சத்தில் உரிய விதிகளின்படி இறுதி முடிவு எடுக்கப்படும்.

e. P. 11/12/20
உதவி இயக்குநர்,
புவியியல் மற்றும் சுரங்கத்துறை,
திண்டுக்கல்

நகல்:-

இயக்குநர், புவியியல் மற்றும் சுரங்கத்துறை, கிண்டி, சென்னை - 32.

ANNEXURE III- CONSENT LETTER



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.100-

P. சத்தியேன்
பண்ணுகாரன்புதூர்.
15.12.2021

CF 125507

R. RAMASAMY,
STAMP VENDOR
L.No:3861/83
D.M.COURT.KARUR.

குத்தகை ஒப்பந்த பத்திரம்

வருடம் 1 (ஒன்று)-க்கு குத்தகை ரூ.1,00,000/- வதம் 15

வருடங்கள் (15.12.2021 (முதல் வரை 14.12.2036)

2021-ம் வருடம், டிசம்பர் மாதம், 15-ம் தேதி,

கருர் மாவட்டம், கருர் வட்டம், தோரணக்கல்பட்டி கிராமம், கக்காலியூர் அஞ்சல், பண்ணுகாரன்புதூர், கதவு எண்.23 என்ற முகவரியில் வசிக்கும் லேட்.P.பழனிச்சாமி அவர்களின் குமாரர் திரு.P.சத்தியேன் (ஆதார அடையாள அட்டை எண்.5151 8610 5043, தொடர்பு எண்.98435-22422)-1,

1. P. Sathyan
2. P. Sathyan

1. புத்தகம் 2021 வருடத்தின் 11-ம் ஆவணம்
2. தள்ளுதலைக் கொண்டது
பதிவு தரார் பதிவு தரார்

42



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.100—

CF 125508



P. சக்தேவன்
பணக்குகாணியார்.

15.12.2021
-2-

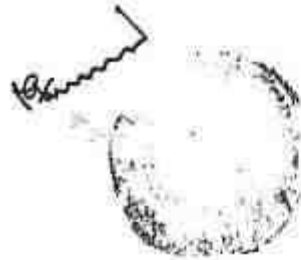
R. RAMASAMY,
STAMP VENDOR
L.No:3881/83
D.M.COURT,KARUR.

கரூர் மாவட்டம், கரூர் வட்டம், சின்ன ஆண்டாங்கோவில் வீதி, M.G.R. நகர், கதவு எண்.32 என்ற முகவரியில் வசிக்கும் திரு.M.குமரேசன் அவர்கள் குமாரர் திரு.M.K.குங்குமராஜ் (ஆதார் அடையாள அட்டை எண்.5857 9921 2349, தொடர்பு எண்.94896-82473)-2 ஆகிய நாங்கள் இருவரும் சேர்ந்து மனப்பூர்வமான சம்மதத்துடன் எழுதிக் கொண்ட குத்தகைப் ஒப்பந்த பத்திரம் என்னவென்றால்,

கீழ்க்கண்ட சொத்தானது நம்மில் 1-ஆவது நபருக்கு கடந்த 25.08.2021-ம் தேதிய கிரையப் பத்திரப்படி (பத்திர எண். 1-புத்தகம், 2942/2021, சா.ப.அ. அரவக்குறிச்சி) பாத்தியப்பட்டும், நம்மில் 1-ஆவது நபரின் பெயரில் பட்டா (தனிப் பட்டா எண்.2796) ஏற்பட்டும், நம்மில்

1. P. Sakthivel

2.



புத்தகம் 2021-ம் வருடத்தி் 1711ம் ஆவணம்
நாங்கள் கொண்டது
வது நாள்
பதிவு அலுவலர்

244



TP/1081/10767/2021

தமிழ்நாடு தமில்நாடு TAMILNADU ரூ 100 -

P. சந்திரன்
பன்னாட்டுக் கல்விப்பள்ளி
15-12-2021

CF 125509
R. RAMASAMY,
STAMP VENDOR
L.No:3861/83
D.M.COURT,KARUR.

-3-

1-ஆவது நபர் சர்வ சுதந்திர பாத்தியங்களுடன் ஆண்டலுபவித்து வருகிற சொந்தில், இதனடியில் கண்ட சொத்தை குத்தகைக்கு கொடுப்பதாக பேசி நாளது தேதி முதல் வருடம் 1 (ஒன்று)-க்கு ரூ.1,00,000/- (ஒரு இலட்சம்) வதம் 15.12.2021-ஆம் தேதி முதல் 14.12.2036 தேதிவரை 15 (பதினானந்து) வருட கெடுவிற்கு நம்மில் 1-ஆவது நபரிடமிருந்து, நம்மில் 2-ஆவது நபர் குத்தகைக்கு பேசி அதற்கு நம்மில் 1-ஆவது நபரும் சம்மதித்து முதல் வருட குத்தகை தொகையான ரூ.1,00,000/-த்தை (ஒரு இலட்சம்) நாளது தேதியில் நம்மில் 2-வது நபரின் வங்கிக்

1. P. S. K. S. S.
2. P. S. K. S. S.

முத்தலம் 2021 மார்ச்சு 17 ம ஆவணம்
12 நாட்கள் காலம் காலம்
3. வரி 1000
பதிவு ஆணை



446

TP/108110767/2021



தமிழ்நாடு தமில்நாடு TAMILNADU ரூ.100-

CF 125510

P. சக்திவேள்
புள்குடி காரூர் புள்குடி
15.12.2021
-4-

R. RAMASAMY,
STAMP VENDOR
L.No:3881/83
D.M.COURT,KARUR.

காரூரில் இருந்து (City Union Bank Ltd., Karur Branch, A/C. No:510909010117866) நம்மில் 1-வது நபரின் வங்கிக் கணக்கிற்கு (A/C. No:1227101025634, Canara Bank, Karur Branch) இன்றைய (15.12.2021) தேதியில் IMPS (Reference No.151221402369347) செய்த வகையில் செல்லானதால், இன்று முதல் வருகின்ற பதினைந்து வருடங்களுக்கு இதனடியில் கண்ட சொத்தை 2-ஆவது நபர் தான் வேண்டும் கனிமங்களான (Rough Stone) கருங்கல், உடைகல், கரணைக்கல் மற்றும் கல் தூண் வெட்டி எடுக்கும் தொழில் செய்து ஆண்டனுபவித்து வரவேண்டியதென்றும், கெடுக்காலத்தில் ஒவ்வொரு வருட குத்தகை தொகையான ரூ.1,00,000/- (ஒரு இலட்சம்)-த்தை 2-ஆவது நபர், 1-ஆவது நபருக்கு ரொக்கம் செலுத்தி அந்தந்த வருட முதல்

1. P. Saktivel

2. Ramasamy

முதல் 2021...
12...
4...

42

TP/108/0767/2021



தமிழ்நாடு தமிழ்நாடு TAMILNADU 100 -

CF 125511



P. சந்திரன்
பண்ணக்காரன் யார்.
15.12.2021

R. RAMASAMY
STAMP VENDOR
L.No:3861/83
D.M.COURT.KARUR.

-5-

தேதியில் ரசீது பெற்றுக் கொள்ள வேண்டியதென்றும், 1-ஆவது நபர் இதனிடையில் கண்ட சாட்சிகள் முன்னிலையில் முதல் வருட குத்தகை தொகையை IMPS மூலம் பெற்றுக் கொண்டபடியால், நானது தேதியில் 2-ஆவது நபர் வசம் சொத்தை கவர்தீனம் செய்து கொடுத்து, 2-ஆவது நபரும் கவர்தீனம் அடைந்து கொண்டபடியால், நானது தேதி முதல் பதினானந்து (15) வருடக் கெடுவிற்கு இதனிடையில் கண்ட சொத்தை நம்மில் 2-ஆவது நபர் தான் வேண்டும் கனிமங்களான (Rough Stone) கருங்கல், உடைகல், கரணைக்கல் மற்றும் கல் தூண் வெட்டி எடுக்கும் தொழில்

1. P. S. H. S. V.
2. Ramana

புத்தகம் 2021... கட்டு ஆவணம்
12...
S...
ஆவணம்



TP/108/0767/2021

-6-

செய்து கொள்ள வேண்டியது என்றும், அதாவது வருகிற 14.12.2021 தேதிவரை அனுபவித்து வந்து, மேற்படி பதினைந்து வருடக் கெடு முடிந்தவுடன் கீழ்க்கண்ட சொத்தின் சுவாதினத்தை நம்மில் 1-ஆவது நபர் வசம் ஒப்படைத்துவிட வேண்டியதென்றும் மற்றும் அரசு வழங்கும் மானியங்களை நம்மில் 2-ஆவது நபரே பெற்றுக் கொள்ள வேண்டியதென்றும், நம்மில் 2-ஆவது நபரின் பெயரிலோ அல்லது அவரது ஸ்தாபனத்தின் பெயரிலோ உரிமம் பெற இந்த ஆவணத்தை அனைத்து துறைகளிலும் சமர்ப்பித்து உரிய உரிமம் பெற நம்மில் 1-ஆவது நபருக்கு ஆட்சேபனை ஏதும் இல்லை என்றும், நில வரியை நம்மில் 1-ஆவது நபரின் பெயரில் நம்மில் 2-ஆவது நபரே செலுத்திக் கொள்ள வேண்டியது, மேற்படி குத்தகைக்கு விடப்பட்டுள்ள ஏக்.7, செ.41 உள்ள நிலத்திற்கு, திருக்கூர்ணம் - பண்ணப்பட்டி செல்லும் தென்வடல் தார் ரோடு வழியாகவும், மேற்படி சர்வே 182/2 நெம்பருக்கு தென்புரம் உள்ள கிழமேல் எல்லைப் பாதையின் வழியாகவும் நம்மில் 2-ஆவது நபரும், அவரிடம் பணிபுரியும் வேலை ஆட்களும், வண்டி, வாகனங்கள், கால்நடை, ஜனங்கள், அனைத்து கனரக வாகனங்கள் போகவர தடம் நடந்து கொள்ள வேண்டியதென்று, நாம் இருவரும் சேர்ந்து எழுதிக் கொண்ட குத்தகை ஒப்பந்த பத்திரம் இதுவாகும்.

மேற்படி குத்தகைக்கு விடப்பட்டுள்ள நிலத்தில் உள்ள கனிமங்களான (Rough Stone) கருங்கல், உடைகல், கரணைக்கல் மற்றும் கல் தூண் எடுப்பதற்கான உரிமம் பெற்ற காலம் முடிந்தவுடன், அரசாங்கத்திற்கு செலுத்த வேண்டிய நிலுவை தொகை (Royalty) ஏதேனும் இருந்தால், அதனை நம்மில் 2-ஆவது நபரே கொடுக்க கடமைப்பட்டவர் ஆவார்.

1. P. H. H. H.

2.

புத்தகம் 204 வகுத்திய 4711 ஆவணம்
12-தாரிகளைக் கொண்டது
...வந்து தான்
பதிவு அலுவலர்

TP/10/10767/2021

-7-

சொத்து விபரம்

கரூர் பதிவு மாவட்டம், அரவக்குறிச்சி சார்-பதிவுகம், திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராமம், க.அ.சர்வே.182/2 நெ.பு.ஹெக்.3.60.0-க்கு ஏக்.8.89-1/2 செண்ட் இதில், ஹெக்.3.00.00 ஏர்ஸ்க்கு ஏக்.7.41 செண்ட் இந்தளவுள்ள புஞ்சை பூமிக்கு நான்கெல்லை விபரம்:-

கிழமேல் கிராம எல்லைப் பாதைக்கும் - வடக்கு,

சர்வே.180 நெம்பர் பூமிக்கும் - கிழக்கு,

சர்வே.182/1B நெம்பர் பூமிக்கும் - தெற்கு,

நம்மில் 1-ஆவது நபர் வசமுள்ள மீதி நிலத்திற்கும் - மேற்கு,

இதன் மத்தியில் ஏக்.7.41 செண்ட்க்கு ஹெக்.3.00.00 ஏர்ஸ இந்த விஸ்தீரணமுள்ள பூமி சகிதம். மேற்படி பூமிக்குண்டான மாமூல் வழித்தடம் மற்றும் சகல ஈஸ்மெண்ட் பாத்தியங்கள் சகிதம்.

மேற்படி சொத்தின் மதிப்பு - ரூ.8,00,000-00

1. P. Subramanian

2. M. S. S. S. S.

சாட்சிகள்:-

1. S. பாஸ்கரன், த/பெ.லேட்.R.சிவானந்தம், கதவு எண்.91/3ஏ, சுக்காலியூர், கருப்பம்பாளையம் கிராமம், மண்மங்கலம் வட்டம், கரூர் மாவட்டம்.
2. K.நல்லுசாமி, த/பெ.கந்தசாமி, கதவு எண்.2/51ஏ, செல்வ நகர் காலனி, பாகநத்தம், பாகநத்தம் கிராமம், கரூர் வட்டம், கரூர் மாவட்டம்.

ஆவண அமைப்பு:-



R.GUNASEKARAN M.A., B.L.,
Advocate, Enrol. No:MS.327/2010.
70E/11, Pon Nagar, Rayanur South,
Thanthoni Post, Karur-5.
Cell No.98942-13328

புத்தகம் 2021ம் வருடத்தில் 711ம் ஆவணம்
12. தாக்கனைக் கொண்டு
7. வலு தள் பதிவு அலுவலர்





தமிழக அரசு
வருவாய்த் துறை



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

மாவட்டம் : திண்டிவகம்

வட்டம் : குளியேரப்பாளையம்

வருவாய் கிராமம் : திருக்கூடலாறு

பட்டா எண் : 2796

உரிமையாளர்கள் பெயர்

I. பழனிசாமி

மகன்

சத்தியம்

புல எண்	உட்பிரிவு	புள்ளிகள்		தரங்கள்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
182	2	3 - 60.00	7.74	--	--	--	--	2021/0103 /13/164059--- -- 11-09-2021
		3 - 60.00	7.74					

குறிப்பு 2 :



1. பதிவுகள், தகவல் / சான்றிதழ் தகவல் விவரங்கள் பின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 13/24/001/02796 /150104 என்ற குறிப்பு எண்ணை உடனடி செய்த உறுதி செய்துகொள்ளவும்.
2. இது தகவல்கள் 15-12-2021 ஆன்று 12:31:14 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. மகப்பேசி கோர்வலின் 2D barcode படிபாசர் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்.

புத்தகம் 2021-ம் வருடத்திய 6711-ம் ஆவணம்
12-தாள்களைக் கொண்டது
R. வது தாள் பதிவு சீலுவரை



56

15-Dec-

இந்திய அரசாங்கம்
Government of India



சக்திவேல் பாலசிவம்
Sakthivel Palanisamy
பிறப்பு நாள் DOB: 30/11/1979
ஆண் / MALE

5151 8610 5043
VID: 8188 6082 1208246

எனது ஆதார், எனது அடையாளம்



Union Identification Authority of India

முயல்: 50: பாலசிவம், 23, புகழ் தங்கு, திண்டிவனம், திருவாரூர் மாவட்டம், திருவாரூர், தமிழ்நாடு - 639003

Address:
SO: Palanisamy, 23, PANDUTHAKANAPUDUR, SUKKALYUR POST, THORANAKALPATTI VILLAGE, Thandivan, Karur, Tamil Nadu - 639003

5151 8610 5043
VID: 8188 6082 1208246

P. Sakthivel

இந்திய அரசாங்கம்
Government of India



கங்குமலி கி. கி
Kungumaligh M K
பிறப்பு நாள் DOB: 28/05/1979
ஆண் / MALE

5857 9921 2349
VID: 8133 2486 2178 5922

எனது ஆதார், எனது அடையாளம்


Union Identification Authority of India

முயல்: கி. கி கங்குமலி, 28, எம். ஜி. ராஜா தெரு, சிவன் ஆண்டிஸ் காலனி கிராமம், காரூ, தமிழ்நாடு - 629001

Address:
S/O M Kungumaligh, No 28 M. G. R. Nagar, Chinnai Andhi Kovi Street, Karur, Karur, Tamil Nadu - 629001

5857 9921 2349
VID: 8133 2486 2178 5922

இந்திய அரசாங்கம்
Government of India



கங்குமலி கி. கி
Kungumaligh M K
பிறப்பு நாள் DOB: 28/05/1979
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எனது ஆதார், எனது அடையாளம்

Union Identification Authority of India

முயல்: கி. கி கங்குமலி, 28, எம். ஜி. ராஜா தெரு, சிவன் ஆண்டிஸ் காலனி கிராமம், காரூ, தமிழ்நாடு - 629001

Address:
S/O M Kungumaligh, No 28 M. G. R. Nagar, Chinnai Andhi Kovi Street, Karur, Karur, Tamil Nadu - 629001

5857 9921 2349
VID: 8133 2486 2178 5922

P. Sakthivel



1. புத்தகம் 2021 ம் வருடத்திற்கு (T.I) ஆவணம்
2. தாள்களைக் கொண்டது
9. வது நாள் பதிவு ஆவணம்




 Government of India
 பி.சுவாமிநாதன்
 Baskaran Sivanandam
 பிழையாறு/DOB: 25/10/1973
 ஆண்/ MALE
 6544 9138 7856
 VID : 9138 0990 7998 2298
 எனது ஆதார, எனது அடையாளம்


 Unique Identification Authority of India
 பி.சுவாமிநாதன்
 Baskaran Sivanandam
 பிழையாறு - 626002
 Address:
 DO SIVANANDAM, 810 A, SURKALYUR,
 KARUPPAMPALAYAM, KARUPPAMPALAYAM,
 Tamil Nadu - 626002
 6544 9138 7856
 VID : 9138 0990 7998 2298

Handwritten signature

<p>  Government of India பி.சுவாமிநாதன் Nallasamy Kardasamy பிழையாறு/DOB: 19/06/1988 ஆண்/ MALE 7203 3694 8041 VID : 9142 1164 3065 1314 எனது ஆதார, எனது அடையாளம் </p>	<p>  Unique Identification Authority of India பி.சுவாமிநாதன் Nallasamy Kardasamy பிழையாறு - 626002 Address: DO Kardasamy, 251A, SELVANIGAR COLONY, Papanthalam, Karaikudi, Tamil Nadu - 626002 7203 3694 8041 VID : 9142 1164 3065 1314 </p>
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Handwritten signature

புத்தகம் 2021ம் வருடத்திற்காக ஆவணம்
 12 தாள்களைக் கொண்டது
 நிவசு தாள்
 பதிவு அலுவலர்





அரசுவக்குறிச்சிபுத்தகம்-1/471120

1993ம் ஆண்டு இந்திய முத்திரைச் சட்டம் 43வது பிரிவின் கீழ்

2021ம் ஆண்டு வரிசை எண் 1579
கருர் மாவட்டம், கருர் வட்டம், சின்ன ஆண்டாங்கோவில் வீதி, 80A நகர், கதவு எண்.22, கருர், தமிழ்நாடு இந்தியா, 609001-ல் வசிக்கும் திரு குங்குமராஜ் என்பவரிடமிருந்து ₹ 14,500/- ரூபாய் பறிதாண்டாயிரத்து மூன்று மட்டும் சீர்த ஆவணத்திற்காக இந்திய முத்திரைச் சட்டம் 43வது பிரிவின் 14 குறையையிருந்த முத்திரைச் சட்டமும் வதலிக்கப்பட்டது என நான் இதன் மூலம் சான்றளிக்கிறேன்.

சார்பதிவாளர் அரசுவக்குறிச்சி
நாள்: 15/12/2021

சார்பதிவாளர் மற்றும் இந்திய முத்திரைச் சட்டம் பிரிவு
43வது பிரிவு

2021 ஆம் ஆண்டு டிசம்பர் மாதம் 15ம் தேதி வி.ப. 000 மண்டலத்தில் அரசுவக்குறிச்சி சார்பதிவாளர் அலுவலகத்தில் நாகக்கல் செய்து கட்டணம் ₹ 19,215/- செலுத்தியவர்

இடது பெருவிரல் 		 கருதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.
எழுதிக்கொடுத்ததாக ஒப்புக் கொண்டவர் இடது பெருவிரல் 		 கருதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.
எழுதி வாங்கியதாக ஒப்புக் கொண்டவர் இடது பெருவிரல் 		 கருதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளது.

1. புத்தகம் 2021ம் வருடத்தின் 11ம் ஆவணம்
2. தாள்களைக் கொண்டது
3. வது தாள் பதிவு அலுவலர்



புதுவகை நகராட்சி நிர்வாகம்-1/4711/2021



சம்பந்தம் திருபிதவர்கள்

1.

திரு நல்லுசாமி தயெ கந்தசாமி கதவு ஈண்டிடி, செல்வ திருமணி, பட்டக்கம்
புகந்தம் கிராமம், கரூர் வட்டம், கரூர் மாவட்டம், கரூர், தமிழ்நாடு, இந்தியா, 605005

2.

திரு பாஸ்கரன் தயெ சீவாசந்தம் கதவு ஈண்டிடி, கக்கலிபுரம், கருமயப்பாளையம்
கிராமம், மன்னார்குடி வட்டம், கரூர் மாவட்டம், கரூர், தமிழ்நாடு, இந்தியா, 605005

2021 ஆம் ஆண்டு டிசம்பர் மாதம் 15ம் நாள்

தமிழ்செயல்புத்தல்வர்கள்
கூப்பதிவாளர்
புதுவகை

புதுவகை நகராட்சி நிர்வாகம்-1/4711/2021 ஈண்டிடி பதிவு செய்யப்பட்டது.

நாள் 15/12/2021
புதுவகை



தமிழ்செயல்புத்தல்வர்கள்
கூப்பதிவாளர்


S. SURIYAKUMAR
B.Sc., M.Phil (Geol), P.O.C (Mining)
Qualified Person

1. புத்தகம் 2021 ம் வருடத்திற்கும் ஆவணம்
2. தாள்களைக் கொண்டு
12 வது தாள் பதிவு செய்யுமா



ANNEXURE VI - COPY OF PATTA, ADANGAL, 'A' REGISTER

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழக அரசு

வருவாய்த் துறை

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

மாவட்டம் : திண்டுக்கல்

வட்டம் : குஜிவியம்பாளையம்

வருவாய் கிராமம் : திருக்கூரணம்

மட்டா எண் : 2796

உரிமையாளர்கள் பெயர்

1. பழனிச்சாமி		மகள்				சக்திவேல்		
புல எண்	உட்பிரிவு	புன்செய்		நன்செய்		மற்றவை		குறிப்புகள்
		பரப்பு	தீர்வை	பரப்பு	தீர்வை	பரப்பு	தீர்வை	
		ஹெக்ட - ஏர்	ரூ - ஷப	ஹெக்ட - ஏர்	ரூ - ஷப	ஹெக்ட - ஏர்	ரூ - ஷப	
182	2	3 - 60.00	7.74	--	--	--	--	2021/0103/13/164059- -- 11-09-2021
		3 - 60.00	7.74					

குறிப்பு 2 :



1. மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை நான்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 13/24/001/02796/150104 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
2. இத் தகவல்கள் 11-02-2022 அன்று 01:40:36 PM நேரத்தில் அச்சடிக்கப்பட்டது.
3. டைப்-பிசி கேமராவின் 2D barcode படிப்பதன் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்.

ANNEXURE VII - COPY OF QP



सेल रिफ्रेक्टरी कम्पनी लिमिटेड, सेलम
SAIL REFRACTORY COMPANY LTD., SALEM.
(A Govt. of India Enterprises)
(A Subsidiary of Steel Authority of India Limited)



SRCLIP&A/2017/0380 /1935

EMPLOYMENT CERTIFICATE

Employee Details :

Name : S.SURIYAKUMAR
Employee No : 100045
Grade : E-2
Designation : Asst. Manager (Geology)
Department : Mines

This is to certify that Sri. S.SURIYAKUMAR F.S.No.100045 was in the employment of this organisation from 20.03.1981 to 31.07.1992 and he has resigned & released with effect from 31.07.1992 AN.

At the time of his resignation on 31.07.1992, he was employed as Assistant Manager in the capacity of II class Mines Manager.

13/09/18
S.SRIDHARAN

Asst. General Manager (Prsi & Admn)

Post Box No. 565 Salem - 636 005. Phone : +91427-2341403/4/5/6 Fax : +91427-2341407
पोस्ट बॉक्स नं. : 565, सेलम - 636 005. फोन : +91427-2341403/4/5/6 फैक्स : +91427-2341407
E-mail : srclsalem@gmail.com CIN No. : U14200TZ2011GO1017357

54

002646



University of Madras

FACULTY OF SCIENCE

The Senate of the *University of Madras* hereby makes known that..... *S. Suriyakumar*..... has been admitted to the Degree of Master of Science, he having been duly certified to be qualified to receive the same, and awarded an Overall Grade..... *D*..... at the Examination held in the month of..... *May*..... 1979..... in Branch *VII A - Special Geology* Given under the seal of the University, at Madras this..... *28*th..... day of *September*..... 1979.....

[Signature]
Registrar



[Signature]
D. Sc. Engg., D. Engg., F.I.E.E. (Lond.),
F.L.Hoo. E. (Lond.), F.I.E. (Ind.),
Vice-Chancellor



155

UNIVERSITY OF MADRAS

FACULTY OF SCIENCE

The Senate of the *University of Madras* hereby
makes known that *E. Srinivakumar*
has been admitted to the Degree of Master of Philosophy
in *Geology* , he having been certified by duly
appointed Examiners to be qualified to receive the same, and
having been by them placed in the *First* Class
at the Examinations held on *September 1986*

Given under the seal of the University.

James H. ...

21, 1988

P. ...
Registrar

A. ...
F.N.A., F.N.A.So.,
Vice-Chancellor

Government of India
Ministry of Labour
DIRECTORATE-GENERAL OF MINES SAFETY



No. Exam/ENGR-I/Field/Metal/R/113/90 / Dated, Dhanbad, the

To

Shri S. Suriya Kumar,
Assistant Manager,
Hangnesite Mines, Barn Standard Co, Ltd.,
SALEM-636005, TAMIL NADU.

MEMORANDUM

Ref:-his application dated, 18-7-90

By virtue of Govt. Notification
No.S.O.712(B) dated 13.12.1974 Shri S. Suriyakumar
son of Shri A. Jamban has become
eligible to work in a capacity requiring the possession
of First Class Manager's certificate,
restricted to mines having opencast workings only, under
the Metalliferous Mines Regulations, 1961 with effect
from 19th March, 1991 till the above notification
remain in force.

Encl:-

Secretary,
Board of Mining Examinations &
Director of Mines Safety (Gen)



57



தமிழ்நாடு தமில்நாடு TAMILNADU 01.04.2022 50

BB 743347

M.K. Kungumarajh
Karur

மா. இளங்கோவன்
மு.தா.னி
L.No: 9/2011
கனூர் - 639 004.

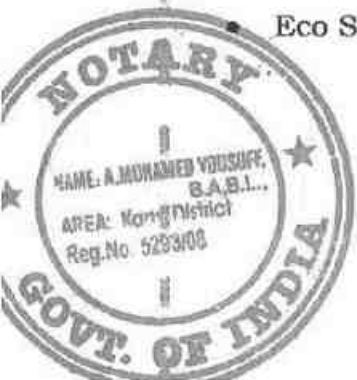
AFFIDAVIT TO SEIAA, TAMIL NADU

I, **Thiru. M. K. Kungumarajh S/o. Thiru. M. Kumaresan**, aged about 42 years, having registered office at No.32, M.G.R Nagar, Chinna Andan Kovil Street, Karur District, TamilNadu state do hereby solemnly declare and sincerely affirm that,

I have applied for getting environmental clearance to SEIAA Tamil Nadu for quarry lease for Rough stone & Gravel, over an extent of S.F.No: 182/2 (P), Consent Patta land, over an extent of 3.00.0 Hectares, Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, TamilNadu.

1. I swear to state that within 10kms radius of the mines which I have applied for environmental clearance, none of the followings are situated as per the General Conditions of EIA Notification, 2006.

- Protected areas notified under the Wildlife (Protection) Act, 1972
- Critically polluted area as identified by CPCB constituted under Water (Prevention and Control of Pollution) Act, 1974
- Eco Sensitive areas identified by the Forest Dept/State Govt



A. Muhamed Yousuff, B.A., B.L.,
ADVOCATE & NOTARY PUBLIC,
ENRoll No: 1212/92,
Notary Reg No: 5293/2008,
No:77, Covai Road, Near Canara Bank,
KARUR - 639 002. T.N.
Cell: 94433 38397

- Interstate boundaries are located at 7. 8 kms and there is no International boundaries within 10Km Radius from the proposed site.
2. I will complete the following Corporate Environment Responsibility (CER) activities before commencement of the quarrying activities in addition to CSR and EMP.

CER Activity	Project Cost (Rs. In Lakh)	CER Cost 2% of Project Cost (Rs in Lakh)
Developing Library Facilities to Government High school, Thirukooranam Village.	19 lakh	0.38
Total Cost Allocation	19 lakh	0.38Lakh

3. There are Quarries located within 500m radius from the periphery of our quarry.

i. Existing Quarries

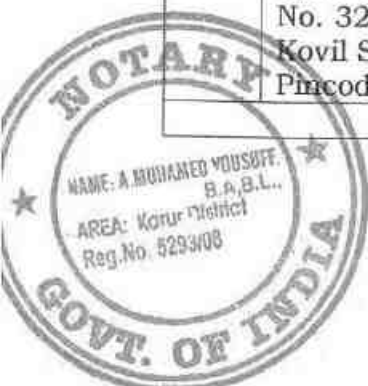
S. No	Name of the owner	Village & S.F.No	Extent (In Ha.)	Lease Period
DINDIGUL DISTRICT				
---NIL---				
KARUR DISTRICT				
1.	Thiru.D.Sivajeeganesan, S/o. Duraisamy, No.53F, Periyakadai Street, Aravakurichi Taluk, Karur District.	27/2, 28	1.39.5ha 2.01.5ha 3.41.0Ha	07.02.2018 To 06.02.2023
2.	Thiru.R.K.Pannerselvam, S/o.R.P.Kaliappan, No.163, Rengapalayam, Punnamchathiram, Punnam, Aravakurichi Taluk, Karur	2/4B, 3/3(P), 3/4	0.70.0 0.45.32 0.43.00 1.58.32	13.03.2020 To 12.03.2025
Total Extent			4.99.32Ha	---

ii. Abandoned or Expired Quarries

S.No	Name of the owner	Village & S.F.No	Extent (In Ha.)	Lease Period
DINDIGUL DISTRICT				
----NIL---				
KARUR DISTRICT				
1	K.Palanisamy, S/o. Sri Krishnasamy Gounder, Uthukkaraipatti, Paganatham Village, Karur.	2/3 2/4A	0.20.0 0.95.0 1.15.0Ha	09.08.2016 To 08.08.2021

iii. Present Proposed Quarries

S. No	Name of the owner	Village & S.F. No	Extent (In Ha.)	Lease status
1.	Thiru.M.K.KUNGUMARAJH S/o. Thiru. M.Kumaresan, No. 32, M.G.R. Nagar, Chinna Andan Kovil Street, Karur District, Tamil Nadu, Pincode-639 301,	Thirukooranam Village & 182/2(P)	3.00.0	Applied Area
Total Extent			3.00.0Ha	



A. MUHAMED YOUSUFF, B.A., B.L.,
ADVOCATE & NOTARY PUBLIC,
ENRoll No: 1212/92,
Notary Reg No: 5293/2008,
No:77, Coval Road, Near Canara Bank,
KARUR - 639 002. T.N.
Cell: 94433 38397

iv. Future Proposed Quarries

S. No	Name of the owner	Village & S.F. No	Extent (In Ha.)	Lease status
---NIL---				

4. There will not be any hindrance or disturbance to the people living on enroute / nearby my quarry site while transporting the mined out materials and due to quarrying activities.
5. There are no habitations / villages located within 300 meters radius from the periphery of my quarry.
6. I swear that afforestation will be carried out during the course of quarrying operation and maintained.
7. The required insurance will be taken in the name of the labourers working in my proposed quarry.
8. The existing road from the main road to the quarry is in good condition and the same will be maintained and utilized for transportation of rough stone.
9. I will not engaging any child labour at my mines and I aware that engaging child labour is punishable under the Law.
10. All types of safety/protective equipments will be provided to all the laborers working in my quarry.
11. No permanent structures, temples etc are located within 500 m from the periphery of my quarry.
12. The quarrying activity has not yet commenced and it will be carried out only after obtaining environmental clearance.


Deponent


(M.K.KUNGUMARAJH)

Solemnly and sincerely affirmed and
Signed before the Notary Public on ^{01st}
the day of April 2022

Solemnly Affirmed and Signed
Before me at Karur on 01/04/2022




A. MUHAMED YOUSUFF, B.A., B.L.,
ADVOCATE & NOTARY PUBLIC,
ENROLL No: 1212/92,
Notary Reg No: 5293/2008,
No: 77, Covai Road, Near Canara Bank,
KARUR - 639 002. T.N.
Cell: 94433 38397

ANNEXURE IX - COPY OF AFFIDAVIT

சான்று

திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராம நிர்வாக அலுவலர் அளிக்கும் சான்று:-

கரூர் மாவட்டம், கரூர் வட்டம், சின்ன ஆண்டாங்கோவில் ரோடு, எம்.ஜி.ஆர். நகர், கதவு எண்.32 என்ற முகவரியில் வசிக்கும் திரு.ம.குமரேசன் மகன் திரு.ம.க.குங்குமராஜ் என்பவர் திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராமத்தில் உள்ள சர்வே எண்.182/2(பகுதி)-ல் உள்ள 3.00.0 ஹெக்டேர் பரப்பு பட்டா நிலத்தில் கிராவல் மண், சாதாரண உடைகல் வெட்டி எடுக்க அரசாங்கத்திடம் இருந்து குத்தகை அனுமதி கோரியுள்ளார். மேற்படி குவாரி குத்தகை உரிமம் கோரியுள்ள நிலத்தைச் சுற்றி சுமார் 300 மீட்டருக்கு அருகில் அங்கீகரிக்கப்பட்ட வீட்டு மனைகள் மற்றும் புராதனச் சின்னங்கள் ஏதும் இல்லை எனவும், இதனால் பொதுமக்களுக்கு எவ்வித இடைஞ்சல்களோ அல்லது பாதிப்புகளோ ஏற்படாது எனவும் தெரிவித்துக் கொள்கிறேன். மேலும் அனுமதி கோரிய புலத்திற்கு வண்டிகள் சென்று வர பாதை அமைந்துள்ளது.

 24/03/2022

கிராம நிர்வாக அலுவலர்
01. திருக்கூர்ணம்
குஜிலியம்பாறை - வட்டம்
திண்டுக்கல் - மாவட்டம்

ANNEXURE X - COPY OF AD 500M RADIUS CLUSTER LETTER

From

To

S.Poornavel, M.Sc.,
Assistant Director,
Geology and Mining,
Dindigul

Thiru.M.K.Kungumarajh,
S/o.Thiru.M.Kumareshan,
No.32, M.G.R.Nagar,
Chinna Andan Kovil Street,
Karur - 639 301

Rc.No. 23/2022 (Mines), dated: 01.04.2022.

Sub: Mines and Minerals - Minor Mineral - Rough stone - Dindigul District - Gujiliamparai Taluk - Thirukooranam Village - Patta Land in S.F.No.182/2 (P) over an extent of 3.00.0 Hectare - preferred by Thiru.M.K.Kungumarajh - requesting Rough Stone quarry lease - Details of quarries located in 500m radius- requested - furnished - reg.

- Ref: 1. Thiru.M.K.Kungumarajh, S/o.Kumaresan, M.G.R.Nagar, Karur dated.24.03.2022.
2. This office letter even no dated: 24.03.2022 (addressed to the Deputy Director Geology and Mining, Karur)
3. The Deputy Director Geology and Mining, Karur letter Rc.No.101/Kanimam/2022, dated: 01.04.2022

In the reference cited, Thiru.M.K.Kungumarajh, the applicant of proposed Rough Stone quarry lease in S.F.No.182/2(P) over an extent of 3.00.0 Hectare., of Thirukooranam Village, Gujiliamparai Taluk has requested to furnish the details of quarries located within 500 meters radius from his proposed quarry.

In this regard, the followings are furnished.

i). Existing quarries

Sl. No.	Name of the Owner (Tvl.)	Village & S.F. Nos.	Extent in Hect.	Lease Period
DINDIGUL DISTRICT				
----- NIL -----				
KARUR DISTRICT				
1.	D.Sivajeeganesan, S/o.Duraisamy, No.53F, Periyakadai Street Aravakurichi Taluk, Karur	27/2 28	1.39.5 2.01.5 <hr/> 3.41.0	07.02.2018 to 06.02.2023
2.	R.K.Pannerselvam, S/o.R.P.Kaliappan, 163, Rengapalayam, Punnamchathiram, Punnam, Aravakurichi Taluk, Karur	2/4B, 3/3(P), 3/4	0.70.00 0.45.32 0.43.00 <hr/> 1.58.32	13.03.2020 to 12.03.2025

ii). Expired/Abandoned quarries

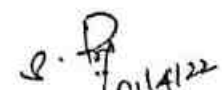
Sl. No.	Name of the Owner (Tvl.)	Village & S.F. Nos.	Extent in Hect.	Lease Period
DINDIGUL DISTRICT				
----- NIL -----				
KARUR DISTRICT				
1.	K.Palanisamy, S/o.Sri.Krishnasamy Gounder, Uthukkaraipatti, Paganatham Village, Karur	2/3 2/4A	0.20.0 0.95.0 1.15.0	09.08.2016 to 08.08.2021

iii). Present Proposed quarries

Sl. No	Name of the Owner (Tvl)	Village & S.F. Nos.	Extent in Hect.	Lease Period
1.	Thiru.M.K.Kungumarajh, S/o.Thiru.M.Kumareshan, No.32, M.G.R.Nagar, Chinna Andan Kovil Street, Karur - 639 301	182/2 (P)	3.00.0	applied area

iv). Future Proposed quarries

Sl. No.	Name of the Owner (Tvl.)	Village & S.F. Nos.	Extent in Hect.	Lease Period	Remarks
----- NIL -----					


 Assistant Director,
 Geology and Mining,
 Dindigul


 01/04/22

ANNEXURE XI - COPY OF DFO LETTER

ந.க.எண்.4760/2022/வ1, நாள்: 15.06.2022.

மாவட்ட வன அலுவலகம்,
திண்டுக்கல் வனக்கோட்டம்,
திண்டுக்கல்.

பொருள்:- கனிமங்களும் குவாரிகளும் - திண்டுக்கல் மாவட்டம் - குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் உள்ள 3.00 ஹெக்டேர் பரப்பில் கல்குவாரி பணி மேற்கொள்வதற்கு திரு.எம்.கே.குங்குமராஜ், சின்ன ஆண்டான் கோவில் ரோடு, கரூர் என்பவருக்கு அனுமதி வழங்க - அருகிலுள்ள காப்புக்காடுகளின் தொலைவு கோரியது - தொடர்பாக.

- பார்வை:-
- 1) மாவட்ட வன அலுவலர், திண்டுக்கல் ந.க.எண்:4760/2022/வ1 நாள்:07.06.2022.
 - 2) வனச்சரக அலுவலர், அய்யலூர் கடித நாள்:09.06.2022.
 - 3) திரு.எம்.கே.குங்குமராஜ், சின்ன ஆண்டான் கோவில் ரோடு, கரூர் மனு நாள்:06.06.2022.

பார்வையில் கண்டுள்ள திரு.எம்.கே.குங்குமராஜ், சின்ன ஆண்டான் கோவில் ரோடு, கரூர் என்பவர் கடிதத்தில், திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் உள்ள 3.00 ஹெக்டேர் பரப்பில் கல்குவாரி பணி மேற்கொள்வதற்கு மாநில அளவிலான சுற்றுச்சூழல் செயல்விளைவு மதிப்பீட்டு அதிகார அமைப்பிடம் தடையின்மை சான்று பெறுவதற்கு, குவாரி அமைய உள்ள புலத்திற்கு அருகிலுள்ள காப்புக்காட்டின் தொலைவினை வழங்குமாறு கோரப்பட்டுள்ளது.

பார்வை 1-ல் கண்டுள்ள கடிதத்தில், மேற்படி இடத்தினை களத்தணிக்கை செய்து அறிக்கை செய்ய அய்யலூர் வனச்சரக அலுவலரிடம் கேட்கப்பட்டது. அதன்படி அய்யலூர் வனச்சரக அலுவலரால் 08.06.2022-ம் தேதி களத்தணிக்கை மேற்கொள்ளப்பட்டு, பார்வை 2-ல் கண்டுள்ள கடிதத்தில் அறிக்கை சமர்ப்பிக்கப்பட்டுள்ளது.

மேற்படி வனச்சரக அலுவலரின் அறிக்கையின்படி, திண்டுக்கல் மாவட்டம், குஜிலியம்பாறை வட்டம், திருக்கூர்ணம் கிராமம், புல எண்.182/2 (பகுதி)-ல் உள்ள 3.00 ஹெக்டேர் நிலத்தின் 20.90 கி.மீ தூரத்தில் தொப்பசாமிமலை காப்புக்காடும், 10.20 கி.மீ தூரத்தில் ரெங்கமலை காப்புக்காடும் அமைந்துள்ளது. மேலும், மேற்படி நிலங்களின் 25 கி.மீ சுற்றளவில் வன உயிரின சரணாலயம், தேசிய பூங்கா, புலிகள் சரணாலயம் மற்றும் யானைகள் வழித்தடம் ஆகியவை ஏதுமில்லை என்பதை தெரிவித்துக்கொள்ளப்படுகிறது.

ஓம்/-செ.பிரபு,
மாவட்ட வன அலுவலர்,
திண்டுக்கல் கோட்டம், திண்டுக்கல்.

பெறுநர்

திரு.எம்.கே.குங்குமராஜ், த/பெ எம்.குமரேசன், 32, எம்.ஜி.ஆர் நகர், சின்ன ஆண்டான் கோவில் ரோடு, கரூர்

/உண்மை நகல்/உத்தரவுப்படி/


வரைதொழில் அலுவலருக்காக

ANNEXURE XII - COPY OF APPROVED MINING PLAN LETTER

From

S.Poornavel, M.Sc.,
Assistant Director,
Geology and Mining,
Dindigul

To

Thiru.M.K.Kungumarajh,
S/o.Thiru.M.Kumareshan,
No.32, M.G.R.Nagar,
Chinna Andan Kovil Street,
Karur - 639 301

Rc.No. 23/2022 (Mines), dated: .03.2022.

Sir,

Sub: Mines and Minerals - Minor Mineral - Rough stone - Dindigul District - Gujiliamparai Taluk - Thirukooranam Village - Patta Land in S.F.No.182/2 (P) over an extent of 3.00.0 Hectare - preferred by Thiru.M.K.Kungumarajh - Precise area communicated - Submission of Mining Plan for approval - Approved - Regarding.

- Ref: 1. Application from Thiru.M.K.Kungumarajh, S/o.Kumaresan, M.G.R.Nagar, Karur dated.12.01.2022
2. Precise Area Communication Notice Rc.No.23/2022 (Mines), dated 18.03.2022
3. Mining Plan submitted by Thiru.M.K.Kungumarajh, S/o.Kumaresan, M.G.R.Nagar, Karur dated.24.03.2022

In the reference 2nd cited, the Assistant Director of Geology and Mining Dindigul has communicated the S.F.No.182/2(P) over an extent of 3.00.0 Hect of Thirukooranam village, Gujiliamparai Taluk, as precise area to the applicant Thiru.M.Shankar for grant of quarry lease for quarrying Rough Stone and Gravel for a period of 10 years with a direction to produce an approved mining plan in respect of the precise area as per Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 by incorporating the conditions stipulated in the Assistant Director of Geology and Mining letter dated 18.03.2022.

In response to the precise area communication letter issued by the Assistant Director of Geology and Mining Dindigul vide reference 2nd cited, the applicant has submitted three copies of mining plan duly prepared by Qualified Person for approval vide reference 3rd cited.

The draft mining plan submitted in respect of the precise area communication has been examined with reference to the provisions of Rule 41 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the followings are observed.

i) All the conditions stipulated in the Assistant Director of Geology and Mining Dindigul Letter Rc.No.23/2022 (Mines) dated: 18.03.2022 have been incorporated in the mining plan.

ii) The boundary Co-ordinates (GPS readings) for the entire boundary pillars of the area have been incorporated and shown in the mining plan.

iii) The recoverable reserves estimated for the first 5 years in the mining plan for quarrying Rough Stone and Gravel to a depth of 20m below the ground level is as follows.

Details	Geological reserves in Cu.m	Mineable Reserves in Cu.m	Yearwise production in Cum
Depth persistence in Mts.	20m below ground level	20m below ground level	20m below ground level
ROM	Rough Stone + Gravel : 419040	Rough Stone : 322936 Gravel : 33360	Rough Stone : 160296 Gravel : 31958
Recovery 95%	Rough Stone + Gravel : 398088	Rough Stone: 306789 Gravel : 33360	Rough Stone: 152281 Gravel : 31958

4. In the light of the above, in exercise of the powers conferred under Rule 41 (7) of Tamil Nadu Minor Mineral Concession Rules, 1959 the mining plan in respect of Rough Stone & Gravel quarry of Thiru.M.K.Kungumarajh is approved subject to the following conditions.

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

ii) The approval of the mining plan does not in any way imply the approval of the Government it 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, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

iii) The mining Plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.

iv) 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.

Encl: 2 Copies of Approved Mining Plan.

S. P.
7/24/22
Assistant Director,
Geology and Mining,
Dindigul

Copy submitted to:

1. The Chairman, SEIAA, Tamil Nadu, 3rd Floor, Panagal Maaligai, No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.